CONTRACT DOCUMENTS
AND
SPECIFICATIONS
FOR
NEW HANOVER COUNTY SECURE LANDFILL
CELLS 2-6E PARTIAL CLOSURE PHASE 3
NEW HANOVER COUNTY, NORTH CAROLINA
COUNTY CONTRACT NO. 20-0298
BID DATE
January 12th, 2020
Prepared for
NEW HANOVER COUNTY, NORTH CAROLINA
Prepared by
SCS ENGINEERS, PC
Prepared by
SCS ENGINEERS, PC
3922 Coconut Palm Drive, Suite 102
Tampa, FL 33619
This item has been digitally signed and sealed by Ian Spurlock, P.E. on the date adjacent to the seal.
Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.
Digitally signed by Ian Spurlock
Date: 2020.01.09
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DIVISION 0

BIDDING AND CONTRACT DOCUMENTS
Section 00020

INVITATION TO BID

NEW HANOVER COUNTY
INVITATION TO SUBMIT PROPOSAL
FOR LANDFILL CELLS 2-6E PARTIAL CLOSURE PHASE 3

New Hanover County will receive sealed proposals from qualified contractors for all labor and materials to complete the work in accordance with the “Specifications and Contract Documents” for New Hanover County Secure Landfill Cells 2-6E Partial Closure Phase 3 for New Hanover County, North Carolina, for Contract #20-0298. Bid documents can be obtained at the County’s website (http://www.nhcgov.com/business-nhc/bids).

The partial closure consists of approximately 13.4 acres that will include site preparation, placement of the liner system, placement of the soil cover systems, installation of a gas collection and control system, construction of the stormwater management structures, erosion control structures, grading, seeding and sodding, and all incidentals necessary to complete the work as specified. See section 01000 and the plans for more complete details about the work. The construction period will be 210 days from the notice to proceed to substantial completion and an additional 30 days to final completion. Fill soil for the preparation of the intermediate cover, protective cover and topsoil for the landfill shall be supplied from an off-site borrow source.

CAUTION – During recent landfill excavations within the closure area, high levels of H₂S and Methane were encountered. The levels encountered at the excavation necessitated the use of a Self-Contained Breathing Apparatus and non-sparking tools. As with all landfill construction projects the Health and Safety of those performing the work is the first priority.

A MANDATORY pre-bid conference will be held on January 21, 2020 at 2:00 pm in the Environmental Management Administration Building, 3002 Highway 421 North, Wilmington, NC.

Proposals will be received until 2:00 p.m. on February 18, 2020, by New Hanover County, in the Conference room at the New Hanover County Department of Environmental Management Administration Building, 3002 HWY 421 North, Wilmington, North Carolina 28401, at which time the proposals will be publicly opened and read in accordance with the provisions of law. The deadline time shall be established by the timepiece of New Hanover County's representative. No bids will be accepted after that time.

A copy of the Specifications and Contract Documents can be reviewed at the New Hanover County Environmental Management Office, 3002 Highway 421 North, Wilmington, North Carolina 28401, between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday. Please call for appointments.

Bidders must be licensed contractors in the State of North Carolina at the time proposals are submitted. Pursuant to N.C.G.S. S87-15, it will be necessary for contractors to show evidence of such license in the bid document.

No proposal for construction or repair work may be considered or accepted by said board or governing body unless at the time of its filing the same shall be accompanied by a deposit with said board or governing body of cash, or a cashier's check, or a certified check on some bank or trust company insured by the Federal Deposit Insurance Corporation in an amount equal to not less than five percent (5%) of the proposal. In lieu of making the cash deposit as above provided, such bidder may file a bid bond executed by a corporate surety licensed under the laws of North Carolina to execute such bonds, conditioned that the surety will
upon demand forthwith make payment to the obligee upon said bond if the bidder fails to execute the contract in accordance with the bid bond. This deposit shall be retained if the successful bidder fails to execute the contract within 10 days after the award or fails to give satisfactory surety as required herein.

CONTRACTOR will be required to comply with OSHA and all federal, state and local laws, ordinances, rules and regulations that in any way affect the WORK and will be required to review/endorse the County’s CONTRACTOR Compliance Requirements in Section 01910. Bidders will be required to submit a Qualification Questionnaire located in Section 00300 as part of their bid to demonstrate qualifications to perform the WORK.

The bidder shall make good faith efforts, as defined in the bid specifications, to subcontract 10% of the dollar value of the single prime contract to businesses owned and controlled by minorities. Individuals who are rebuttably presumed to be minorities include women, Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans, and Asian-Indian Americans. Bidders are required to submit, along with the bid, information concerning minority business enterprises which will participate in the contract. The information will include: (1) name and address of each minority firm; (2) description of the work to be performed by each minority firm named; and (3) the dollar value of the work to be performed by each firm named. Bidders are required to submit along with the bid, specific documentation demonstrating that they made good faith efforts to meet established goals. A bid which fails to meet these requirements may be considered non-responsive. Contact Lena Butler at Lbutler@nhcgov.com concerning questions related to this issue.

All prime bidders on this project must be pre-qualified in accordance with New Hanover County’s Pre-qualification Ordinance, in order to bid. Bids will not be opened unless the bidder is pre-qualified. Pre-qualification applications may be obtained at the County Legal Department, 230 Government Center Drive, Suite 155, Wilmington, N.C. 28403 or by visiting the County’s website at www.nhcgov.com.

This Invitation to Bid is being used to solicit responses from suitably qualified, experienced and licensed contractors to qualify for services related to the construction of a secure landfill closure project in New Hanover County, North Carolina.

New Hanover County reserves the right to reject any and all bids. Questions will only be accepted in writing by Mr. Ian Spurlock (ispurlock@scsengineers.com) through the end of business on February 4, 2020. Response to the questions will be issued on February 11, 2020. For further information, contact Mr. Ian Spurlock, P.E., SCS Engineers, PC, at 813.804.6732.
SECTION 00100

INSTRUCTIONS TO BIDDERS

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INSTRUCTIONS TO BIDDERS

ARTICLE 1 - DEFINITIONS

Terms used in these Instructions to Bidders which are defined in the General Conditions have the meanings assigned to them in the General Conditions. Instructions or references in these documents that refer to the titles of “Stearns, Conrad, & Schmidt Consulting Engineers, Inc.”, “SCS Engineers”, or “SCS Engineers, PC” apply to each individual title as appropriate for the location of the WORK.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

2.1 Complete sets of Bidding Documents may be obtained in the manner defined in the Invitation to Bid.

2.2 Complete sets of full size Bidding Documents shall be used in preparing Bids; neither OWNER nor ENGINEER assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.3 OWNER and ENGINEER, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

ARTICLE 3 - QUALIFICATIONS OF BIDDERS

3.1 Bidders must be licensed contractors in the State of North Carolina at the time proposals are submitted.

3.2 Bidders shall have successfully completed a minimum of 10.0 acres of Subtitle C or D landfill cell construction or landfill closure projects, including the installation of liner within the last 5 years from the date of this bid advertisement. Bidders are to provide a list of references that will be contacted concerning the noted experience, quality of WORK, timeliness of completion of project(s), and efficiency of administrative processes.

3.3 To demonstrate qualifications to perform the Work, each Bidder must be prepared to submit, following receipt of written request by COUNTY, information including, but not limited to, financial data, previous experience, including additional references and evidence of authority to conduct business in the jurisdiction where the Project is located. This information must be received by COUNTY within ten days of Bidder receiving the written request. Submittals requested pursuant to this paragraph are in addition to those required elsewhere. Additionally, note that all bidders must be registered through the
New Hanover County Attorney’s Office. See the Invitation to Bid for instructions on making the necessary contact for this item.

3.4 The Bidder must include in the bid submittal documentation from the major material suppliers (liners, geocomposites, textiles, pipe, structures, etc) that the prime or sub contractor responsible for paying the supplier for the material is not in arrears on payments for purchases of materials on other projects.

ARTICLE 4 - EXAMINATION OF CONTRACT DOCUMENTS AND SITE

4.1 The Bidder, by and through the submission of his Bid, agrees that he shall be held responsible for having theretofore examined the site, the location of all proposed WORK and for having satisfied himself from his own personal knowledge and experience or professional advice as to the character, and location of the site, the nature of the ground, surface and subsurface, the water elevations, location of buried utilities and any other conditions surrounding and affecting the WORK, any obstructions, the nature of any existing construction, and all other physical characteristics of the job, in order that he may include in the prices which he bids all costs pertaining to the WORK and thereby provide for the satisfactory completion thereof, including the removal, relocation or replacement of any objects or obstructions which may be encountered in doing the proposed WORK.

4.2 Any records of contours, obstructions, and other subsurface investigations shown on the Drawings or included hereinafter, were made solely for design purposes for the WORK; and the OWNER and ENGINEER do not warrant, guarantee or represent that said data is correct with respect to actual subsurface conditions; therefore, the Bidder, by and through the submission of his Bid, affirms that he has made, or has caused to be made, his own test holes and/or other investigations of such subsurface conditions, and/or that he has otherwise satisfied himself with respect to such conditions; and, should the Bidder be awarded the Contract, he agrees that he will make no claims against the OWNER or ENGINEER if, in carrying out the WORK, he finds that the actual conditions do not conform to those indicated.

4.3 The Bidder, in preparing his Bid, shall take into consideration that WORK by other contractors may be in progress at or near the site during the performance of the WORK to which the Bid relates and that he will be expected, should he be awarded a Contract, to avoid interference with WORK done by other contractors and daily operations of landfill personnel and to coordinate his WORK with contractor’s landfill personnel at the site.

4.4 The Bidder shall examine carefully the Drawings and Specifications and other Contract Documents, and inform himself thoroughly regarding any and all conditions and requirements, including the construction schedule, that may in any manner affect the WORK to be performed under the Contract. Ignorance on the part of the Bidder will in no way relieve him of the obligations and responsibilities assumed under the Contract.
4.5 The Bidder is required to be familiar with, and shall be responsible for, complying with all federal, state, and local laws, ordinances, rules and regulations that in any manner affect the WORK.

4.6. In the case of unit price items, the quantities of WORK to be done and materials to be furnished under this Contract, given in the Bid Form, are to be considered as approximate only and are to be used solely for the comparison of Bids received. The OWNER and/or ENGINEER do not expressly or by implication represent that the actual quantities involved will correspond exactly therewith; nor shall the Bidder plead misunderstanding or deception because of such estimate or quantities or of the character, location or other conditions pertaining to the WORK. Payment to the Contractor will only be made for the actual quantities of WORK performed or material furnished in accordance with the Drawings and other Contract Documents, and it is understood that the quantities may be increased or diminished as provided in the General Conditions without in any way invalidating any of the unit or lump sum prices bid.

ARTICLE 5 - ADDENDA AND INTERPRETATIONS

5.1 Should a Bidder find discrepancies or ambiguities in, or omissions from, the Drawings or Specifications, or should he be in doubt as to their meaning, he shall at once notify the ENGINEER.

5.2 No oral interpretations will be made to any Bidder as to the meaning of the Contract Documents. Any inquiry or request for interpretation received seven (7) or more days prior to the date fixed for opening of Bids will be given consideration. All such changes or interpretations will be made in writing in the form of an addendum and, if issued, will be mailed or sent by available means to all known prospective Bidders not later than five (5) days prior to the established Bid opening date. Each prospective Bidder shall acknowledge receipt of such addenda in the space provided therefor in the Bid Form. In case any Bidder fails to acknowledge receipt of such addenda or addendum, his Bid will nevertheless be construed as though it had been received and acknowledged and the submission of his Bid will constitute acknowledgment of the receipt of same. All addenda are a part of the Contract Documents and each Bidder will be bound by such addenda, whether or not received by him. It is the responsibility of each prospective Bidder to verify that he has received all addenda issued before Bids are opened.

ARTICLE 6 - BID SECURITY

Each bid must be accompanied by a cashier’s check or Bid Bond in an amount not less than five percent (5%) of the amount of the Bid. The Bid Security of all Bidders, excepting the three (3) lowest responsible Bidders, will be returned within ten (10) days after the formal opening of Bids. The Bid Security of the three (3) lowest responsible Bidders will be returned within ten (10) days after the OWNER and the accepted Bidder have executed the written Contract and the
accepted Bidder has filed an acceptable Bond. If thirty (30) days have passed after the date of the formal opening of the Bids and no Contract has been awarded, the Bid Security of any Bidder will be returned on demand, provided that the Bidder has not been notified of the acceptance of his Bid.

ARTICLE 7 - CONTRACT TIME

The time of completion is of the essence of the Contract, and the Bidder awarded the Contract shall proceed with the Work in accordance with the Contract time period specified in the Contract Documents. In the event of failure to complete the Work within the time specified, the COUNTY may assess damages as provided by law or the Contract Documents, unless an appropriate extension of time has been granted by the COUNTY.

ARTICLE 8 - LIQUIDATED DAMAGES

Provisions for liquidated damages, if any, are set forth in the Agreement and/or Supplementary Conditions or in the contract document.

ARTICLE 9 - SUBSTITUTE MATERIAL AND EQUIPMENT

9.1 When certain items of equipment and/or materials are specified and/or described as the product of a particular manufacturer together with any required additional information such as model, number, size or catalog number, only such specific items may be used in the Base Bid except as hereinafter provided.

9.2 The Contractor must judge for himself that any proposed alternate equipment is of comparable character and quality to the specified equipment. The OWNER or the OWNER’S ENGINEER will not discuss, approve or disapprove any alternate equipment and/or materials before the proposals are opened. The cost of changes in related WORK, additional drawings which may be required to illustrate or define the alternate equipment and its relation to the other parts or portions of the Work shall be paid by the Contractor. No change will be made in the amount of time in which to complete the Work or in the liquidated damages.

ARTICLE 10 - BID FORM

10.1 The Bid Form is included in the Contract Documents.

10.2 Bid Forms must be completed in ink or by typewriter. The Bid price of each item on the form must be stated in words and numerals; in case of conflict, words will take precedence.

10.3 Bids by corporations must be executed in the corporate name by the president or a vice-president (or other corporate officer) and the corporate seal must be affixed and attested
by another corporate officer. The corporate address and State of incorporation shall be shown below the signature.

10.4 Bids by partnerships must be executed in the partnership name and signed by an authorized partner, whose title must appear under the signature.

10.5 All names and titles must be typed or printed below the signature.

10.6 The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers and dates of which shall be filled in on the Bid Form).

10.7 The address in which communications regarding the Bid are to be directed must be shown.

10.8 The Contractor must submit the names of the subcontractors and material suppliers to be used on this project for items listed on the Bid Form.

10.9 Name of Bidder shall be clearly typed, printed or stamped at the top of each page of the Bid Form.

ARTICLE 11 - PREPARATION AND SUBMISSION OF BIDS

11.1 Signature of the Bidder: The Bidder must sign the Bid Form in the space provided for the signature. If the Bidder is an individual, the words “doing business as ____________”, or “Sole OWNER” must appear beneath such signature. In the case of a partnership, the signature of at least one of the partners must follow the firm name and the words “Member of the Firm” should be written beneath such signature. If the Bidder is a corporation, the title of the officer signing the Bid Form on behalf of the corporation must be stated and evidence of his authority to sign the Bid Form must be submitted. The Bidder shall state in the Bid Form the name and address of each person interested therein.

11.2 Basis for Bidding: The price bid for each item shall be on a lump sum or unit price basis according to the form of the Bid Form. The bid prices shall remain unchanged for the duration of the Contract and no claims for cost escalation during the progress of the Work will be considered.

11.3 Price Bid: The total price bid for the Work shall be the sum of the lump sum prices bid and/or unit prices multiplied by the appropriate estimated quantities for the individual items and shall be stated in figures in the appropriate place on the Bid Form. In the event that there is a discrepancy on the Bid Form due to unit price extensions or addition, the corrected extensions and additions shall be used to determine the project bid amount.

11.4 Submission of Bids:
A. Each Bid must be submitted on the Bid Form as furnished, together with a suitable Bid Security, herein described.

B. The above Bid Form and Bid Security must be submitted in a sealed envelope which shall be marked so as to clearly indicate the following:

1. Bid Project: The Enclosed Bid is for performing/providing services for the construction of New Hanover County Landfill Cells 2-6E Partial Closure Phase 3.

2. Name of Bidder: _______________________________.

3. Bidder’s State of North Carolina Contractor’s License No. ___________.

Any Bid received without the Bid Project information, Name of Bidder, and the Bidder’s State of North Carolina Contractor’s License Number clearly marked on the outside of the envelope enclosing the Bid Form will not be opened and will not be considered for performance of this project.

If forwarded by mail, the above mentioned envelope shall be enclosed in another envelope. The envelopes shall be addressed and delivered, preferably by special delivery or registered mail, to the New Hanover County Department of Environmental Management, 3002 Highway 421 North, Wilmington, North Carolina  28401. If forwarded by other means than mail, it shall be delivered to the same address listed above. Bids will be received until the date and hour stated in the Invitation for Bid.

C. The Bidder must submit with his Bid an accompanying letter in which he shall list the names and addresses of his major subcontractors together with the services they will supply. These subcontractors will be subject to review as to their competency by the OWNER prior to award of Contract and shall be one of the considerations in determining the lowest responsible Bidder as defined hereafter. After award of Contract, no change in subcontractors shall be made unless approved by the OWNER after a request for such a change has been submitted in writing by the Contractor which shall include the reasons for such request.

D. The Bidder shall submit with his Bid Form evidence of his experience and financial status. The evidence shall include a list of projects similar in character, size and value which he has satisfactorily completed and which are now in satisfactory operation and showing the location, the OWNER’s name and address, the money value of the WORK and a brief description of each project.

ARTICLE 12 - MODIFICATION AND WITHDRAWAL OF BIDS
12.1 Any Bid may be withdrawn prior to the time scheduled in the Invitation to Bid for the opening thereof. A Bid may also be withdrawn thirty (30) days after the date of the opening of the Bids, provided that the Bidder has not been notified that his Bid has been accepted.

12.2 Written Bid modification will be accepted from Bidders if addressed to the New Hanover County office of the Director of Environmental Management, 3002 HWY 421 North, Wilmington, North Carolina 28401, and received prior to opening of formal Bids.

ARTICLE 13 - OPENING OF BIDS

13.1 Bids will be publicly opened and read aloud in the conference room at the New Hanover County office of the Director of Environmental Management, 3002 HWY 421 North, Wilmington, North Carolina 28401, at the appointed time stated in the Invitation to Bid. The officer whose duty it is to open them will decide when the specified time has arrived and no bids received thereafter will be considered. No responsibility will be attached to any officer for the premature opening of a bid not properly addressed and identified. Bidders or their authorized agents are invited to be present.

13.2 Bids will be received until the designated time and, after being opened in public will be reviewed in the private offices of the OWNER’s ENGINEER. No responsibility will be attached to any officer for the premature opening of a Bid not properly addressed and identified.

13.3 For the purpose of award, after the Bid Forms are opened and read, the correct summation of the lump sum prices and/or of the products of the estimated quantities shown in the Bid Form and the unit prices will be considered the Bid. The amounts then will be compared and the results of such comparison made available to the public. Until the final award of the Contract, the right will be reserved to reject any and all Bid Forms and to waive technical errors and irregularities as may be deemed best for the interests of the OWNER.

13.4 Bids which contain modifications are incomplete, unbalanced, conditional, obscure or which contain additions not requested or irregularities of any kind, or which do not comply in every respect with the Instructions to Bidders, and the Contract Documents, may be rejected at the option of the OWNER. The OWNER does not bind himself to accept the minimum bid stated herein, but reserves the right to accept any Bid which in the judgement of the OWNER will best serve the needs and interests of the OWNER, according to law.

13.5 One Proposal: Only one Bid Form from an individual firm, partnership or corporation under the same or under difference names will be considered. If it is believed that a
Bidder is interested in more than one Bid for the WORK involved, all Bid Forms, in which such a Bidder is interested, will be rejected.

13.6 Collusion Among Bidders: If it is believed that collusion exists among the Bidders, the Bid Forms of all participants in such collusion will be rejected, and no participants in such collusion will be considered in future Bids for the same WORK.

ARTICLE 14 - AWARD OF CONTRACT

14.1 The OWNER reserves the right to reject any or all Bids, or any part of any Bid, to waive any informality in any Bid, or to readvertise for all or part of the WORK contemplated. The OWNER reserves the right, prior to award of Contract, to delete from the scope of the project any item or any combination of items of the aggregate Bid prices which do not exceed 25 percent of the total Bid price for the project. If Bids are found to be acceptable by the OWNER, written notice will be given to the lowest responsible Bidder, according to law, of the acceptance of his Proposal and of the award of the Contract to him.

14.2 If a Bidder to whom a Contract is awarded forfeits his Bid Security and the award of the Contract is annulled, the OWNER may then award the Contract to the next lowest responsible Bidder or the WORK may be readvertised or may be constructed by day labor as the OWNER decides.

14.3 The Contract will be awarded to a lowest responsible Bidder according to law complying with the applicable conditions of the Contract Documents. In determining the lowest responsible Bidder, the following elements, in addition to those noted in the Contract Documents, will be considered: Does each Bidder involved (1), maintain a permanent place of business; (2) have adequate plant and equipment to do the WORK properly and expeditiously; (3) have suitable financial status to meet the obligations incidental to the WORK; (4) have appropriate successful contractual and technical experience in similar WORK; and further (5) what proportional amount of the WORK does each Bidder intend to perform with his own organization as compared with the portion he intends to subcontract; and (6) what are the qualifications of subcontractors whom each Bidder proposes to use? In addition, each Bidder shall produce satisfactory evidence that he and all subcontractors he proposes to use hold valid state, county and local licenses or certificates of competency covering all operations and all areas of political jurisdiction involved in the WORK of this Contract.

14.4 The ability of any Bidder to obtain a Performance Bond shall not be regarded as the sole test of such Bidder’s competence or responsibility.

14.5 The OWNER also reserves the right to reject the Proposal of a Bidder who has previously failed to perform properly or to complete Contracts of a similar nature on time.
ARTICLE 15 - BONDS AND INSURANCE

15.1 Attorneys-in-Fact who sign Bid Bonds or Contract Bonds, must file with such bonds a certified copy of their Power of Attorney to sign said Bonds.

15.2 Simultaneously with his delivery of the executed Contract to the OWNER, a Bidder to whom a Contract has been awarded must deliver to the OWNER executed Performance and Payment Bonds on the prescribed forms each in an amount of one-hundred percent (100%) of the total amount of the accepted Bid, as security for the faithful performance of his Contract and for the payment of all persons performing labor or furnishing materials in connection therewith. The Performance and Payment Bonds shall have as the surety thereon only such surety company or companies as are authorized to write bonds of such character and amount under the laws of the State of North Carolina and with a resident agent in New Hanover County, North Carolina. The Attorney-in-Fact, or other officer who signs Performance and Payment Bonds for a surety company must file with such bonds a certified copy of his Power-of-Attorney authorizing him to do so.

15.3 The Performance and Payment Bonds shall remain in force for one (1) year from the date of final acceptance of the WORK as a protection to the OWNER against losses resulting from latent defects in materials or improper performance of WORK under the Contract, which may appear or be discovered during that period.

15.4 Qualifications of Sureties:

General: The following requirements shall be met by all surety companies furnishing Bid, Performance, Payment or other type of Bonds:

A. Qualifications: As to companies being rated acceptable:

1. The Surety shall be rated as “A” or better as to General Policyholders Rating and Class X or better as to Financial Category by Best’s Key Rating Guide, published by Alfred M. Best Company, Inc., of 75 Fulton Street, New York, New York, 10038.

2. The Surety shall be listed on the U.S. Department of the Treasury, Fiscal Service, Bureau of Government Financial Operations, Circular 570, (current Revision) entitled, “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies”.

3. All Surety Companies are subject to approval and may be rejected by the OWNER without cause, in the same manner that Bids may be rejected.

B. Limitations:
1. Bonding Limits or Bonding Capacity refer to the limit or amount of Bond acceptable on any one risk.

2. The Bonding Limit of the Surety shall not exceed ten percent (10%) of the policy holder surplus (capital and surplus) as listed by the aforementioned Best’s Key Rating Guide, on any one risk (penalty or amount of any one Bond).

C. Requirements: The Agent countersigning the Bond shall be resident in the State of North Carolina.

ARTICLE 16 - SIGNING OF AGREEMENT

16.1 Failure to execute a Contract and file acceptable Bonds as provided herein within ten (10) days after a written Notice of Award has been given, shall be just cause for the annulment of the award and the forfeiture of the Bid Security to the OWNER, which forfeiture shall be considered not as a penalty, but in liquidation of damages sustained. Award may then be made to the next lowest responsible Bidder or all Bids may be rejected.

16.2 The Bidder to whom a Contract is awarded will be required to execute in two (2) counterparts the prescribed Contract and Performance and Payment Bonds within ten (10) days from the date of Notice of Acceptance of the Bidder’s Proposal, and deliver the executed Contract to the OWNER.

END OF SECTION
SECTION 00110

New Hanover County
Minority and/or Women Business Enterprise
(M/WBE) Program

Construction Guidelines and Affidavits

These instructions shall be included with each bid solicitation.
New Hanover County
Minority and/or Women Business Enterprise Program

Construction Guidelines for M/WBE Participants

Policy Statement
It is the policy of New Hanover County that minority businesses, as defined by North Carolina General Statute 143-128 have maximum opportunity to participate in the performance of contracts and subcontracts funded in whole or in part with public funds. This includes all aspects of the County’s contracting and procurement programs, including but not limited to construction projects, supplies and materials, as well as professional and personal service contracts.

Goals and Good Faith Efforts
Bidders responding to this solicitation shall comply with the M/WBE program by making Good Faith Efforts to achieve the following aspiration goals for participation.

<table>
<thead>
<tr>
<th>PROJECT</th>
<th>MBE</th>
<th>WBE</th>
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<tbody>
<tr>
<td>NEW HANOVER CELLS 2-6E PARTIAL CLOSURE PHASE 3</td>
<td>6%</td>
<td>4%</td>
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</table>

Bidders shall submit M/WBE information with their bids on the forms provided. This information will be subject to verification by the County prior to contract award. Firms qualifying as “M/WBE” for the County’s goals must be certified by the NC Department of Historically Underutilized Businesses (NCHUB). Firms qualifying as “WBE” must be designated as “women-owned business and firms qualifying as “MBE” must be certified in one of the other categories (i.e.: Black, Hispanic, Asian American, American Indian, Disabled, or Socially and Economically Disadvantaged). Those firms who are certified as both a “WBE” and “MBE” may only satisfy the “MBE” requirement. A complete database of NC HUB certified firms may be found at http://www.doa.nc.gov/hub/default.aspx. The County shall accept only firms certified by NCDOT for federally funded projects.

Please note: A contractor may utilize any firm desired; however, for participation purposes, all M/WBE vendors who wish to do business as a minority or female must be certified by NC HUB.

The Bidder shall make good faith efforts to encourage participation of M/WBEs prior to submission of bids in order to be considered as a responsive bidder. Bidders are cautioned that even though their submittal indicates they will meet the M/WBE goal, they should document their good faith efforts and be prepared to submit this information, if requested.

The M/WBE’s listed by the Contractor on the Identification of Minority/Women Business Participation which are determined by the County to be certified shall perform the work and supply the materials for which they are listed unless the Contractors receive prior authorization from the County to perform the work with other forces or to obtain materials from other sources. If a contractor is proposing to perform all elements of the work with his own forces, he must be prepared to document evidence satisfactory to the owner of similar government contracts where he has self-performed.

The Contractor shall enter into and supply copies of fully executed subcontracts with each M/WBE or supply signed Letter(s) of Intent to the Project Manager after award of contract and prior to Notice to Proceed. Any amendments to subcontracts shall be submitted to the Project Manager prior to execution.
Instructions

The Bidder shall provide with the bid the following documentation:

☐ Identification of Minority/Women Business Participation
  (if participation is zero, please mark zero—Blank forms will be considered nonresponsive)

☐ Affidavit A (if subcontracting)

OR

☐ Identification of Minority/Women Business Participation
  (if participation is zero, please mark zero—Blank forms will be considered nonresponsive)

☐ Affidavit B (if self-performing; must attest that bidder does not customarily subcontract work on this type of project—includes supplies and materials)

Within 72 hours or 3 business days after notification of being the apparent low bidder who is subcontracting anything must provide the following information:

☐ Affidavit C (if aspirational goals are met or are exceeded)

OR

☐ Affidavit D (if aspirational goals are not met)

After award of contract and prior to issuance of notice to proceed:

☐ Letter(s) of Intent or Executed Contracts

**With each pay request, the prime contractors will submit the Proof of Payment Certification, listing payments made to M/WBE subcontractors.

***If a change is needed in M/WBE Participation, submit a Request to Change M/WBE Participation Form. Good Faith Efforts to substitute with another M/WBE contractor must be demonstrated.

Minimum Compliance Requirements:

All written statements, affidavits, or intentions made by the Bidder shall become a part of the agreement between the Contractor and the County for performance of contracts. Failure to comply with any of these statements, affidavits or intentions or with the minority business guidelines shall constitute a breach of the contract. A finding by the County that any information submitted (either prior to award of the contract or during the performance of the contract) is inaccurate, false, or incomplete, shall also constitute a breach of the contract. Any such breach may result in termination of the contract in accordance with the termination provisions contained in the contract. It shall be solely at the option of the County whether to terminate the contract for breach or not. In determining whether a contractor has made Good Faith Efforts, the COUNTY will evaluate all efforts made by the Contractor and will determine compliance in regard to quantity, intensity, and results of these efforts.
NEW HANOVER COUNTY
Identification of Minority/Women Business Participation

I, ____________________________, (Name of Bidder)
do hereby certify that on this project, we will use the following minority/women business enterprises as
collection subcontractors, vendors, suppliers or providers of professional services.

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<th>Firm Name, Address and Phone #</th>
<th>Work type</th>
<th>*M/WBE Category</th>
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*M/WBE categories: Black, African American (B), Hispanic (H), Asian American (A) American Indian (I),
Female (F) Socially and Economically Disadvantaged (S) Disabled (D)

If you will not be utilizing M/WBE contractors, please certify by entering zero “0”

The total value of MBE business contracting will be ($)__________________.
The total value of WBE business contracting will be ($)__________________.
NEW HANOVER COUNTY AFFIDAVIT A – Listing of Good Faith Efforts

County of ___________________________ (Name of Bidder)

Affidavit of __________________________________________

I have made a good faith effort to comply under the following areas checked:

Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive. (1 NC Administrative Code 30 I.0101)

☐ 1 – (10 pts) Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.

☐ 2 –(10 pts) Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due.

☐ 3 – (15 pts) Broken down or combined elements of work into economically feasible units to facilitate minority participation.

☐ 4 – (10 pts) Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.

☐ 5 – (10 pts) Attended prebid meetings scheduled by the public owner.

☐ 6 – (20 pts) Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.

☐ 7 – (15 pts) Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.

☐ 8 – (25 pts) Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.

☐ 9 – (20 pts) Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.

☐ 10 - (20 pts) Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority/Women Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d) Failure to abide by this statutory provision will constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of the minority/women business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: ______________ Name of Authorized Officer: ______________________

Signature: ______________________________

Title: ______________________________

State of ______________, County of ____________________________

Subscribed and sworn to before me this _____day of ___________ 20___

Notary Public __________________________

My commission expires __________________________
NEW HANOVER COUNTY --AFFIDAVIT B-- Intent to Perform Contract with Own Workforce.

County of ________________________

Affidavit of ________________________________
(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the ________________________________ contract.

________________________
(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this project with his/her own current work forces; and

The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date: __________ Name of Authorized Officer: ________________________________

Signature: ________________________________

Title: ________________________________

State of ________________________, County of ___________________________

Subscribed and sworn to before me this ____________ day of ______ 20___

Notary Public ____________________________

My commission expires ____________________
NEW HANOVER COUNTY - AFFIDAVIT C - Portion of the Work to be Performed by M/WBE Firms

County of ____________________________
(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the portion of the work to be executed by M/WBE businesses as defined in GS143-128.2(g) and 128.4(a),(b),(e) is equal to or greater than 10% of the bidders total contract price, then the bidder must complete this affidavit. This affidavit shall be provided by the apparent lowest responsible, responsive bidder within 72 hours after notification of being low bidder.

Affidavit of ________________________________ I do hereby certify that on the
(Name of Bidder)

(Project Name)

Project ID# ____________________________ Amount of Bid: $ ____________________________

I will expend a minimum of ________% of the total dollar amount of the contract with MBE firms and a minimum of ________% of the total dollar amount of the contract with WBE firms. Minority/women businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below.

Attach additional sheets, if needed

<table>
<thead>
<tr>
<th>Name and Phone Number</th>
<th>*M/WBE Category</th>
<th>Work description</th>
<th>Dollar Value</th>
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*Minority categories: Black, African American (B), Hispanic (H), Asian American (A) American Indian (I), Female (F) Socially and Economically Disadvantaged (S) Disabled (D)

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with M/WBE Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: ____________ Name of Authorized Officer: ________________________________

Signature: ________________________________

Title: ________________________________

State of ______________, County of ______________

Subscribed and sworn to before me this ______ day of _______ 20____

Notary Public ________________________________

My commission expires ________________
NEW HANOVER COUNTY AFFIDAVIT D – Good Faith Efforts

County of ______________________
(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the goal of 10% participation by minority/women business is not achieved, the Bidder shall provide the following documentation to the Owner of his good faith efforts:

Affidavit of ______________________ I do hereby certify that on the ______________________
(Name of Bidder)

__________________________
(Project Name)

Project ID# ______________________ Amount of Bid $ ______________________

I will expend a minimum of ______% of the total dollar amount of the contract with MBE firms and a minimum of ______% of the total dollar amount of the contract with WBE firms. Minority/women businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below.

(Attach additional sheets if needed)

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*Minority categories: Black, African American (B), Hispanic (H), Asian American (A) American Indian (I), Female (F) Socially and Economically Disadvantaged (S) Disabled (D)

Examples of documentation required to demonstrate the Bidder's good faith efforts to meet the goals set forth in these provisions include, but are not necessarily limited to, the following:

A. Copies of solicitations for quotes to at least three (3) minority business firms from the source list provided by the State for each subcontract to be let under this contract (if 3 or more firms are shown on the source list). Each solicitation shall contain a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received.

B. Copies of quotes or responses received from each firm responding to the solicitation.

C. A telephone log of follow-up calls to each firm sent a solicitation.

D. For subcontracts where a minority business firm is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.

E. Documentation of any contacts or correspondence to minority business, community, or contractor organizations in an attempt to meet the goal.

F. Copy of pre-bid roster.
G. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for minority business.

H. Letter detailing reasons for rejection of minority business due to lack of qualification.

I. Letter documenting proposed assistance offered to minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive bidder.

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with M/WBE Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date:______________ Name of Authorized Officer:____________________________

Signature:____________________________ Title:____________________________

State of ________________, County of ________________

Subscribed and sworn to before me this _______ day of ______

______ 20____

Notary Public ________________

My commission expires ____________
LETTER OF INTENT
M/WBE Subcontractor Performance

Please submit this form or executed subcontracts with M/WBE firms after award of contract and prior to issuance of notice to proceed.

PROJECT: ____________________________________________________________

(Project Name)

TO: ________________________________________________________________

(Name of Prime Bidder/Architect)

The undersigned intends to perform work in connection with the above project as a:

____ Minority Business Enterprise    _____ Women Business Enterprise

The M/WBE status of the undersigned is certified the NC Office of Historically Underutilized Businesses (required). ___ Yes    ___ No

The undersigned is prepared to perform the following described work or provide materials or services in connection with the above project at the following dollar amount:

<table>
<thead>
<tr>
<th>Work/Materials/Service Provided</th>
<th>Dollar Amount of Contract</th>
<th>Projected Start Date</th>
<th>Projected End Date</th>
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_______________________________________

(Date)

_______________________________________

(Address)                               (Name & Phone No. of M/WBE Firm)

(Name & Title of Authorized Representative of M/WBE) (Signature of Authorized Representative of M/WBE)
REQUEST TO CHANGE M/WBE PARTICIPATION

(Submit changes only if notified as apparent lowest bidder, continuing through project completion)

Project: ______________________________________________________________________

Bidder or Prime Contractor: ____________________________________________________

Name & Title of Authorized Representative: _______________________________________

Address: ________________________________ Phone #: ___________________________

________________________________________ Email Address: ______________________

Total Contract Amount (including approved change orders or amendments): $__________

Name of subcontractor: _________________________________________________________

Good or service provided: _______________________________________________________

Proposed Action:

___ Replace subcontractor
___ Perform work with own forces

For the above actions, you must provide one of the following reasons (Please check applicable reason):

___ The listed MBE/WBE, after having had a reasonable opportunity to do so, fails or refuses to execute a written contract.

___ The listed MBE/WBE is bankrupt or insolvent.

___ The listed MBE/WBE fails or refuses to perform his/her subcontract or furnish the listed materials.

___ The work performed by the listed subcontractor is unsatisfactory according to industry standards and is not in accordance with the plans and specifications; or the subcontractor is substantially delaying or disrupting the progress of the work.

If replacing subcontractor:

Name of replacement subcontractor: ____________________________________________
The M/WBE status of the contractor is certified by the NC Office of Historically Underutilized Businesses (required). ___Yes ___No

Dollar amount of original contract $________________

Dollar amount of amended contract $ _______________

Other Proposed Action:

___Increase total dollar amount of work  ___Add additional subcontractor

___Decrease total dollar amount of work  ___Other

Please describe reason for requested action: _________________________________________
____________________________________________________________________________

*Please attach Letter of Intent or executed contract document

Dollar amount of original contract $_______________

Dollar amount of amended contract $ _______________

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<th>Interoffice Use Only:</th>
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<tr>
<td>Approval __Y __N</td>
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<td>Date_________________</td>
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<td>Signature_______________</td>
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</table>
Proof of Payment Certification  
M/WBE Contractors, Suppliers, Service Providers

Project Name: ________________________________________________

Prime Contractor: _____________________________________________

Current Contract Amount (including change orders): $_________________

Requested Payment Amount for this Period: $_______________________

Is this the final payment? ___ Yes ___ No

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<tr>
<th>Firm Name</th>
<th>M/WBE Category*</th>
<th>Total Amount Paid from this Pay Request</th>
<th>Total Contract Amount (including changes)</th>
<th>Total Amount Remaining</th>
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*Minority categories: Black, African American (B), Hispanic (H), Asian American (A) American Indian (I), Female (F) Socially and Economically Disadvantaged (S) Disabled (D)

Date:_____________________       Certified By:  __________________________________________

__________________________________________  ____________________________________________
Name  Title

__________________________________________
Signature
SECTION 00300

BID FORM

Proposal For

NEW HANOVER COUNTY CONSTRUCTION OF
CELLS 2-6E PARTIAL CLOSURE PHASE 3

BID NUMBER 20-0298

Submitted: _____________, 20__

New Hanover County
Department of Environmental Management
3002 Highway 421 North
Wilmington, North Carolina 28401

Sir or Madam:

The undersigned, as Bidder, hereby declares that the only person or persons interested in the Proposal, as principal or principals, is or are named herein and that no other person than herein mentioned has any interest in the Proposal of the Contract to which the WORK pertains; that this Proposal is made without connection or arrangement with any other person, company, or parties making a bid or proposal and that the Proposal is in all respects fair and made in good faith without collusion or fraud.

The Bidder further declares that he has examined the site of the WORK and that from personal knowledge and experience, or that he has made sufficient test holes and/or other subsurface investigations to fully satisfy himself that such site is a correct and suitable one for this WORK and he assumes full responsibility therefore; that he has examined the Drawings and Specifications for the WORK and from his own experience or from professional advice that the Drawings and Specifications are sufficient for the WORK be done and he has examined the other Contract Documents and all addenda relating thereto, and that he has satisfied himself fully, relative to all matters and conditions with respect to the WORK to which this Proposal pertains.

The Bidder proposes and agrees, if this Proposal is accepted, to contract with New Hanover County Board of County Commissioners (OWNER) in the form of Contract specified, to furnish all necessary materials, equipment, machinery, tools, apparatus, transportation, and labor and to perform the WORK specified in the Proposal and other Contract Documents.
The Bidder further proposes and agrees to comply in all respects with the time limits for commencement and completion of the WORK within the days stated below and as stated in the Contract Form.

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<thead>
<tr>
<th>Item of Project</th>
<th>Substantial Completion from NTP</th>
<th>Final Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell 2-6 Partial Closure</td>
<td>210 days</td>
<td>30 Additional days</td>
</tr>
</tbody>
</table>

The Bidder further agrees that the deductions for liquidated damages, as stated in the Contract Form, constitute fixed, agreed, and liquidated damages to reimburse the OWNER for additional costs to the OWNER resulting from the WORK not being completed to substantial completion within the time limit stated in the Contract Form.

The Bidder further agrees to execute a Contract and furnish satisfactory Performance and Payment Bonds, each in the amount of one hundred percent of the Contract price, and the required Certificates of Insurance, within ten consecutive calendar days after written notice being given by the OWNER of the award of the Contract, and the undersigned agrees that in case of failure on his part to execute the said Contract and Performance and Payment Bonds within the ten consecutive calendar days after the award of the Contract, the bid guarantee accompanying his bid and the money payable thereon shall be paid to the OWNER as liquidation of damages sustained by the OWNER; otherwise, the bid guarantee shall be returned to the undersigned after the Contract is signed and the Performance and Payment Bonds are filed.

The undersigned agrees to accept in full compensation therefor the total of the lump sum prices and extended unit prices items named in the following schedule (estimating worksheet). It is understood that the unit prices quoted or established for a particular item are to be used for computing the amount to be paid to the Contractor, based on the quantities actually constructed as determined by the applicable measurement and payment portion of these specifications.

Bidder’s General Contractors License No. _________________________

Bidder’s Utilities License No. _________________________

Name of Bidder and/or Representative
1. **BASE BID PROPOSAL:**

The undersigned as BIDDER, hereby declares that the only person or persons interested in the Bid as Principal or Principals is, or are, named herein and that no other person that is herein mentioned has any interest in this Bid or in the Contract to be entered into; that this Bid is made without connection with any other person, company or parties to make a bid or proposal; and that it is in all respects fair and in good faith, without collusion or fraud.

Having become completely familiar with the local conditions affecting the cost of the WORK at the place where the WORK is to be executed, and having carefully examined the site conditions as they currently exist, and having carefully examined Bidding and Contract Documents prepared by: SCS Engineers, PC and titled **LANDFILL CELLS 2-6E PARTIAL CLOSURE PHASE 3** dated *January 2020*, together with any Addenda to such Bidding Documents as listed hereinafter, the undersigned hereby proposes and agrees to provide all labor, materials, plant, equipment, transportation and other facilities as necessary, but which may not be separately itemized and to execute all of the WORK described by the aforesaid Bidding and Contract Documents for the lump sum consideration of:

Words

$\ldots$

Dollars $\ldots$

said amount being hereinafter referred to as the Base Bid or Base Bid Proposal.

2. Each BIDDER shall fill out and complete the Estimating Worksheet in this Section and submit the appropriate number of copies as part of the Bid. The purpose of the Worksheet is to give each BIDDER the approximate magnitude of the WORK required and a basis for uniform comparison of Bids. OWNER does not express, imply or guarantee that the actual amount of WORK to be accomplished will correspond to the quantities given, if any. The BIDDERS must assume that the quantities, if indicated, are not accurate and therefore, the BIDDERS must satisfy themselves by personal examination of the location of WORK; estimate the quantity of the WORK based on the Bid Drawings, Specifications, and any Addendum, thereafter; and by such other means as they may choose, as to the actual conditions and requirements of the WORK and the accuracy of the estimate of the ENGINEER. The BIDDER shall not, at any time after the submission of Bid, dispute any such statement or estimate of the ENGINEER nor assert that there has been any misunderstanding in regard to the nature or amount of the WORK to be done.

The BIDDER may modify the quantities given in the Worksheet if required. Quantities, if listed on the Worksheet are for in-place materials and do not account for settlement, waste, overlaps, volume changes or unusable portions of the materials or products.
installed. Each section contains a miscellaneous item for BIDDERS to add any cost for work items not identified on the worksheets, but required by the Contract Documents and Plans.

This Contract includes both **LUMP SUM BID ITEMS** and **UNIT PRICE WORK**. Items G and H are included to import offsite material for the purpose of establishing the proposed intermediate cover, protective cover, and topsoil or for the purpose of establishing a unit cost if it becomes necessary to relocate waste to the working face. The BIDDER is to include all costs the BIDDER may anticipate during the length of this project and the contract. Each BIDDER shall also add any extras or deductions from the ENGINEER's estimate that the BIDDER may determine necessary to provide the quantity and quality of WORK required by the Bid Drawings, Specifications, and any Addenda.

Any increase or decrease in the quantities listed in the Worksheet and shown on the Drawing, for any item, shall not be regarded as sufficient grounds for an increase or decrease in the price of that item, nor total price of the Contract, nor in the time allowed for the completion of the WORK, except as provided in the Contract Documents. The OWNER reserves the right to delete portions of the WORK, or add to the WORK, as OWNER deems necessary and shall have the right to use the BIDDER's unit prices in these Bid Schedules as a basis of negotiation if a change in the quantity of WORK occurs.

**TRENCH SAFETY COMPLIANCE**

1. The bidder acknowledges the existence of North Carolina trench safety standards and the requirements established therein.

2. The bidder further acknowledges that the standards follow the Federal excavation safety standards set forth at 29 CFR Part 1926, Subpart P.

3. The bidder will comply with all applicable trench safety standards, during all phases of the WORK, if awarded the contract, and will ensure that all subcontractors also comply with the Act.

4. The bidder will consider the geotechnical information available from the OWNER, from its own sources, and all other relevant information in its design of the trench safety system it will employ on the subject project. The bidder acknowledges that the OWNER is not obligated to provide such information, that he is not to rely solely on such information if provided, and that he is solely responsible for the selection of the data on which he relies in designing said safety system, as well as for the system itself.

5. The bidder acknowledges that included in the Total Price in the Bid Form are costs for complying with the trench safety standards that are in effect as of the date of award of this agreement. The undersigned further identifies the costs to be $10.00.
6. The amount in Item 12 herein includes the following Trench Safety Compliance Methods and the units of each safety measure.

<table>
<thead>
<tr>
<th>Trench Safety Compliance Method</th>
<th>Unit (LF,SY)</th>
<th>Estimated Quantity</th>
<th>Unit Cost</th>
<th>Extended Cost</th>
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<tbody>
<tr>
<td>A.</td>
<td>____________</td>
<td>__________</td>
<td>_________</td>
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<tr>
<td>B.</td>
<td>____________</td>
<td>__________</td>
<td>_________</td>
<td>______</td>
</tr>
<tr>
<td>C.</td>
<td>____________</td>
<td>__________</td>
<td>_________</td>
<td>______</td>
</tr>
<tr>
<td>D.</td>
<td>____________</td>
<td>__________</td>
<td>_________</td>
<td>______</td>
</tr>
</tbody>
</table>

7. Acceptance of the bid to which this certification and disclosure applies in no way represents that the OWNER or its representatives have evaluated or determined that the above costs are adequate to comply with the applicable trench safety requirements, nor does it in any way relieve the undersigned of his sole responsibility for complying with all applicable safety requirements.
A. GENERAL

<table>
<thead>
<tr>
<th>NO.</th>
<th>DESCRIPTION</th>
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<th>TOTAL</th>
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<tbody>
<tr>
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<td>Demobilization</td>
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<tr>
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<td>4</td>
<td>Engineer's Field Office</td>
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Subtotal A: __________

B. SURVEY AND DEPTH CHECKS

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</tr>
</thead>
<tbody>
<tr>
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<td>Existing Conditions Survey</td>
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<td>Post Stripping Survey</td>
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<tr>
<td>3</td>
<td>Top of Intermediate Cover Survey</td>
<td>1</td>
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<td></td>
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<tr>
<td>4</td>
<td>Top of Liner Survey</td>
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<td>Protective Cover Depth Checks</td>
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<td>6</td>
<td>Final/Record Survey</td>
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Subtotal B: __________

C. TEMPORARY EROSION AND SEDIMENTATION CONTROL

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</tr>
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<td>Removing Controls</td>
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Subtotal C: __________
### D. MULCH REMOVAL AND STRIPPING

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<td>2</td>
<td>Stripping</td>
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Subtotal D: ____________________

### E. CLOSURE

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<td>Seed and Mulch</td>
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<td>Acres</td>
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<td>4</td>
<td>GFFR Spillways &amp; Swales</td>
<td>1</td>
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<td>5</td>
<td>12” HDPE Downchutes</td>
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<td>4” Toe Drain Pipes</td>
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<td>Bollards</td>
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Subtotal E: ____________________

### F. OFFSITE SOIL, DELIVERY AND PLACEMENT

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Subtotal F: ____________________

### G. LFG EXPANSION

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<td>4</td>
<td>2-inch Diameter SDR-9 Air Pipe and Fittings</td>
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<tr>
<td>5</td>
<td>4-inch (SDR-11) by 8-inch (SDR-17) Dual Containment Forcemain Pipe and Fittings</td>
<td>1210</td>
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<td>4-inch (SDR-11) Single Wall Forcemain Pipe and Fittings</td>
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<td>Well Casing Pipe Geomembrane Boot</td>
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<td>22</td>
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<td>23</td>
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**Subtotal G:**
### H. ADDITIONAL ITEMS

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<td>6” Cleanout Extensions</td>
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<td>GFFR Spillway Repair</td>
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<td>8</td>
<td>Replace Flow Meters</td>
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**Subtotal H:**

**Total Base Bid (A through H):**
**Note: The Bid comparisons for selection of CONTRACTOR will be determined by total of bid items A-H.**

Acknowledgement is hereby made of the following Addenda received since issuance of Plans and Specifications:

Addendum No._______ Dated:_______  Addendum No._______ Dated:_______
Addendum No._______ Dated:_______  Addendum No._______ Dated:_______
Addendum No._______ Dated:_______  Addendum No._______ Dated:_______
Addendum No._______ Dated:_______  Addendum No._______ Dated:_______

Attached hereto is a cashier's check on the _____________ Bank of _______ or Bid Bond for the sum of _______________ Dollars(___________), made payable to New Hanover County, North Carolina.

_________________________________________ L.S.
(Name of Bidder)  (Affix Seal)

_________________________________________ L.S.
(Signature of Officer)

_________________________________________ L.S.
(Title of Officer)

Address:__________________________________________

City: ________________________________________________

State: _______________________________________________

The full names and residences of persons and firms interested in the foregoing bid, as principals, are as follows:

____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

Name of the executive who will give personal attention to the WORK:

____________________________________________________________________________

Attach list of subcontractors as required by Article 11.4.C of Instruction to Bidders.
QUALIFICATIONS QUESTIONNAIRE

The undersigned warrants the truth and accuracy of all statements and answers herein contained. Include additional sheets if necessary.

1. How many years has your organization been in business as a General Contractor?

2. Describe and give the dates and owners of the last two projects that you have completed similar in type, size, and nature as the one proposed?

3. Have you ever failed to complete WORK awarded to you? If so, where and why?

4. Name three individuals or corporations for which you have performed similar WORK and to which you refer:

5. Have you personally inspected the site of the proposed WORK? Describe any anticipated problems with the site and your proposed solutions?

6. Will you subcontract any part of this WORK? If so, describe which portions:

7. Please list the names and addresses of the subcontractors to be used. Additional information may be required in accordance with the Instructions to Bidders, Item 10.8 and Item 3.4.

8. What equipment do you own that is available for the WORK?

9. What equipment will you purchase for the WORK?
10. What equipment will you rent for the WORK?

____________________________________________________________________________________

11. The following is given as a summary of the Financial Statement of the undersigned: (List Assets and Liabilities and use insert sheet if necessary.)

____________________________________________________________________________________

12. State the true and exact, correct, and complete name under which you do business.

BIDDER IS: ____________________________________________________________

CORPORATION, SOLE PROPRIETORSHIP, PARTNERSHIP
________________________________________________________________________(SEAL)
(Individual's Signature)
________________________________________________________________________(SEAL)
(Individual's Name)

doing business as: __________________________________________________________

Business Address:
________________________________________________________________________

Phone No.: ________________________________________________________________

END OF SECTION
SECTION 00410

BID BOND

STATE OF NORTH CAROLINA

COUNTY OF NEW HANOVER

KNOW ALL MEN BY THESE PRESENTS, that ____________________________, as Principal, and ____________________________, as Surety, a Corporation chartered and existing under the laws of the State of ____________, with its principal offices in the City of ________, and authorized to do business in the State of North Carolina are held and firmly bound unto the OWNER, ____________________________, in the penal sum of ____________________________ Dollars ($ ____________) lawful money of the United States, for the payment of which sum will and truly to be made, we bond ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has submitted the accompanying bid, dated ____________, 20__, for:

NEW HANOVER COUNTY SECURE LANDFILL

CELLS 2-6E PARTIAL CLOSURE PHASE 3

NOW, THEREFORE,

A. If the principal shall not withdraw said bid within thirty (30) days after date of opening of the same, and shall within ten (10) days after the prescribed forms are presented to him for signature, enter into a written contract with the OWNER in accordance with the Bid as accepted, and give Bonds with good and sufficient surety or sureties, as may be required, for the faithful performance and proper fulfillment of such Contract, then the above obligations shall be void and of no effect, otherwise to remain in full force and effect.

B. In the event of the withdrawal of said bid within the period specified, or the failure to enter into such Contract and give such bonds within the time specified, if the Principal shall pay the OWNER the difference between the amount specified in said Bid and the amount for which the OWNER may procure the required work and supplies, if the latter amount be in excess of the former, then the above obligations shall be void and of no effect, otherwise to remain in full force and effect.
IN WITNESS WHEREOF, the above bounded parties have executed this instrument under their several seals, this ____ day of __________, A.D., 20__, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

WITNESSES: (If Sole Ownership or Partnership, two (2) Witnesses required).  
(If Corporation, Secretary Only will attest and affix seal).

PRINCIPAL:

WITNESSES:

Name of Firm

(Affix Seal)  
Signature of Authorized Officer

Title

Business Address

City State

SURETY:

WITNESSES:

Corporate Surety

(Affix Seal)  
Attorney-in-Fact

Title

Business Address

City State

Name of Local Insurance Agency
CERTIFICATES AS TO CORPORATE PRINCIPAL

I, ______________________, certify that I am the Secretary of the Corporation named as Principal in the within bond; that __________________ who signed the said bond on behalf of the principal, was then __________________ of said corporation; that I know his signature, and his signature hereto is genuine; and that said bond was duly signed, sealed, and attested for and in behalf of said corporation by authority of its governing body.

_________________________ (Corporate Seal)
Secretary

STATE OF NORTH CAROLINA
COUNTY OF NEW HANOVER

Before me, a Notary Public duly commissioned, qualified and acting, personally appeared __________________ to me well known, who being by me first duly sworn upon oath, says that he is the Attorney-in-Fact, for the ____________________________ and that he has been authorized by ____________________________ to execute the foregoing bond on behalf of the Contractor named therein in favor of the OWNER, New Hanover County, North Carolina.

Subscribed and sworn to before me this ___ day of __________, 20__, A.D.

(Attach Power of Attorney to original Bid Bond) Notary Public
State of North Carolina-at-Large

My Commission Expires: ______________

END OF SECTION
STATE OF NORTH CAROLINA
COUNTY OF NEW HANOVER

__________________________________ Affiant

STATE OF _____________
COUNTY OF _____________

The foregoing instrument was acknowledged before me this _______________ by

__________________________________
(Name of Officer or agent, title of officer or agent)

of ________________, ____________________________, a
(Name of Corporation acknowledging)

______________ corporation, on behalf of the corporation. He/she is
(State of place of incorporation)

personally known to me or has produced __________________________
(Type of identification)

as identification and did take an oath.

________________________ Notary Public, Commission No.________

________________________ (Name of Notary typed, printed or stamped)
SECTION 00500
AGREEMENT
NEW HANOVER COUNTY CONTRACT 20-0298
NEW HANOVER COUNTY, NORTH CAROLINA

THIS CONTRACT made and entered into this________day of______________, 20__, by and between NEW HANOVER COUNTY, a political subdivision of the State of North Carolina, hereinafter referred to as "County", and ______________________________________ a Corporation, hereinafter referred to as "Contractor";

WITNESSETH:

That the Contractor, for the consideration hereinafter fully set out, hereby agrees with the County as follows:

1. **Performance.** Contractor shall furnish all labor, materials and equipment and shall perform all work in the manner and form as provided by the following enumerated specifications and documents, which are attached hereto and made a part hereof as if fully contained herein: Advertisement for Bids, Instructions to Bidders, General Conditions, Supplemental General Conditions, Special Conditions, Plans and Specifications, Addenda, and Insurance Certificates for Workers' Compensation, Public Liability and Property Damage, for the project more fully described herein and generally described as:

   NEW HANOVER COUNTY LANDFILL
   CELLS 2-6E PARTIAL CLOSURE PHASE 3

2. **Time of Performance.** Contractor shall commence work within ten (10) calendar days after execution of this agreement; provided that, if County specifies a Notice to Proceed, Contractor shall commence work on the date indicated in the Notice to Proceed.

2.1 **Delay in Authorization to Commence Work.** If, through no fault of Contractor County's authorization to commence work is delayed later than the ninetieth (90th) day after the bid opening date or the thirtieth (30th) day after Contractor's delivery of the executed agreement to County, Contractor may terminate this agreement.
2.2 Required Completion Time. Prior to commencing work, Contractor shall give County a construction schedule broken down into calendar days for the various divisions or parts of work. Contractor shall complete all work for the closure as indicated in paragraph 2.2.1., after the beginning date/Notice-to-Proceed. If the Contractor fails to complete all work within the required and specified time, the County may at its option either terminate this agreement pursuant to the procedures specified in paragraph 24 herein, or assess liquidated damages against Contractor. In the event County exercises its option to assess liquidated damages, Contractor shall pay the County One Thousand Dollars ($1,000) per day for each consecutive-calendar-day past the scheduled final completion date for the Closure that the work or performance, herein contracted for, remains unfinished and incomplete. It is understood and agreed by the parties hereto that time is of the essence of this contract and that the sum of One Thousand Dollars ($1,000) per day represents the actual damages which the County will have sustained by failure of Contractor to complete the work within the specified times and is agreed upon as liquidated damages; that the provisions for damages are a bona fide provision for such and are not a penalty. It is understood and agreed that if the work herein contracted for is not completed and finished as scheduled herein, the County will have sustained damages and, therefore, the provision for liquidated and agreed upon damages has been incorporated in this agreement as a provision beneficial to both parties.

2.2.1 Completion Time – from Notice to Proceed

<table>
<thead>
<tr>
<th>Item of Work</th>
<th>Substantial Completion</th>
<th>Final Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell Closure</td>
<td>210 days</td>
<td>30 days</td>
</tr>
</tbody>
</table>

3. CONTRACT Amendments and Change Orders. No modification or rescission of this agreement shall be effective unless evidenced by a writing signed by both parties and by the surety to this agreement. County may issue change orders, which are defined as written orders to Contractor, approved by Board of County Commissioners and signed by the County Manager, authorizing an addition, deletion or revision in the work or an adjustment in the contract price or the contract time.

3.1 Extra Work. Contractor agrees to perform such reasonable extra work as may be ordered in writing by the County Manager. County agrees to pay Contractor, upon Contractor's presentation of itemized cost statements, for extra work computed as follows: (a) labor used at actual payroll charges therefor; (b) actual payroll charges for Workers' Compensation Insurance, Social Security and all other payroll charges; (c) an hourly rate for actual
operating hours of equipment used; (d) amounts paid by Contractor to vendors, as evidenced by paid invoices, for material purchased and used on extra work orders; (e) cost of bonding, if applicable; and (f) overhead and profit combined based on fifteen percent (15%) of the total of cost items (a) through (e) above.

3.2 Changes of the Contract Time. The time limit for completion of the project is of the essence of this agreement. If Contractor finds it impossible to complete the work on the project within the originally scheduled time, Contractor may submit a written request for a time extension to the County Manager. The writing shall specify the reasons justifying the granting of the request. Contractor's plea that insufficient time was scheduled shall not be a valid reason for a time extension. If the County Manager finds that work was delayed because of conditions beyond the control and without the fault of both Contractor and his or her subcontractors or suppliers, the County Manager shall extend the time for completion in such amount as the conditions justify. Under no circumstances shall Contractor be entitled to damages against County on account of delay.

3.3 Notification of Surety. Contractor shall be solely responsible for notifying his or her surety of any changes affecting the general scope of the work or change in the contract price, and the amount of the applicable bonds shall be adjusted accordingly. Contractor shall furnish written documentation of such adjustment to the County.

4. Payment. County agrees to pay Contractor, for the full and faithful performance of this agreement, the not to exceed the total lump sum and/or unit price sum of: ___________________________________________________________ Dollars and __________________________________________ Cents ($___________).

4.1 Partial Payments. County shall make partial payments to Contractor in lump sum and/or unit price amounts upon the successful completion by Contractor and acceptance by County of sections of the work, as specified in the agreement specifications and in accordance with the amounts indicated for each bid in Contractor's bid proposal. From the total amount determined to be payable on a partial payment, five percent (5%) of such amount shall be deducted and retained by County until all work has been accepted by County; provided that, if the County Manager determines that the work is on schedule at the halfway point of the construction schedule, retainage may thereafter be discontinued on future partial payments. County at its option may reinstate retainage at any time.

4.2 Acceptance of Final Payment as Release. The acceptance by Contractor of final payment shall be and shall operate as a release of County from all claims of Contractor against County, except for claims specifically excepted by Contractor in stated written amounts. However, no payment, final or
otherwise, shall release Contractor or his or her sureties from any obligations under the agreement documents or the payment and performance bonds.

4.3 County's Right to Offset and Recoup. Nothing contained in this Section 4 shall be construed to impair County's rights to deduct from partial or final payments any sums due to County pursuant to Sections 2, 5, 24 or any other section of this agreement.

5. Contractor's Warranties. Contractor makes the following warranties concerning the materials, equipment and work furnished pursuant to this Contract.

5.1 Warranty of Title. Contractor warrants that title to all work, materials and equipment covered by a request for payment, whether incorporated in the project or not, will have passed to County prior to the submission of the request for payment, free and clear of all liens, claims, security interests and encumbrances.

5.2 Warranty of Materials and Equipment. Contractor warrants to County that all materials and equipment furnished under this agreement will be new unless otherwise specified, will be of good quality and free from faults and defects, and will conform to the agreement documents. Contractor warrants all such materials and equipment for a period of one (1) year from the date of completion of the work unless the specifications require a different period of warranty.

5.3 Warranty of Work. Contractor warrants to County, for a period of one (1) year from the date of completion of the work, that all work performed under this agreement has been performed in a workmanlike manner, so as to meet the standards of workmanlike quality prevailing in North Carolina at the time of construction.

5.4 Warranty Against Major Structural Defects. Contractor warrants that all structures constructed under this agreement are free from major structural defects.

5.5 Correction of Defects. County shall give Contractor reasonably prompt notice of all observable defects. If Contractor fails to perform corrective work within a reasonable time, County may perform such work and charge Contractor for the costs thereby incurred. Contractor's Performance Bond shall remain in full force and effect through the applicable one (1) year warranty period.

6. Indemnity. Contractor shall indemnify and hold New Hanover County, its officers, officials, agents and employees, harmless against any and all claims, demands, causes of action, or other liability, including attorney fees, on account of personal
injuries or death or on account of property damages arising out of or relating to the work to be performed by Contractor hereunder, resulting from the negligence of or the willful act or omission of Contractor, his agents, employees and Subcontractors.

7. **Insurance.** Contractor shall maintain insurance from companies licensed to write business in North Carolina and acceptable to New Hanover County, of the kinds and minimum amounts specified below.

8. **Certificates and Notice of Cancellation.** Before commencing work under this contract, Contractor shall furnish County with certificates of all insurance required below. The certificate of insurance should also evidence self-insured retention/deductibles applicable to the insurance required. Certificates shall indicate the type; amount, class of operations covered, effective date and expiration date of all policies, and shall contain the following statement:

   "The insurance covered by this certificate will not be canceled or materially altered, except after thirty (30) days written notice has been received by County".

9. **Commercial General Liability.**

   9.1 Contractor shall maintain Commercial General Liability and if necessary, Commercial Umbrella Liability insurance with a total limit of not less than $5,000,000 each occurrence for bodily injury and property damage. If such CGL insurance contains a general aggregate limit, it shall apply separately to this project/location or the general aggregate shall be twice the required limit.

   9.2 CGL insurance shall be written on Insurance Services Office (ISO) “occurrence” form CG 00 01 covering Commercial General Liability or its equivalent and shall cover the liability arising from premises, operations, independent Contractors, products-completed operations, personal and advertising injury, and liability assumed under an insured contract (including the tort liability of another assumed in a business contract).

   9.3 County, its officers, officials, agents, and employees are to be covered as additional insureds under the CGL by endorsement CG 20 10 and CG 20 37 or an endorsement providing equivalent coverage as respects to liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor; premises owned, leased or used by the Contractor; and under the commercial umbrella, if any. The coverage shall contain no special limitations on the scope of protection afforded to County, its officers, officials, agents, and employees.

   9.4 The status of County as an additional insured under a CGL obtained in compliance with this agreement shall not restrict coverage under such CGL with
respect to the escape or release of pollutants at or from a site owned or occupied by or rented to County.

9.5 There shall be no endorsement or modification of the CGL or Umbrella Liability limiting the scope of coverage for liability arising from pollution, explosion, collapse, underground property damage, employment-related practices, or damage to the named insured’s work.

9.6 The Contractor’s Commercial General Liability insurance shall be primary as respects County, its officers, officials, agents, and employees. Any other insurance or self-insurance maintained by County, its officers, officials, and employees shall be excess of and not contribute with the Contractor’s insurance.

10. **Workers’ Compensation and Employer’s Liability.**

10.1 Contractor shall maintain Workers’ Compensation as required by the general statutes of the State of North Carolina and Employer’s Liability Insurance.

10.2 The Employer’s Liability, and if necessary, Commercial Umbrella Liability insurance shall not be less than $5,000,000 each accident for bodily injury by accident, $5,000,000 each employee for bodily injury by disease, and $5,000,000 policy limit.

10.3 The insurer shall agree to waive all rights of subrogation against the County, its officers, officials, and employees for losses arising from work performed by the Contractor for County.

11. **Business Auto Liability.**

11.1 Contractor shall maintain Business Auto Liability and, if necessary, Commercial Umbrella Liability insurance with a limit of not less than $5,000,000 each accident.

11.2 Such insurance shall cover liability arising out of any auto, including owned, hired, and non-owned autos.

11.3 Business Auto coverage shall be written on ISO form CA 00 01, or a substitute form providing equivalent liability coverage. If necessary, the policy shall be endorsed to provide contractual liability coverage equivalent to that provided in ISO form CA 00 01.

11.4 The Contractor’s Business Auto Liability insurance shall be primary as respects County, its officers, officials, agents, and employees. Any other insurance or self-insurance maintained by County, its officers, officials, and employees shall be excess of and not contribute with the Contractor’s insurance.
12. **Contractors Pollution Liability Insurance.**

12.1 Contractor shall maintain Contractors Pollution Liability covering losses caused by pollution incidents that arise from the operations of the contractor described under the scope of services of this contract.

12.2 Contractor’s Pollution Liability shall apply to bodily injury; property damage, including loss of use of damaged property or of property that has not been physically injured; cleanup costs and defense, including costs and expenses incurred in the investigation defense, or settlement of claims. The policy of insurance affording these required coverages shall be written in an amount of at least $5,000,000 per claim, with an annual aggregate of at least $5,000,000.

12.3 Contractors Pollution Liability shall include as an additional insured County, its officers, officials, agents, and employees.

12.4 If Contractors Pollution Liability is written on a claims-made basis, the Contractor warrants that any retroactive date applicable to coverage under the policy precedes the effective date of this contract; and that continuous coverage will be maintained or an extended discovery period will be exercised for a period of two (2) years, beginning from the time that work under the contract is complete.

13. **Bonds Required.** Pursuant to Article 3, Chapter 44A and Article 8, Chapter 143 of the North Carolina General Statutes, Contractor shall furnish performance and payment bonds, as herein described:

a) Contractor shall furnish and deliver to the New Hanover County a Payment Bond and a Performance Bond covering the faithful performance and completion of the work included in this Agreement and payment for all materials and labor furnished or supplied in connection with the work included in this Agreement.

b) Said bonds shall be issued and furnished to New Hanover County prior to, and as a condition precedent to, commencement of the work of this Agreement.

c) Each of the Payment Bond and Performance Bond shall be furnished on behalf of the Contractor, shall name New Hanover County obligee, and shall be in the amount of one hundred percent (100%) of the amount of the guaranteed repair and maintenance costs. Such bond(s) shall be solely for the protection of New Hanover County.

d) The Payment Bond and the Performance Bond shall be issued by a surety of financial standing having a rating from A.M. Best Company equal to or better than A X and must be included on the approved list of sureties issued by the United States Department of Treasury.
e) The bond shall remain in effect at least one (1) year after the date when final payment becomes due.

f) The surety bond must be in the form set forth in NCGS 44A-33, without any variations therefrom.

g) The Contractor shall provide surety bond wherein surety waives notice of any and all modifications, omissions, additions, changes and advance payments or deferred payments in or about the Contract, and agrees that the obligations undertaken by the Bond shall not be impaired in any manner by reason of any such modifications, omissions, additions, changes, and advance payments or deferred payments.

h) The surety bond must set forth no requirement that suit be initiated prior to the time stipulated in applicable North Carolina Statutes of Limitation.


14.1 Any deductibles or self-insured retentions must be declared to and approved by County. At the option of County, either the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects County, its officers, officials, agents, and employees; or the Contractor shall procure a bond guaranteeing payment of deductibles or self-insured retentions.

14.2 The Contractor shall be solely responsible for the payment of all deductibles to which such policies are subject, whether or not County is an insured under the policy.


15.1 The policies are to contain, or be endorsed to contain, the following provisions:

15.2 Any failure to comply with reporting provisions of the policies listed in this agreement shall not affect coverage provided to County its officers, officials, agents and employees.

15.3 Each insurance policy required by this contract shall be endorsed to state that coverage shall not canceled by either party except after 30 days prior written notice has been given to County, 230 Government Center Drive #125, Wilmington, NC 28403.

15.4 If Contractor’s liability policies do not contain the standard ISO separation of insureds provision, or a substantially similar clause, they shall be endorsed to provide cross-liability coverage.
16. **Acceptability of Insurers.** Insurance is to be placed with insurers licensed to do business in the State of North Carolina with an A.M. Best’s rating of no less than A VII unless County has granted specific approval.

17. **Evidence of Insurance.**

17.1 The Contractor shall furnish County with a certificate(s) of insurance, executed by a duly authorized representative of each insurer, showing compliance with the insurance requirements prior to commencing the work, and thereafter upon renewal or replacement of each certified coverage until all operations under this contract are deemed complete.

17.2 Evidence of additional insured status shall be noted on the certificate of insurance as per requirements in this agreement.

17.3 With respect to insurance maintained after final payment in compliance with requirements, an additional certificate(s) evidencing such coverage shall be provided to County with final application for payment and thereafter upon renewal or replacement of such insurance until the expiration of the period for which such insurance must be maintained.

18. **Sub-Contractors.** Contractor shall include all sub-contractors as insureds under its policies or shall furnish separate certificates for each sub-contractor. All coverage for sub-contractors shall be subject to all of the requirements stated herein. Commercial General Liability coverage shall include independent Contractors’ coverage, and the Contractor shall be responsible for assuring that all sub-contractors are properly insured.

19. **Conditions**

19.1 The insurance required for this contract must be on forms acceptable to County.

19.2 Where circumstances warrant, County may, at its discretion subject to acceptance by the Risk Management and Finance Department accept letters of credit or custodial accounts in lieu of specific insurance requirements.

19.3 The Contractor shall provide that the insurance contributing to satisfaction of insurance requirements in this agreement shall not be canceled, terminated, or modified by the Contractor without prior written approval of County.

19.4 The Contractor shall promptly notify Environmental Management and the Risk Management Office at (910) 798-7497 of any accidents arising in the course of operations under the contract causing bodily injury or property damage.
19.5 County reserves the right to obtain complete, certified copies of all required insurance policies, at any time.

19.6 Failure of County to demand a certificate of insurance or other evidence of full compliance with these insurance requirements or failure of County to identify a deficiency from evidence that is provided shall not be construed as a waiver of Contractor’s obligation to maintain such insurance.

19.7 By requiring insurance herein, County does not represent that coverage and limits will necessarily be adequate to protect the Contractor and such coverage and limits shall not be deemed as a limitation of Contractor’s liability under the indemnities granted to County in this contract.

19.8 If Contractor fails to maintain the insurance as set forth herein, County shall have the right, but not the obligation, to purchase said insurance at Contractor’s expense.

19.9 The Contractor or his engineer may apply to County for approval of higher deductibles based on financial capacity and quality of the carrier affording coverage.

19.10 County shall have the right, but not the obligation of prohibiting Contractor or any sub-contractor from entering the project site or withhold payment until such certificates or other evidence that insurance has been placed in complete compliance with these requirements is received and approved by County.

20. Independent Contractor. It is mutually understood and agreed that Contractor is an independent contractor and not an agent of County, and as such, Contractor, his or her agents and employees shall not be entitled to any County employment benefits, such as, but not limited to, vacation, sick leave, insurance, worker's compensation, or pension or retirement benefits.

21. Subcontractors. Contractor shall be fully responsible for all negligent acts and omissions of his or her Subcontractors and of persons and organizations employed by them to the same extent that Contractor would be responsible for these acts and omissions. Nothing in the contract documents shall create any contractual relationship between County and any subcontractor or other person or organization having a direct contract with Contractor, nor shall it create any obligation on the part of County to pay any money due any such subcontractor or other person or organization, except as may otherwise be required by law.

22. No Waiver of Legal Rights. Upon completion of the contract work, Engineer/County will promptly make final inspection and notify Contractor of final acceptance. However, final acceptance shall not preclude or estop County from correcting any measurement, estimate or certificate made before or after completion of the work, nor shall County be precluded or estopped from recovering over payments from
Contractor or his surety, or both. A waiver on the part of County of any breach of any part of the agreement shall not be held to be a waiver of any other or subsequent breach.

23. **Default and Termination.** If, through no fault of Contractor, the work on the project is stopped for a period of thirty (30) consecutive days or more, Contractor may terminate this agreement, in which event Contractor will be paid for materials and equipment supplied and work performed up to the date of termination. If Contractor fails to prosecute the work with such diligence as will insure its completion within the contract time, or if Contractor breaches any one of the terms or conditions contained in this agreement and fails to cure said breach within fifteen (15) days of County's mailing of Notice of Default, County may terminate this agreement forthwith. Upon termination, County may, without prejudice to an action for damages or any other remedy, take the prosecution of the work out of the hands of Contractor. County may enter into another agreement for the completion of this contract, or use such other methods as may be required for the completion of the contract. County may deduct all costs of completing the contract from any monies due to which may become due to Contractor.

24. **Assignment.** The parties mutually agree that this contract is not assignable and shall not be assigned by either party without the written consent of the other party and the surety of this contract.

25. **Contractor's Representation.** Contractor makes the following representations to the County.

Contractor has familiarized itself with the nature and extent of the Contract Documents, work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the work.

Contractor has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing facilities at or contiguous to the site and assumes responsibility for the accurate location of said facilities. No additional examinations, investigations, explorations, tests, reports, studies or similar information or data in respect of said facilities are or will be required by Contractor in order to perform and furnish the work at the contract price, within the contract time and in accordance with the other terms and conditions of the Contract Documents. Contractor has given Engineer written notice of all conflicts, errors or discrepancies that he or she has discovered in the Contract Documents and the written resolution thereof by Engineer is acceptable to Contractor.

26. **Entire Understanding.** This contract constitutes the entire understanding of the parties and contains all of the terms agreed upon with respect to the subject matter hereof. No modification or rescission of this contract shall be effective unless evidenced by a signed writing.
27. **Familiarity with Laws.** The Contractor specifically acknowledges that he has made himself familiar with all Federal, State and local laws, ordinances, rules and regulations, including all Federal and State Occupational Safety and Health Act (OSHA) requirements, which may in any manner affect those engaged or employed in the work of the project, or the materials or equipment in or about such work, or in any way affect the conduct of such work and agrees that he, his employees, Subcontractors and suppliers will, at all times, comply with same. If the Contractor shall discover any provisions in the Contract Documents which are contrary to or inconsistent with any such law ordinance, rule or regulation, he shall immediately give notice thereof to the County in writing, identifying any items of work affected, and he shall not proceed until he has received written direction from the County with respect to these items. If the Contractor performs contrary to or inconsistently with any such law ordinance rule or regulation without giving such notice, he shall bear all costs that are consequences of such performance.

28. **Contract Work Hours and Safety Standards Act.** The Contractor shall fully comply with the Contract Work Hours and Safety Standards Act (40 USC 327-330) as supplemented by Department of Labor Regulations contained in 29 CFR Parts 3, 5 and 5a.

29. **Copeland "Anti-Kickback" Act.** The Contractor shall fully comply with all Federal provisions set forth in this act and 24 CFR 85.36, such that each contractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he is otherwise entitled. The Contractor shall report all suspected or reported violations to New Hanover County and other appropriate authority.

30. **Section 504 of the Rehabilitation Act of 1973, as amended and Nondiscrimination on the Basis of Handicap.** The Contractor shall fully comply with all Federal provisions set forth, such that no qualified handicapped person shall, on the basis of handicap be excluded from participation in, be denied the benefits of, or otherwise be subjected to discrimination hereunder.

31. **Age Discrimination Act of 1975, as amended and Nondiscrimination on the Basis of Age.** The Contractor shall fully comply with all Federal provisions set forth such that no qualified person shall on the basis of age be excluded from participation in, be denied the benefits of, or otherwise be subjected to discrimination hereunder.

32. **Executive Order 11246, as amended.** The Contractor shall fully comply with all Federal provisions set forth in this order including any amendments currently enacted.

33. **Permits and Licenses.** Contractor shall procure all applicable permits and licenses, including permits and licenses required pursuant to applicable patent and copyright laws, shall pay all charges and fees, and shall give all notices necessary and incidental to the due and lawful prosecution of the work.
34. **Non-Discrimination.** Contractor will take affirmative action not to discriminate against any employee or applicant for employment or otherwise illegally deny any person participation in or the benefits of the project that is the subject of this contract because of age, race, creed, color, sex, disability or national origin. To the extent applicable, Vendor will comply with all provisions of Executive Order No. 11246, the Civil Rights Acts of 1964 (P.L. 88-352) and 1968 (P.L. 90-284), and all applicable Federal, State and local laws, ordinances, rules, regulations, orders, instructions, designations and other directives promulgated to prohibit discriminations. Violation of this provision, after notice, shall be a material breach of this agreement and may result, at County's option, in a termination or suspension of this agreement in whole or in part.

35. **Taxes.** Contractor shall pay all applicable Federal, State and local taxes, including sales taxes on all equipment and materials used in the project. County is qualified to receive all sales taxes paid on the project as a rebate. Contractor shall submit a statement showing the invoice, sales taxes paid to State, sales taxes paid to county of vendor's location, and name of county of all material and equipment used in the project. A tax statement shall be submitted with each pay request and shall be accompanied by an affidavit verifying validation.

36. **Interpretation.** All of the terms and conditions contained in the agreement shall be interpreted in accordance with the laws of the state of North Carolina. The agreement documents shall be given precedence in the following order: Agreement, Modifications, Addenda, Supplementary Conditions, Special Conditions, Instructions to Bidders, General Conditions, Specifications and Drawings.

37. **Deletions of General Conditions.** The following General Conditions are hereby deleted: N/A.

38. **Arbitration.** Arbitration of claims, disputes, and questions arising under this agreement may only be used when both parties agree to arbitrate. Arbitration shall be in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then obtaining. In no event shall fewer than three (3) arbitrators be used; County and Contractor shall each select one (1) arbitrator and the two (2) arbitrators shall select a third. The award rendered by the arbitrators shall be final, specifically enforceable and recordable as a judgment in any court having jurisdiction thereof.

39. **Notices.** All notices required hereunder to be sent to either party shall be sent to the following designated address, or to such other address or addresses as may hereafter be designated by either party by mailing of written notice of such change of address, by Certified Mail, Return Receipt Requested:

   To County:
To Contractor:

40. **Additional Provisions.** No provision of this Contract shall be amended nor deleted; however, additional provisions may be added to the Contract.

41. **E-Verify Compliance.** Pursuant to S.L. 2015-294, Contractor shall fully comply with the U.S. Department of Homeland Security employee legal status E-Verify requirements for itself and all its subcontractors. Violation of the provision, unless timely cured, shall constitute a breach of contract. By endorsement of this agreement Contractor confirms compliance.

42. **Iran Divestment Act of 2016 Compliance** Pursuant to N.C.G.S. 147-86.55 et. seq. The Act requires that the State, a North Carolina local government, or any other political subdivision of the State of North Carolina must not utilize any contractor or subcontractor found on the State Treasurer’s Final Divestment List. Contractor certifies that it or its subcontractors are not listed on the Final Divestment List created by the North Carolina State Treasurer pursuant to N.C.G.S. 147-85.60. The State Treasurer’s Final Divestment List can be found on the State Treasurer’s website at the address [www.nctreasurer.com/Iran](http://www.nctreasurer.com/Iran) and will be updated every 180 days. By endorsement of this agreement Contractor confirms compliance.

43. **Contract Documents.** The Contract Documents, as stated in the Instructions to Bidders and attached hereto, are as fully a part of this Contract as if herein repeated. An enumeration of the Drawings accompanying these Contract Documents follows:

<table>
<thead>
<tr>
<th>SHEET NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>COVER SHEET</td>
</tr>
<tr>
<td>2</td>
<td>SITE PLAN</td>
</tr>
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<td>3</td>
<td>EXISTING CONDITIONS</td>
</tr>
<tr>
<td>4</td>
<td>INTERMEDIATE COVER GRADING PLAN</td>
</tr>
<tr>
<td>5</td>
<td>FINAL COVER GRADING PLAN</td>
</tr>
<tr>
<td>6</td>
<td>STORMWATER MANAGEMENT PLAN</td>
</tr>
<tr>
<td>7</td>
<td>SECTIONS</td>
</tr>
<tr>
<td>8</td>
<td>DETAILS – 1</td>
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<td>9</td>
<td>DETAILS – 2</td>
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<td>DETAILS – 3</td>
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<td>11</td>
<td>DETAILS – 4</td>
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<tr>
<td>12</td>
<td>DETAILS – 5</td>
</tr>
<tr>
<td>13</td>
<td>GCCS – NOTES AND SCOPE OF WORK</td>
</tr>
</tbody>
</table>
IN WITNESS WHEREOF, the parties have caused the execution of this instrument, by authority duly given and on the day and year first above written.

NEW HANOVER COUNTY

[SEAL]

________________________
County Manager

ATTEST:

Clerk to the Board

[CORPORATE SEAL]

ATTEST:

Secretary
This instrument has been pre-audited in the manner required by the Local Government Budget and Fiscal Control Act.

________________________
President

Approved as to form:

________________________
County Finance Director

________________________
County Attorney
NORTH CAROLINA

NEW HANOVER COUNTY

I, ____________________________, a Notary Public of the State and County aforesaid, certify that __________________ personally came before me this day and acknowledged that (s)he is Clerk to the Board of County Commissioners of New Hanover County, and that by authority duly given and as the act of the Board, the foregoing instrument was signed in its name by its Chairman, ____________________________, sealed with its official seal and attested by herself as its Clerk.

WITNESS my hand and official seal, this _______ day of ______________, 20__.

Notary Public: ____________________________

My commission expires: ________________

STATE OF: ____________________

COUNTY OF: ___________________

I, ____________________________, a Notary Public of the State and County aforesaid, certify that __________________ personally came before me this day and acknowledged that (s)he is Secretary of ____________________, a ____________________ corporation, and that by authority duly given and as the act of the corporation, the foregoing instrument was signed in its name by its President, ________________, sealed with its official seal and attested by herself as its Secretary.

WITNESS my hand and official seal, this _______ day of ______________, 20__.

Notary Public: ____________________________

My commission expires: ________________

END OF SECTION
STATE OF NORTH CAROLINA
COUNTY OF NEW HANOVER

KNOW ALL MEN BY THESE PRESENTS that ___________________________________ as CONTRACTOR, hereinafter called Principal, and _______________________________________________________ as Surety, hereinafter called Surety, are held and firmly bound unto New Hanover County, as Obligee, hereinafter called OWNER, in the amount of__________________________________________________________ Dollars ($________________) for the payment whereof CONTRACTOR and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, CONTRACTOR has by written agreement dated ______________, 20__, entered into a Contract with OWNER for:

NEW HANOVER COUNTY LANDFILL
CELLS 2-6E PARTIAL CLOSURE PHASE 3

In accordance with Drawings and Specifications prepared by SCS Engineers, which Contract is by reference made a part hereof and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION ARE SUCH, that, if the Principal shall in all respects promptly and faithfully perform and comply with the terms and conditions of said Contract and his obligations thereunder and shall indemnify the OWNER and the Consulting ENGINEER and save either or all of them harmless against and from all costs, expenses and damages arising from the performance of said Contract or the repair of any WORK thereunder, then this obligation shall be void; otherwise, this Bond shall remain in full force and effect, in accordance with the following terms and conditions:

1. The Principal and Surety jointly and severally agree to pay the OWNER any difference between the sum to which the said Principal would be entitled on the completion of the Contract, and that sum which the OWNER may be obliged to pay for the completion of said WORK by Contract or otherwise, and any damages, direct or indirect or consequential, which the said OWNER may sustain on account of such WORK, or on account of the failure of said CONTRACTOR to properly and in all things, keep and execute all of the provisions of said Contract.
2. And this Bond shall remain in full force and effect for a period of one (1) year from the date of acceptance of the project by the OWNER and shall provide that the CONTRACTOR guarantees to repair or replace for said period of one (1) year all WORK performed and materials and equipment furnished that were not performed or furnished according to the terms of the Contract, and shall make good, defects thereof which have become apparent before the expiration of said period of one (1) year. If any part of the project, in the judgment of the OWNER, for the reasons above stated needs to be replaced, repaired or made good during that time, the OWNER shall so notify the CONTRACTOR in writing. If the CONTRACTOR refuses or neglects to do such WORK within five (5) days from the date of service of such Notice, the OWNER shall have the WORK done by others and the cost thereof shall be paid by the CONTRACTOR or his Surety.

3. And the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the WORK to be performed thereunder or the specifications accompanying the same shall in any wise affect its obligations on this bond, and it does hereby waive Notice of any change, extension of time, alteration or addition to the terms of the Contract or to the WORK or to the Specifications.

4. The surety represents and warrants to the OWNER that they have a Best's Key Rating Guide General Policyholder's Rating of "________" and Financial Category of "Class ______".
IN WITNESS WHEREOF, the above bounded parties executed this instrument under their several seals, this ________ day of ___________ 20__, A.D., the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

WITNESS: (If Sole Ownership or Partnership, two (2) Witnesses required).

(If Corporation, Secretary only will attest and affix seal).

PRINCIPAL:

________________________________
(Affix Seal)

Signature of Authorized Officer

WITNESSES:

________________________________
Title

________________________________
Business Address

City                State

SURETY:

WITNESS:

________________________________
Corporate Surety

________________________________
(Affix Seal)

Attorney-in-Fact

________________________________
Business Address

City                State

Name of Local Insurance Agency
CERTIFICATES AS TO CORPORATE PRINCIPAL

I, ___________________________, certify that I am the Secretary of the Corporation named as Principal in the within bond; that _____________________ who signed the said bond on behalf of the Principal, was then _______________ of said Corporation; that I know his signature, and his signature hereto is genuine; and that said bond was duly signed, sealed, and attested for and in behalf of said Corporation by authority of its governing body.

_________________________ Corporate Seal
Secretary

STATE OF NORTH CAROLINA
COUNTY OF NEW HANOVER

Before me, a Notary Public, duly commissioned, qualified and acting, personally appeared ______________________ to me well known, who being by me first duly sworn upon oath, says that he is the Attorney-in-Fact, for the__________________________ and that he has been authorized by ___________________________ to execute the foregoing bond on behalf of the CONTRACTOR named therein in favor of New Hanover County, North Carolina.

Subscribed and sworn to before me this ______ day of __________________, 20__, A.D.

(Attach Power of Attorney)

________________________________________
Notary Public
State of North Carolina-at-Large

My Commission Expires:____________________

END OF SECTION
SECTION 00620
PAYMENT BOND

STATE OF NORTH CAROLINA
COUNTY OF NEW HANOVER

KNOW ALL MEN BY THESE PRESENTS that _____________________________ as CONTRACTOR, hereinafter called Principal, and _______________________________ as Surety, hereinafter called Surety, are held and firmly bound unto New Hanover County, North Carolina, as Obligee, hereinafter called OWNER, in the amount of $ __________ for the payment whereof CONTRACTOR and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, CONTRACTOR has by written agreement dated ________________, 20__, entered into a Contract with OWNER for:

NEW HANOVER COUNTY SECURE LANDFILL
CELLS 2-6E PARTIAL CLOSURE PHASE 3

In accordance with Drawings and Specifications prepared by SCS Engineers, PC, which Contract is by reference made a part hereof and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION ARE SUCH, that, if the Principal shall promptly make payments to all claimants, as herein below defined, then this obligation shall be void; otherwise, this Bond shall remain in full force and effect, subject to the following terms and conditions:

A. A claimant is defined as any person supplying the Principal with labor, material and supplies, used directly or indirectly by the said Principal or any subcontractor in the prosecution of the WORK provided for in said Contract, and is further defined in The North Carolina Statutes.

B. The above named Principal and Surety hereby jointly and severally agree with the OWNER that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after performance of the labor or after complete delivery of materials and supplies by such Claimant, may sue on this Bond for the use of such Claimant, prosecute the suit to final judgment for such sum or sums as may be justly due Claimant, and have execution thereon. The OWNER shall not be liable for the payment of any costs or expenses of any such suit.

C. No suit or action shall be commenced hereunder by any Claimant:

1. Unless Claimant, other than one having a direct Contract with the Principal, shall within forty-five (45) days after beginning to furnish labor, materials or supplies for the
prosecution of the WORK, furnish the Principal with a notice that he intends to look to this Bond for protection.

2. Unless Claimant, other than one having a direct contract with the Principal, shall within ninety (90) days after such Claimant's performance of the labor or complete delivery of materials and supplies, deliver to the Principal written notice of the performance of such labor or delivery of such material and supplies and the nonpayment therefor.

3. After the expiration of one (1) year from the performance of the labor or completion of delivery of the materials and supplies; it being understood, however, that if any limitation embodied in this Bond is prohibited by any law controlling the construction hereof such limitations shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

4. Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the project, or any part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not elsewhere.

D. The Principal and the Surety jointly and severally, shall repay the OWNER any sum which the OWNER may be compelled to pay because of any lien for labor or materials furnished for any WORK included in or provided by said Contract and shall pay OWNER all losses, damages, expenses, costs and attorney's fees, including appellate proceedings, that OWNER sustains because of a default by Principal under the contract.

E. The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration of or addition to the terms of the Contract or to the WORK to be performed thereunder or the Specifications applicable thereto shall in any wise affect its obligations on this Bond, and the Surety hereby waives notice of any such change, extension of time, alterations of or addition to the terms of the Contract, or to the WORK or to the Specifications.

F. The Surety represents and warrants to the OWNER that they have a Best's Key Rating Guide General Policyholder's rating of "________________" and Financial Category of "Class ________________".
IN WITNESS WHEREOF, the above bounded parties executed this instrument under their several seals, this ___ day of _______________ 20__, A.D., the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

WITNESS: (If Sole Ownership or Partnership, two (2) Witnesses required).

(If Corporation, Secretary only will attest and affix seal).

PRINCIPAL:

________________________________

__________________________________(Affix Seal)
Signature of Authorized Officer

WITNESSES:

________________________
Title

________________________
Business Address

City         State

SURETY:

WITNESS:

________________________
Corporate Surety

__________________________(Affix Seal)
Attorney-in-Fact

________________________
Business Address

City         State

Name of Local Insurance Agency
CERTIFICATES AS TO CORPORATE PRINCIPAL

I, ___________________________, certify that I am the Secretary of the Corporation named as Principal in the within bond; that ______________________ who signed the said Bond on behalf of the Principal, was then __________________ of said Corporation; that I know his signature, and his signature hereto is genuine; and that said bond was duly signed, sealed, and attested for and in behalf of said Corporation by authority of its governing body.

__________________________________
Corporate Seal
Secretary

STATE OF NORTH CAROLINA
COUNTY OF NEW HANOVER

Before me, a Notary Public, duly commissioned, qualified and acting, personally appeared ________________________ to me well known, who being by me first duly sworn upon oath, says that he is the Attorney-in-Fact, for the ____________________________ and that he has been authorized by ____________________________ to execute the foregoing Bond on behalf of the CONTRACTOR named therein in favor of New Hanover County, North Carolina.

Subscribed and sworn to before me this ____ day of __________________, 20__, A.D.

(Attach Power of Attorney)

_______________________________
Notary Public
State of North Carolina-at-Large

My Commission Expires: _________________

END OF SECTION
SECTION 00650
CERTIFICATE OF INSURANCE

THIS IS TO CERTIFY THAT THE ____________________________ Insurance Company

Address _______________________________________________________________________

of ______________________ has issued policies of insurance, as described below and identified by a policy number, to the insured named below; and to certify that such policies are in full force and effect at this time. It is agreed that none of these policies will be cancelled or changed so as to affect the interest(s) of ______________________ (hereinafter sometimes called the OWNER) until thirty (30) days after written notice of such cancellation or change has been delivered to the ENGINEER; SCS Engineers, PC, and to the OWNER.

Insured: ________________________________________________________________

Address: __________________________________________________________________

Status of Insured   ___ Corporation   ___ Partnership   ___ Individual

Location of Operations Insured: ____________________________________________

Description of Work: ____________________________________________________

INSURANCE POLICIES IN FORCE

<table>
<thead>
<tr>
<th>Forms of Coverage</th>
<th>Policy Number</th>
<th>Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Worker’s Compensation/Employers’ Liability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+Comprehensive Automobile Liability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comprehensive General Liability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Worker's Compensation/Employers' Liability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+Excess Liability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (Please specify type)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

POLICY INCLUDES COVERAGE FOR:

1. Additional Insured: OWNER and Engineer


3. +All owned, hired, or non-owned automotive equipment used in connection with work done for the OWNER.
### CONTRACTUAL LIABILITY

5. Damage caused by explosion, collapse or structural injury, and damage to underground utilities.

6. Products/Completed Operations

7. Owners and Contractors Protective Liability

8. Personal Injury Liability

9. Excess Liability applies excess of:
   (a) Employers' Liability
   (b) Comprehensive General Liability
   (c) Comprehensive Automobile Liability
   (d) Contractual Liability

### TYPES OF POLICY FORMS OF COVERAGE LIMITS OF LIABILITY

<table>
<thead>
<tr>
<th>Workers' Compensation</th>
<th>Bodily Injury</th>
<th>Statutory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employers' Liability</td>
<td>Bodily Injury</td>
<td>$__________ Each Accident</td>
</tr>
<tr>
<td></td>
<td>Disease</td>
<td>$__________ Each Person</td>
</tr>
<tr>
<td></td>
<td>Disease</td>
<td>$__________ Policy Limit</td>
</tr>
<tr>
<td>Comprehensive Auto</td>
<td>Combined Single Limit BI/PD $__________ Each Accident</td>
<td></td>
</tr>
<tr>
<td>Liability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comprehensive General</td>
<td>Bodily Injury</td>
<td>$__________ Each Occurrence Aggregate</td>
</tr>
<tr>
<td>Liability</td>
<td>Property Damage</td>
<td>$__________ Each Occurrence Aggregate</td>
</tr>
</tbody>
</table>

OR

| Combined Single Limit BI/PD $__________ Each Occurrence Aggregate |
|-----------------------|--------------|----------|
|                       |              |          |
Excess Liability  Combined Single  $___________  Aggregate

Other (Please Specify Type) ___________________________________________________________

The Insurance Company hereby agrees to deliver, within ten (10) days, two (2) copies of the above policies to the OWNER’s ENGINEER when so requested.

NOTE: Entries on this certificate are limited to the Authorized Agent or Insurance Company Representative.

Date _____________________________ (SEAL) _________________________________

Insurance Company

Issued at ___________________________ __________________________________________

Authorized Representative

Note that insurance requirements listed in Section 00500 – Agreement are the minimum requirements acceptable regardless of the listings on this form.

Insurance Agent or Company
- Send original and one copy to:  SCS Engineers, PC, Inc.
  3922 Coconut Palm Dr., Suite 102
  Tampa, FL 33619

END OF SECTION
INDEX

ARTICLE 1 - DEFINITIONS
ARTICLE 2 - PRELIMINARY MATTERS
ARTICLE 3 - CONTRACT DOCUMENTS; INTENT, AMENDING, REUSE
ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS
ARTICLE 5 - BONDS AND INSURANCE
ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES
ARTICLE 7 - OTHER WORK
ARTICLE 8 - OWNER'S RESPONSIBILITIES
ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION
ARTICLE 10 - CHANGES IN THE WORK
ARTICLE 11 - CHANGES OF THE CONTRACT PRICE
ARTICLE 12 - CHANGE OF CONTRACT TIME
ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK
ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION
ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION
ARTICLE 16 - MISCELLANEOUS
ARTICLE 1 - DEFINITIONS

Wherever used in these General Conditions or in the other Contract Documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

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

1.2 **Agreement:** The written contract between OWNER and CONTRACTOR covering the WORK to be performed, Contract Price, Contract Time and other requirements; other contract documents are attached to the Agreement and made a part thereof as provided therein.

1.3 **Application for Payment:** The form accepted by ENGINEER which is to be used by CONTRACTOR in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

1.4 **Asbestos:** Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

1.5 **Bid:** The offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the WORK to be performed.

1.6 **Bidding Documents:** The Contract Documents as existing at time of Bid.

1.7 **Bidding Requirements:** The Advertisement or Invitation to Bid, Instructions to Bidders, the Bid Form and the Bid Bond Form.

1.8 **Bonds:** Bid, performance and payment bonds and other instruments of security.

1.9 **Change Order:** A document recommended by the ENGINEER which is signed by CONTRACTOR and OWNER and directs or authorizes an addition, deletion or revision in the WORK, or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

1.10 **Contract Documents:** The Advertisement or Invitation to Bid, Instructions to Bidders, Addenda (which pertain to the Contract Documents), CONTRACTOR's Bid (including documentation accompanying the Bid and any post-Bid documentation submitted prior
to the Notice of Award) when attached as an exhibit to the Agreement, the Agreement, the Notice to Proceed, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all Written Amendments, Change Orders, WORK Change Directives, Field Orders and ENGINEER's written interpretations and clarifications issued pursuant to paragraphs 3.5 and 3.6 on or after the Effective Date of the Agreement.

1.11 **Contract Price:** The moneys payable by OWNER to CONTRACTOR for completion of the WORK in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.9.1, in the case of Unit Price Work).

1.12 **Contract Times:** The numbers of days (computed as provided in paragraph 16.2) or the dates stated in the Agreement (i) to achieve Substantial Completion and (ii) to complete the WORK so that it is ready for final payment as evidenced by ENGINEER's written recommendation of final payment in accordance with paragraph 14.13.

1.13 **CONTRACTOR:** The person, firm or corporation with whom OWNER has entered into the Agreement.

1.14 **Defective:** An adjective which when modifying the word WORK refers to WORK that is unsatisfactory, faulty or deficient, in that it does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or acceptance referred to in the Contract Documents, or 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 14.8 or 14.10).

1.15 **Drawings:** The Drawings which show the character, extent and scope of the WORK to be performed by the CONTRACTOR and which have been prepared or accepted by ENGINEER and are referred to in the Contract Documents.

1.16 **Effective Date of the Agreement:** The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

1.17 **ENGINEER:** The person, firm or corporation named as such in the Agreement, or as otherwise designated by the OWNER.

1.18 **ENGINEER's Consultant:** A person, firm or corporation having a contract with ENGINEER to furnish services as ENGINEER's independent professional associate or consultant with respect to the Project and who is identified as such in the Supplementary Conditions.
1.19 **Field Order:** A written order issued by ENGINEER which orders minor changes in the WORK in accordance with paragraph 9.5 but which does not involve a change in the Contract Price or Contract Times.

1.20 **General Requirements:** Sections of Division 1 of the Specifications.

1.21 **Hazardous Waste:** The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

1.22 **Laws and Regulations:** Any and all applicable laws, rules, regulations, ordinances, codes and orders of any and all governmental bodies, agencies, authorities and courts having jurisdiction.

1.23 **Liens:** Charges, security interests or encumbrances upon real property or personal property.

1.24 **Milestone:** A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the WORK.

1.25 **Notice of Award:** The written notice by OWNER to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein, within the time specified, OWNER will sign and deliver the Agreement.

1.26 **Notice to Proceed:** A written notice given by OWNER to CONTRACTOR fixing the date on which the Contract Times will commence to run and on which CONTRACTOR shall start to perform CONTRACTOR's obligations under the Contract Documents.

1.27 **OWNER:** The public body or authority, corporation, association, firm or person with whom CONTRACTOR has entered into the Agreement and for whom the WORK is to be provided.

1.28 **Partial Utilization:** Use by OWNER of a substantially completed portion of the WORK for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the WORK.

1.29 **PCBs:** Polychlorinated biphenyls.

1.30 **Petroleum:** Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Wastes and crude oils.
1.31 **Project:** The total construction of which the WORK to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.

1.32 **Project Manual:** The title of the bound documentary information prepared for a construction project and includes bidding requirements, conditions of contract and product specifications.

1.33 **Radio Active Material:** Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

1.34 **Resident Project Representative:** The authorized representative of ENGINEER or OWNER who may be assigned to the site or any part thereof.

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

1.36 **Shop Drawings:** All drawings, diagrams, illustrations, schedules and other data or information which are specifically prepared or assembled by or for CONTRACTOR to illustrate some portion of the WORK, including illustrations, brochures, standard schedules, performance charts, instructions, diagrams, and other such information furnished by manufacturers and suppliers, and submitted by CONTRACTOR to illustrate material or equipment for some portion of the WORK. Shop drawings are not Drawings as so defined and are not Contract Documents.

1.37 **Specifications:** Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards, and workmanship as applied to the WORK and certain administrative details applicable thereto.

1.38 **Subcontractor:** An individual, firm or corporation having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the WORK at the site.

1.39 **Substantial Completion:** The degree of completion at which, in the opinion of ENGINEER as evidenced by ENGINEER's definitive certificate of Substantial Completion, the WORK (or a specified part thereof) is sufficiently complete, that it can be utilized for the purposes for which it is intended; or if there be no such certificate issued, when WORK is complete and ready for final payment as evidenced by ENGINEER's written recommendation of final payment in accordance with paragraph 14.13. The terms "substantially complete" and "substantially completed" as applied to all or part of the WORK refer to Substantial Completion thereof.
1.40 **Supplementary Conditions:** The part of the Contract Documents which amends or supplements these General Conditions.

1.41 **Supplier:** A manufacturer, fabricator, supplier, distributor, materialman or vendor having a direct contract with CONTRACTOR or any Subcontractors to furnish materials or equipment to be incorporated in the WORK by CONTRACTOR or Subcontractor.

1.42 **Underground Facilities:** All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

1.43 **Unit Price Work:** Work to be paid for on the basis of unit prices.

1.44 **Work or WORK:** The entire completed construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. WORK includes and is the result of performing services, furnishing labor, furnishing and incorporating materials and equipment into the construction, and furnishing services and documents all as required by the Contract Documents.

1.45 **Work Change Directive:** A written directive to CONTRACTOR, recommended by ENGINEER and signed by OWNER, issued on or after the Effective Date of the Agreement ordering an addition, deletion or revision in the WORK, or responding to differing or unforeseen physical conditions under which the WORK is to be performed as provided in paragraph 4.2 or 4.3 or to emergencies under paragraph 6.23. A WORK Change Directive will not change the Contract Price or the Contract Times, but is evidence that the parties expect that the change directed or documented by a WORK Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times as provided in paragraph 10.1.

1.46 **Written Amendment:** A written amendment of the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the non-engineering or nontechnical rather than strictly construction-related aspects of the Contract Documents.

**ARTICLE 2 - PRELIMINARY MATTERS**

**Delivery of Bonds and Insurance Certificates**
2.1 When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish in accordance with paragraph 5.1. The executed Agreements shall also be accompanied by certificates showing the existence of insurance (and other evidence of insurance required by OWNER and/or the Contract Documents) which CONTRACTOR is required to purchase and maintain in accordance with paragraphs 5.3 and 5.4.

Copies of Documents:

2.2 After the Contract has been executed, the Contractor will be furnished one (1) CD of the project documents, one (1) complete set of drawings (24" x 36") and one (1) copy of the Project Manual (Contract Requirements and Specifications) and all addenda.

The Contractor shall furnish each of the subcontractors, manufacturers, and material men such copies of the Contract Documents as may be required for their work. All copies of the Contract Documents shall be printed from the reproductive sets furnished to the Contractor. All costs of reproduction and printing shall be borne by the Contractor.

Commencement of Contract Times - Notice to Proceed

2.3 The Contract Times will commence to run on the date indicated in the Notice to Proceed. Unless otherwise specified in the Supplementary Conditions, a Notice to Proceed will be issued to the CONTRACTOR within thirty days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the ninetieth day after the day of the Bid opening or the starting date indicated therein will not be later than the sixtieth day after the Effective Date of the Agreement.

Starting the Work

2.4 CONTRACTOR shall start to perform the WORK on the date when the Contract Times commence to run, but no work shall be done at the site prior to that date.

Before Starting Construction

2.5 Before undertaking each part of the WORK, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, ambiguity or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any WORK affected thereby; however, CONTRACTOR shall be liable for failure to report to OWNER or ENGINEER any conflict, ambiguity or discrepancy in the Contract Documents, or other such conditions of the WORK which CONTRACTOR knew or reasonably should have known.
Preconstruction Submittals

2.6 Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for review:

2.6.1 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 Documents.

2.6.2 A preliminary schedule of Shop Drawing and Sample submittals, listing each required submittal and times for submitting, reviewing and processing such submittal. It is strongly suggested that shop drawings be submitted in the first two weeks of the project time due to the short duration of the construction period.

2.6.3 A preliminary schedule of values for all of the WORK which shall include quantities and prices of items aggregating the Contract Price and shall subdivide the WORK into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices shall include an appropriate amount of overhead and profit applicable to each item of WORK.

2.6.4 The anticipated monthly payments to become due to the CONTRACTOR.

Preconstruction Conference

2.7 Before any WORK at the site is started, a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to discuss the schedules referred to in paragraph 2.6, to discuss procedures for handling Shop Drawings and other submittals, for processing Applications for Payment, for maintaining required records and to establish a working understanding among the parties as to the WORK.

Acceptable Schedules

2.8 Unless otherwise provided in the Contract Documents, at least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to review for ENGINEER's acceptability of and to finalize the schedules submitted in accordance with paragraph 2.8. The CONTRACTOR shall make required corrections and adjustments and resubmit the schedules. No Application for Payment will be accepted and no progress payment made to CONTRACTOR until the schedules are submitted and acceptable to ENGINEER as provided below. The progress schedule shall be acceptable to ENGINEER as providing an orderly progression of the WORK to completion within
any specified Milestones and the Contract Times, but such acceptance will neither impose on ENGINEER responsibility for the sequencing, scheduling or progress of the WORK nor interfere with or relieve CONTRACTOR from full responsibility therefor. The progress schedule shall show a completion date corresponding to the times or dates stated in the Agreement and described in paragraph 1.12. The schedule of Shop Drawing and Sample submissions shall be acceptable to ENGINEER as providing a workable arrangement for reviewing and processing the required submittals. The schedule of values shall be acceptable to ENGINEER as to form and substance.

ARTICLE 3 - CONTRACT DOCUMENTS; INTENT, AMENDING, REUSE

Contract Documents

3.1 The Contract Documents comprise the entire agreement between OWNER and CONTRACTOR concerning the WORK. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project.

Intent

3.2 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. Any WORK, materials or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for. When words or phrases which have a well-known technical, construction industry or trade meaning are used to describe WORK, materials or equipment, such words or phrases shall be interpreted in accordance with that meaning. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in paragraph 9.4.

3.3 Standards, Standard Specifications and Conflicts Therewith

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

3.3.2 If, during the performance of the WORK, CONTRACTOR discovers any conflict, ambiguity or discrepancy in the Contract Documents, or between the Contract Documents and any provision of any such Law or Regulation applicable to the performance of the WORK, or of any such standard,
specification, manual or code or of any instruction of any Supplier referred to in paragraph 6.5, CONTRACTOR shall so report to ENGINEER in writing at once and shall not proceed with the WORK affected thereby (except in an emergency as authorized by paragraph 6.23) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in paragraph 3.5 or 3.6, provided, however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any such conflict, ambiguity or discrepancy unless CONTRACTOR knew or reasonably should have known thereof.

3.3.3 Except as otherwise specifically stated in the Contract Documents or as may be provided by amendment or supplement thereto issued by one of the methods indicated in paragraph 3.5 or 3.6, the provisions of the Contract Documents shall take precedence in resolving any conflict, ambiguity or discrepancy between the provisions of the Contract Documents and:

3.3.3.1 The provisions of any standard, specification, manual, code or instruction (whether or not specifically incorporated by reference in the Contract Documents);

3.3.3.2 Or 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).

3.3.4 Except as otherwise specifically stated in the Contract Documents, or as may be provided by amendment or supplement thereto, the Agreement shall take precedence over all Contract Documents. In resolving any conflict, inconsisteny, ambiguity or discrepancy among the provisions of the various component documents of the Contract Documents, the various documents shall be given precedence as follows: Agreement Modifications, Agreement, Addenda, Technical Specifications, Supplementary Conditions, General Conditions, and Drawings. In the event of inconsistencies in the same order of precedence, the item or WORK of better quality and/or meeting the more stringent requirements will be required. Full size details shall take precedence over scale drawings and large scale drawings shall take precedence over small scale drawings. Dimensions given in figures shall take precedence over scaled dimensions. Actual job dimensions shall take precedence over scale and figure dimensions on the Drawings.

3.3.5 No provision of any referenced standard, specification, manual, code or instruction (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of OWNER, CONTRACTOR or ENGINEER, or any of their subcontractors,
consultants, agents or employees from those set forth in the Contract Documents, nor shall it be effective to assign to OWNER, ENGINEER, or any of ENGINEER's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.13 or any other provision of the Contract Documents.

Definitions of Terms

3.4 Whenever in the Contract Documents the term "as ordered", "as directed", "as required", "as allowed", "as accepted", or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review or judgement of ENGINEER as to the WORK, it is intended that such requirement, direction, review, or judgement will be solely to evaluate, in general, the completed WORK for compliance with requirements of and information in the Contract Documents and conformance with the design concept of the completed 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 shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.13 or any other provision of the Contract Documents.

Amending Contract Documents

3.5 The Contract Documents may be amended to provide for additions, deletions and revisions in the WORK or to modify the terms and conditions thereof in one or more of the following ways:

3.5.1 a formal Written Amendment,

3.5.2 a Change Order (pursuant to paragraph 10.4), or

3.5.3 a Work Change Directive (pursuant to paragraph 10.1).

Supplementing Contract Documents

3.6 The requirements of the Contract Documents may be supplemented and minor variations and deviations in the WORK may be authorized, in one or more of the following ways:

3.6.1 A Field Order (pursuant to paragraph 9.5),

3.6.2 ENGINEER's acceptance of a Shop Drawing or sample (pursuant to paragraphs 6.26 and 6.27), or
3.6.3 ENGINEER's written interpretation or clarification (pursuant to paragraph 9.4).

Reuse of Documents

3.7 CONTRACTOR, or any Subcontractor or Supplier or other person or organizationperforming or furnishing any of the WORK under a direct or indirect contract withOWNER shall neither have nor acquire any title to or ownership rights in any of theDrawings, Specifications or other documents (or copies of any thereof) prepared by orbearing the seal of ENGINEER or ENGINEER's Consultant, and they shall not reuse anyof them on extensions of the Project or any other project without written consent ofOWNER and ENGINEER and specific written verification or adaptation by ENGINEER.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS

Availability of Lands

4.1 OWNER will furnish, as indicated in the Contract Documents, the lands upon which theWORK is to be performed, rights-of-way and easements for access thereto, and suchother lands which are designated for the use of CONTRACTOR. Upon reasonablewritten request, OWNER will furnish CONTRACTOR with a correct statement of recordlegal title and legal description of the lands upon which the WORK is to be performedand OWNER'S interest therein as necessary for giving notice of or filing a mechanic'slien against such lands in accordance with applicable Laws and Regulations. OWNERshall identify any encumbrances or restrictions not of general application but specificallyrelated to use of lands so furnished with which CONTRACTOR will have to comply inperforming the WORK. Easements for permanent structures or permanent changes inexisting facilities will be obtained and paid for by OWNER, unless otherwise provided inthe Contract Documents. If CONTRACTOR and OWNER are unable to agree onentitlement to or the amount or extent of any adjustments in the Contract Price or theContract Times as a result of any delay in OWNER's furnishing these lands, rights-of-wayoreasements, CONTRACTOR may make a claim therefor as provided in Articles 11and 12. CONTRACTOR shall provide for all additional lands and access thereto thatmay be required for temporary construction facilities or storage of materials and equipment.

4.2 Subsurface and Physical Conditions

4.2.1 Reports and Drawings: Reference is made to the Supplementary Conditions foridentification of:
4.2.1.1 Reports of Subsurface Conditions: Those reports of explorations and tests of subsurface conditions at or contiguous to the site that have been utilized by ENGINEER in preparation of the Contract Documents.

4.2.1.2 Drawings of Physical Conditions: Those drawings of physical conditions in or relating to existing surface and subsurface structures at or contiguous to the site (except Underground Facilities) that have been utilized by ENGINEER in preparation of the Contract Documents.

4.2.2 Limited Reliance on Reports and Drawings: CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," CONTRACTOR may not rely upon or make any claim against OWNER, ENGINEER or any of ENGINEER's Consultants with respect to:

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

4.2.2.2 Other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings, or

4.2.2.3 Any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such data, interpretations, opinions or information.

4.2.3 Notice of Differing Conditions: If CONTRACTOR believes that any subsurface or physical condition at or contiguous to the site that is uncovered or revealed is of such a nature as to establish that:

4.2.3.1 Any technical data on which CONTRACTOR is entitled to rely as provided in paragraphs 4.2.1 and 4.2.2 is materially inaccurate, or

4.2.3.2 It requires a change in the Contract Documents, or

4.2.3.3 It differs materially from that shown or indicated in the Contract Documents, or
4.2.3.4 It 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 conditions affected thereby or performing any WORK in connection therewith (except in an emergency as permitted by paragraph 6.23), notify OWNER and ENGINEER in writing about the inaccuracy or difference. CONTRACTOR shall not further disturb such conditions or perform any work in connection therewith (except as aforesaid) until receipt of a written order to do so.

4.2.4 ENGINEER's Review: ENGINEER will promptly review the pertinent conditions, determine the necessity of OWNER's obtaining additional explorations or tests with respect thereto and advise OWNER in writing (with a copy to CONTRACTOR) of ENGINEER's findings and conclusions.

4.2.5 Possible Contract Documents Change: If ENGINEER concludes that a change in the Contract Documents is required as a result of a condition that meets one or more of the categories in paragraph 4.2.3, a WORK Directive Change or a Change Order will be issued as provided in Article 10 to reflect and document the consequences of such change.

4.2.6 Possible Price and Times Adjustments: An equitable adjustment in the Contract Price or in the Contract Time, or both, will be allowed to the extent that the existence of such uncovered or revealed condition causes an increase or decrease in CONTRACTOR's cost of, or time required for performance of the WORK, subject, however, to the following:

4.2.6.1 Such condition must meet any one or more of the categories described in paragraph 4.2.3;

4.2.6.2 A change in the Contract Documents pursuant to paragraph 4.2.5 will not be an automatic authorization of nor a condition precedent to entitlement to any such adjustment;

4.2.6.3 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 paragraphs 9.10 and 11.9; and

4.2.6.4 CONTRACTOR shall not be entitled to any adjustment in the Contract Price or Times if;
4.2.6.4.1 CONTRACTOR knew of the existence of such conditions at the time CONTRACTOR made a final commitment to OWNER in respect of Contract Price and Contract Times by the submission of a bid or becoming bound under a negotiated contract; or

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

4.2.6.4.3 CONTRACTOR failed to give the written notice within the time and as required by paragraph 4.2.3.

If OWNER and CONTRACTOR are unable to agree on entitlement to or as to the amount or length of any such equitable adjustment in Contract Price or Contract Times, a claim may be made therefor as provided in Articles 11 and 12. However, OWNER, ENGINEER and ENGINEER's Consultants shall not 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.

4.3 Physical Conditions -- Underground Facilities

4.3.1 Shown or Indicated: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is based on information and data furnished to OWNER or ENGINEER by the owners of such Underground Facilities or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

4.3.1.1 OWNER and ENGINEER will not be responsible for the accuracy or completeness of any such information or data; and,

4.3.1.2 The cost of all of the following shall be included in the Contract Price and the CONTRACTOR shall have full responsibility for (i) reviewing and checking all such information and data, (ii) locating all Underground Facilities shown or indicated in the Contract Documents, (iii) coordination of the WORK with the owners of such Underground Facilities during construction, and (iv) the safety and protection of all such underground facilities as provided in paragraph 6.20 and repairing any damage thereto resulting from the WORK.
4.3.2 Not Shown or Indicated: If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the Contract Documents, 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 permitted by paragraph 6.23), identify the owner of such Underground Facility and give written notice thereof to that owner and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility to determine the extent, if any, to which the Contract Documents should be modified to reflect and document the consequences of the existence of the Underground Facility. If ENGINEER concludes that a change in the Contract Documents is required, a WORK Change Directive or a Change Order will be issued as provided in Article 10 to reflect and document such consequences. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility as provided in paragraph 6.20.

Reference Points

4.4 OWNER will provide engineering surveys to establish reference points for construction which in ENGINEER's judgement are necessary to enable CONTRACTOR to proceed with the WORK. CONTRACTOR shall be responsible for laying out the WORK (unless otherwise specified in the Contract Documents), shall protect and preserve the established reference points and shall make no changes or relocations without prior written approval of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grade or locations, and shall be responsible for the accurate replacement or relocation of such reference points by professionally qualified personnel.

4.5 Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material:

4.5.1 OWNER will be responsible for any Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive material uncovered or revealed at the site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the WORK and which may present a substantial danger to persons or property exposed thereto in connection with the WORK at the site. OWNER will not be responsible for any such materials brought to the site by CONTRACTOR, Subcontractor, Suppliers or anyone else for whom CONTRACTOR is responsible.

4.5.2 CONTRACTOR shall immediately: (i) stop all WORK in connection with such hazardous condition and in any area affected thereby (except in an emergency as required by paragraph 6.23), and (ii) notify OWNER and ENGINEER (and 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 hazardous condition or take corrective action, if any. CONTRACTOR will not be required to resume WORK in connection with such hazardous condition or in any such affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR special written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of WORK, or (ii) specifying any special conditions under which such WORK may be resumed safely. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of such WORK stoppage or such special conditions under which WORK is agreed by CONTRACTOR to be resumed, either party may make a claim therefor as provided in Articles 11 and 12.

4.5.3 If after receipt of such special written notice CONTRACTOR does not agree to resume such WORK based on a reasonable belief it is unsafe, or does not agree to resume such WORK under such special conditions, then OWNER may order such portion of the WORK that is in connection with such hazardous condition or in such affected area to be deleted from the WORK. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of deleting such portion of the WORK, then either party may make a claim therefor as provided in Articles 11 and 12. OWNER may have such deleted portion of the WORK performed by OWNER's own forces or others in accordance with Article 7.

4.5.4 To the fullest extent permitted by Laws and Regulations, OWNER will indemnify and hold harmless CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and the officers, directors, employees, agents, other consultants and subcontractors of each and any of them from and against all claims, costs, losses and damages arising out of or resulting from such hazardous condition, provided that: (i) any such claim, cost, loss or damage is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the WORK itself), including the loss of use resulting therefrom, and (ii) nothing in this subparagraph 4.5.4 shall obligate OWNER to indemnify any person or entity from and against the consequences of that person's or entity's own negligence.

4.5.5 The provisions of paragraphs 4.2 and 4.3 are not intended to apply to Asbestos, PCB's, Petroleum, Hazardous Waste or Radioactive Material uncovered or revealed at the site.

ARTICLE 5 - BONDS AND INSURANCE
Performance, Payment and Other Bonds

5.1 CONTRACTOR shall furnish performance and payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, except as otherwise provided by Law or Regulation or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary Conditions. All Bonds shall be in the forms prescribed by the Contract Documents except as provided otherwise by Laws and Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit staff, Bureau of Government Financial Operations, U.S. Department of Treasury. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act. Such agent shall be resident in the County where the Project is located or in such other Counties that are acceptable to OWNER.

5.1.1 Performance and payment bonds shall mean Public Construction Bonds. Public Construction Bonds executed as part of the Contract shall be by a corporate surety authorized to do business in the State of North Carolina. All bids signed by an agent must be accompanied by a certified copy of authority to act.

Bond and Surety Substitution

5.2 If the surety on any Bond furnished by CONTRACTOR is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of paragraph 5.1, CONTRACTOR shall within ten days thereafter substitute another Bond and Surety, both of which must be acceptable to OWNER

5.3 Licensed Sureties and Insurers; Certificates of Insurance:

5.3.1 All Bonds and insurance required by the Contract Documents to be purchased and maintained by CONTRACTOR shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue Bonds or insurance policies for the limits and coverages so required.

5.3.2 All surety companies furnishing bid, performance, payment or other type of bonds shall meet the following requirements:

5.3.2.1 The Surety shall be rated as "A" or better as to General Policyholders Rating and Class X or better as to Financial Category by Best's Key

5.3.2.2 The bonding limit of the Surety shall not exceed ten percent (10%) of the policyholder surplus (capital and surplus) as listed by the aforementioned Best's Key Rating Guide, on any one risk (penalty or amount of any one bond).

5.3.2.3 The Surety shall be subject to approval by the OWNER and may be rejected without cause, in the same manner that bids may be rejected.

5.3.2.4 Policy Holders Surplus shall be ten (10) times the amount of any one bond.

5.3.2.5 Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.3.3 CONTRACTOR shall deliver to OWNER, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by OWNER or any other additional insured) which CONTRACTOR is required to purchase and maintain in accordance with paragraph 5.4.

**CONTRACTOR's Liability Insurance**

5.4 CONTRACTOR shall purchase and maintain such liability and other insurance as is appropriate for the WORK being performed and furnished and as will provide protection from claims set forth below which may arise out of or result from CONTRACTOR's performance and furnishing of the WORK and CONTRACTOR's other obligations under the Contract Documents, whether it is to be performed or furnished by CONTRACTOR, any Subcontractor or Supplier, by anyone directly or indirectly employed by any of them to perform or furnish any of the WORK, or by anyone for whose acts any of them may be liable:

The limits of liability for the insurance required by paragraph 5.4 of the General Conditions shall provide coverage as provided in Section 00500

**Property Insurance**

5.5 CONTRACTOR shall purchase and maintain until final payment property insurance upon the WORK at the site to the full insurable value thereof (subject to such deductible amounts as may be provided in these Supplementary Conditions or required by Laws and Regulations) provided that such deductible not exceed as provided in Section 00500.
This insurance shall include the interests of OWNER, CONTRACTOR Subcontractors, ENGINEER and Engineer's consultants in the WORK (all of whom shall be listed as insureds or additional insured parties), shall insure against the perils of fire and extended coverage, shall include "all-risk" insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, damage from pollution and such other perils as may be provided in these Supplementary Conditions, and shall include damages, losses and expenses arising out of or resulting from any insured loss or incurred.

Boiler and Machinery Insurance

5.6 **NOT REQUIRED UNDER THIS CONTRACT.** Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and any other persons or entities identified in the Supplementary Conditions, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

Notice of Change

5.7 All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with paragraphs 5.5 and 5.6 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least thirty days prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with paragraph 5.8.

5.8 **Waiver of Rights**

5.8.1 OWNER and CONTRACTOR intend that all policies purchased in accordance with paragraphs 5.5 and 5.6 will protect OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and all other persons or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds in such policies and will provide primary coverage for all losses and damages caused by the perils covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. OWNER and CONTRACTOR waive all rights against each other and their respective officers, directors, employees and agents for all losses and damages caused by, arising out of or resulting from any of the perils covered by such policies and any other property insurance
applicable to the WORK; and, in addition, waive all such rights against Subcontractors, ENGINEER, ENGINEER's Consultants and all other persons or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance payable under any policy so issued.

5.8.2 In addition, OWNER waives all rights against CONTRACTOR, Subcontractor, ENGINEER, ENGINEER's Consultants and the officers, directors, employees and agents of any of them, for:

5.8.2.1 Loss due to business interruption, loss of use or other consequential loss extending beyond direct physical loss or damage to OWNER's property or the WORK caused by, arising out of or resulting from fire or other peril; and

5.8.2.2 Loss or damage to the completed Project or part thereof caused by, arising out of or resulting from fire or other insured peril covered by any property insurance maintained on the completed Project or part thereof during partial utilization pursuant to paragraph 14.10, after substantial completion pursuant to paragraph 14.8 or after final payment pursuant to paragraph 14.13.

Any insurance policy covering any loss, damage or consequential loss referred to in this paragraph 5.8.2 shall contain provisions to the effect that in the event of payment of any such loss, damage or consequential loss the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder.

Acceptance of Bonds and Insurance

5.9 If OWNER has any objection to the coverage afforded by or other provisions of the Bonds or insurance required to be purchased and maintained by CONTRACTOR in accordance with Article 5 on the basis of non-conformance with the Contract Documents, OWNER will so notify CONTRACTOR in writing within ten days after receipt of the certificates (or other evidence requested) required by paragraph 2.1. CONTRACTOR shall provide to the OWNER such additional information in respect of insurance provided as the OWNER may reasonably request. If CONTRACTOR fails to correct the deficiency and does not purchase and maintain all of the Bonds and insurance required of the CONTRACTOR by the Contract Documents, then the OWNER, without prejudice to any other right or remedy, may elect to obtain equivalent Bonds and insurance to protect OWNER's interests at the expense of the CONTRACTOR.
5.9.1 CONTRACTOR shall not be given Notice to Proceed under this Contract until he has obtained all the insurance required by the Contract Documents and such insurance has been approved by OWNER.

5.9.2 CONTRACTOR shall not allow a Subcontractor to work on a project without either Subcontractor carrying his own Workers Compensation and Liability insurance or CONTRACTOR covering Subcontractor under his policies. The policy is the same for each succeeding sub-tier contractor. OWNER may request proof of such coverage for any Subcontractor at any time during the project.

Partial Utilization - Property Insurance

5.10 If OWNER finds it necessary to occupy or use a portion or portions of the WORK prior to Substantial Completion of all the WORK, such use or occupancy may be accomplished in accordance with paragraph 14.10, provided that no such use or occupancy shall commence before the insurers have acknowledged notice thereof and in writing effected the changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or lapse on account of any such partial use or occupancy.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

Supervision

6.1. CONTRACTOR shall supervise, inspect and direct the WORK competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the WORK in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction, but CONTRACTOR shall not be responsible for the negligence of others in the design or specification of a specific means, methods, technique, sequence or procedure of construction which is shown or indicated in and expressly required by the Contract Documents. CONTRACTOR shall be responsible to see that the completed WORK complies accurately with the Contract Documents.

Superintendent

6.2 CONTRACTOR shall keep on the WORK at all times during its progress a competent resident superintendent, who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent shall be CONTRACTOR's representative at the site and shall have authority to act on behalf of CONTRACTOR. All communications given to the superintendent shall be as binding as if given to CONTRACTOR.
Labor and Work Hours

6.3 CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out and construct the WORK as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the site. 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 indicated in the Contract Documents, all WORK at the site shall be performed during regular working hours.

6.3.1 Regular working hours shall be a 10-hour period (including a thirty-minute lunch) to be 7:00 a.m. to 5:00 p.m. - 6 days per week except holidays. This period may change with the approval of the OWNER and ENGINEER at least 72 hours prior to the proposed change. Requests to work during other than regular working hours must be submitted to the ENGINEER at least 72 hours in advance of the period proposed for such overtime work and shall set forth the proposed schedule for overtime work to give ENGINEER sample time to arrange for his personnel to be at the site of the work.

6.3.2 CONTRACTOR shall pay for the additional engineering charges to the OWNER on account of the overtime work which may be authorized under the provision of Paragraph 6.3.1. Such additional engineering charges shall be a subsidiary obligation of CONTRACTOR and no extra payment shall be made by OWNER on account of such overtime work. ENGINEERING overtime charges shall be calculated for those hours in excess of 10 hours per day or 60 hours per week when it is deemed necessary by the ENGINEER, that the ENGINEER’s presence is required to observe the work for observation or record purposes. These charges shall be in accordance with the terms of ENGINEER's Agreement with the OWNER. For estimating purposes, a base hourly rate of $95 per hour shall be used for each observer.

Responsibility for Materials and Equipment

6.4 Unless otherwise specified in the General Requirements, CONTRACTOR shall furnish and assume full responsibility for all 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 furnishing, performance, testing, start-up and completion of the WORK.

6.4.1 All water for testing, flushing and construction shall be furnished by the CONTRACTOR. It shall be available by connecting to the OWNER's water system, on-site borrow pits, other surface water locations, or at a point approved by the OWNER. The OWNER shall charge the CONTRACTOR for water used in performing the above functions in accordance with the OWNER's established
rate schedule. There shall be installed in each and every connection to the OWNER's water supply a backflow preventer meeting the requirements of ANSI A40.6, latest revision at each and every connection. CONTRACTOR shall be required to meter all water used. When available, plant effluent (treated wastewater) may be used for flushing and testing.

**Quality of Materials and Equipment**

6.5 All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of OWNER. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable Supplier except as otherwise provided in the Contract Documents.

**Progress Schedule**

6.6 CONTRACTOR shall adhere to the progress schedule established in accordance with paragraph 2.8 as it may be adjusted from time to time as provided below:

6.6.1 CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.8) proposed adjustments in the progress schedule that will not change the Contract Times (or Milestones). Such adjustments shall conform generally to the progress schedule then in effect and additionally will comply with any provision of the General Requirements applicable thereto.

6.6.2 Proposed adjustments in the progress schedule that will change the Contract Times (or Milestones) shall be submitted in accordance with the requirements of paragraph 12.1. Such adjustments may only be made by a Change Order or Written Amendment in accordance with Article 12.

6.7 **Substitutes or "Or-Equal" Items**

6.7.1 Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier the specification or description is intended to establish the type, function and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent or "or equal" item or no substitution is permitted, other items of material or equipment or materials or equipment of other Suppliers may be accepted by ENGINEER under the following circumstances:
6.7.1.1 "Or-Equal": If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR is functionally equal to that named and sufficiently similar so that no change in related WORK will be required, it may be considered by ENGINEER as an "or-equal" item, in which case review and acceptance of the proposed item may, in ENGINEER's sole discretion, be accomplished without compliance with some or all of the requirements for acceptance of proposed substitute items.

6.7.1.2 Substitute Items: If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR does not qualify as an "or-equal" item under subparagraph 6.7.1.1, it will be considered a proposed substitute item. CONTRACTOR shall submit sufficient information as provided below to allow ENGINEER to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor.

The procedure for review by ENGINEER will include the following as supplemented in the General Requirements: Requests for review of proposed substitute items of material or equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR. If CONTRACTOR wishes to furnish or use a substitute item of material or equipment, CONTRACTOR shall first make written application to ENGINEER for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified and be suited to the same use as that specified. The application will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use 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 work on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the WORK is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which shall be considered by ENGINEER in evaluating the proposed substitute.
ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute.

6.7.1.3 CONTRACTOR's Expense: All data to be provided by CONTRACTOR in support of any proposed "or equal" or substitute item shall be at CONTRACTOR's expense.

6.7.2 Substitute Construction Methods or Procedures: If a specific means, method, technique, sequence or procedure of construction is shown or indicated in and expressly required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to ENGINEER. CONTRACTOR shall submit sufficient information to allow ENGINEER, in ENGINEER's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in subparagraph 6.7.1.2.

6.7.3 ENGINEER's Evaluation: ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to paragraphs 6.7.1.2 and 6.7.2. ENGINEER will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized without ENGINEER's prior written acceptance which will be evidenced by either a Change Order or an accepted Shop Drawing. OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any "or equal" or substitute. ENGINEER will record time required by ENGINEER and ENGINEER's Consultants in evaluating substitutions proposed or submitted by CONTRACTOR pursuant to paragraphs 6.7.1.2 and 6.7.2 and in making changes in the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) occasioned thereby. Whether or not ENGINEER accepts a substitute item so proposed or submitted by CONTRACTOR, CONTRACTOR shall reimburse ENGINEER for the charges of ENGINEER and ENGINEER's consultants for evaluating each such proposed substitute item.

6.8 Employment of Subcontractors, Suppliers and Others

6.8.1 CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization (including those acceptable to OWNER and ENGINEER as indicated in paragraph 6.8.2), whether initially or as a substitute, against whom OWNER or ENGINEER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier or other person or organization to furnish or perform any of the WORK against whom CONTRACTOR has reasonable objection.
6.8.2 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers or other persons or organizations (including those who are to furnish the principal items of materials and equipment) to be submitted to OWNER in advance of the specified date prior to the Effective Date of the Agreement for acceptance by OWNER and ENGINEER and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, OWNER's or ENGINEER's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the bidding documents or the Contract Documents) of any such Subcontractor, Supplier or other person or organization so identified may be revoked on the basis of reasonable objection after due investigation, in which case CONTRACTOR shall submit an acceptable substitute, the Contract Price will be adjusted by the difference in the cost occasioned by such substitution and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by OWNER or ENGINEER of any such Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of OWNER or ENGINEER to reject defective WORK.

6.8.3 CONTRACTOR shall identify and provide information on Subcontractors, Suppliers and other persons or organizations which shall be used by CONTRACTOR in accordance with requirements of the Bidding Documents.

6.9 Responsibility for Subcontractors, Suppliers and Others

6.9.1 CONTRACTOR shall be fully responsible to OWNER for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the WORK under a direct or indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier or other person or organization any contractual relationship between OWNER or ENGINEER and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any monies due any such Subcontractor, Supplier or other person or organization except as may otherwise be required by Laws and Regulations.

6.9.2 CONTRACTOR shall be solely responsible for scheduling and coordinating the WORK of Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the WORK under a direct or indirect contract with CONTRACTOR. CONTRACTOR shall require all Subcontractors, Suppliers and such other persons and organizations performing or furnishing
any of the WORK to communicate with the ENGINEER through CONTRACTOR.

Scope of Subcontract Work

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

Subcontractor Agreements

6.11 All WORK performed for CONTRACTOR by a Subcontractor or Supplier will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER.

Patent Fees and Royalties

6.12 CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the WORK or the incorporation in the WORK of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the Contract Documents for use in the performance of the WORK and if to the actual knowledge of OWNER or ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by OWNER in the Contract Documents. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER and ENGINEER, ENGINEER's Consultants and officers, directors, employees, agents and other consultants of each and any of them from and against all claims, costs, damages, losses, and expenses arising out of or resulting from 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, and shall defend all such claims in connection with any alleged infringement of such rights.

Permits

6.13 Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall obtain and pay for all construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses, including revising Drawings and/or Specifications as required by the permitting agencies. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the WORK, which are applicable at the time of opening of Bids, or if there
are no Bids on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility owners for connections to the WORK, and OWNER shall pay all charges of such utility owners for capital costs related thereto such as plant investment fees. The OWNER has applied for or has secured permits and/or licenses for the project from the following agency:

State of North Carolina
Department of Environment and Natural Resources
Division of Waste Management

That include:
- Solid Waste Management Facility Construction Permit.
- Soil and Erosion Control Permit
- Stormwater Management Permit

Prior to the start of construction, the Contractor shall have obtained with the assistance of the Owner, the following item:

N/A.

6.14 **Laws and Regulations**

6.14.1 CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to furnishing and performance of the WORK. Except where otherwise expressly required by applicable Laws and Regulations, neither OWNER nor ENGINEER shall be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.

6.14.2 If CONTRACTOR performs any WORK knowing or having reason to know that it is contrary to such Laws or Regulations, CONTRACTOR shall bear all claims, costs, losses and damages arising out of or resulting therefrom; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with such Laws and Regulations, but this shall not relieve CONTRACTOR of CONTRACTOR's obligations under paragraph 3.3.2.

**Taxes**

6.15 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. Detailed reports of state taxes paid for materials will be provided to the OWNER with each pay request.

**Use of Premises**
6.16 CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Project site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and Regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any adjacent land or areas, resulting from the performance of the WORK. Should any claim be made by any such owner or occupant because of the performance of the WORK, CONTRACTOR shall promptly attempt to settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law. CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultant and anyone directly or indirectly employed by any of them from and against all claims, costs, damages and losses arising out of or resulting from any claim or action, legal or equitable, brought by any such owner or occupant against OWNER, ENGINEER or other party indemnified hereunder to the extent caused by or based upon CONTRACTOR's performance of the WORK.

Control of Waste Materials

6.17 During the progress of the WORK, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the WORK. At the completion of the WORK CONTRACTOR shall remove all remaining waste materials, rubbish, and debris from and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials, and shall leave the site clean and ready for occupancy by OWNER at Substantial Completion of the WORK. CONTRACTOR shall restore to original condition all property not designated for alteration by the Contract Documents.

Loading or Stressing Completed Work

6.18 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 property to stresses or pressures that will endanger it.

Record Documents

6.19 CONTRACTOR shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, WORK Change Directives, Field Orders and written interpretations and clarifications (issued pursuant to paragraph 9.4) in good order and annotated to show all changes made during construction. These record documents together with all accepted Samples and a counterpart of all Shop Drawings reviewed and found satisfactory for construction shall
be available to ENGINEER for reference. Upon completion of the WORK, these record documents, Samples and Shop Drawings shall be delivered to ENGINEER for OWNER. Final payment and acceptance of the project will be withheld until delivery of the documents is made to the ENGINEER.

Safety and Protection

6.20 CONTRACTOR shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the WORK. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

6.20.1 all persons on the worksite who may be affected by the WORK;

6.20.2 all the WORK and materials and equipment to be incorporated therein, whether in storage on or off the site; and

6.20.3 Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and Underground Facilities not designated for removal, relocation or replacement in the course of construction.

CONTRACTOR shall comply with all applicable Laws and Regulations of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss, and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and utility owners when prosecution of the WORK may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property referred to in paragraph 6.20.2 or 6.20.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the WORK or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of OWNER or ENGINEER or ENGINEER's Consultant 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 person or organization directly or indirectly employed by any of them). CONTRACTOR's duties and responsibilities for the safety and protection of the WORK shall continue until such time as all the WORK is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.13 that the
WORK is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

Safety Representative

6.21 CONTRACTOR shall designate a qualified and experienced safety representative at the site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

Hazard Communication Programs

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

Emergencies

6.23 In emergencies affecting the safety or protection of persons or the WORK or property at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from ENGINEER or OWNER, is obligated to act to prevent threatened damage, injury or loss. CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the WORK or variations from the Contract Documents have been caused thereby. If ENGINEER determines that a change in the Contract Documents is required because of the action taken by the CONTRACTOR in response to such an emergency, a WORK Change Directive or Change Order will be issued to document the consequences of such action.

6.24 Shop Drawings and Samples

6.24.1 CONTRACTOR shall submit Shop Drawings to ENGINEER for review in accordance with the accepted schedule of Shop Drawings and Sample submittals (see paragraph 2.9). Shop Drawings shall bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submittal. Shop Drawings submitted without this stamp or specific written indication will be returned without action. All submittals shall be identified as ENGINEER may require and in the number of copies specified in the General Requirements. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to show ENGINEER the materials and equipment CONTRACTOR proposes to provide and to enable ENGINEER to review the information for the limited purposes required by paragraph 6.26.
6.24.2 CONTRACTOR shall also submit Samples to ENGINEER for review in accordance with said accepted schedule of Shop Drawings and Sample submittals. Each Sample shall be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which intended and otherwise as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by paragraph 6.26. The number of each Sample to be submitted shall be as specified in the Specifications.

6.25 Submittal Procedures

6.25.1 Before submitting each Shop Drawing or Sample CONTRACTOR shall have determined and verified:

6.25.1.1 all field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto,

6.25.1.2 all materials with respect to intended use, fabrication, shipping, handling, storage, assembly and installation pertaining to the performance of the WORK, and

6.25.1.3 all information relative to CONTRACTOR's responsibilities in respect of means, methods, techniques, sequences and procedures of construction and safety precautions and programs incident thereto.

CONTRACTOR shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the WORK and the Contract Documents.

6.25.2 Each submittal shall bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's obligations under the Contract Documents with respect to CONTRACTOR's review and acceptance of that submittal.

6.25.3 At the time of each submission, CONTRACTOR shall give ENGINEER specific written notice of such variations, if any, that the Shop Drawing or Sample submitted may have from the requirements of the Contract Documents, such notice to be in written communication separate from the submittal, and, in addition, shall cause a specific notation to be made on each Shop Drawing and Sample submitted to ENGINEER for review of each such variation.

Submittal Review
6.26 ENGINEER will review Shop Drawings and Samples in accordance with the schedule of Shop Drawings and Sample submittals accepted by ENGINEER as required by paragraph 2.8 with time of review up to 30 days. ENGINEER's review will be only to determine if the items covered by the submittals will, after installation or incorporation in the WORK, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. ENGINEER's review will not extend to means, methods, techniques, sequences or procedures of construction (except where a particular means, method, technique, sequence or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review of a separate item as such will not indicate review of the assembly in which the item functions. CONTRACTOR shall make corrections required by ENGINEER, and shall return the required number of corrected copies of Shop Drawings and submittal data will be reviewed up to two times; thereafter all further review time will be charged to the CONTRACTOR.

CONTRACTOR's Responsibility

6.27 ENGINEER's review of Shop Drawings or samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of submission as required by paragraph 6.25.3 and ENGINEER has acted on each such variation by a specific written notation incorporated in or accompanying the Shop Drawing or Sample; nor will any action by ENGINEER relieve CONTRACTOR from responsibility for errors or omissions in the Shop Drawings or CONTRACTOR from responsibility for complying with the provisions of paragraph 6.25.1.

Work Performed Prior to Review

6.28 Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submittals accepted by ENGINEER, as required by paragraph 2.8, any related WORK performed prior to ENGINEER's review of the pertinent submittal will be at the sole expense and the sole responsibility of CONTRACTOR.

Continuing the Work

6.29 CONTRACTOR shall carry on the WORK and adhere to the progress schedule during all disputes or disagreements with OWNER. No WORK shall be delayed or postponed
pending resolution of any disputes or disagreements, except as permitted by paragraph 15.5 or as CONTRACTOR and OWNER may otherwise agree in writing.

6.30 CONTRACTOR's General Warranty and Guarantee

6.30.1 CONTRACTOR warrants and guarantees to OWNER, ENGINEER and ENGINEER's Consultants that all WORK will be in accordance with the Contract Documents and will not be defective. CONTRACTOR's warranty and guarantee hereunder excludes defects or damage caused by:

6.30.1.1 abuse, modification or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors or Suppliers; or

6.30.1.2 normal wear and tear under normal usage.

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

6.30.2.1 observations by ENGINEER;

6.30.2.2 recommendation of any progress or final payment by ENGINEER;

6.30.2.3 the issuance of a certificate of Substantial Completion or any payment by OWNER to CONTRACTOR under the Contract Documents;

6.30.2.4 use or occupancy of the WORK or any part thereof by OWNER;

6.30.2.5 any acceptance by OWNER or any failure to do so;

6.30.2.6 any review and acceptance of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER pursuant to paragraph 14.13;

6.30.2.7 any inspection, test or acceptance by others; or

6.30.2.8 any correction of defective WORK by OWNER.

Indemnification

6.31 To the fullest extent permitted by Laws and Regulations CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants, and the
officers, directors, employees, agents and other consultants of each and any of them from and against all claims, costs, damages, losses and expenses, (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) caused by, arising out of, or resulting from the performance of the WORK, provided that any such claim, cost, damage, loss or expense (i) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the WORK itself) including the loss of use resulting therefrom and (ii) is caused in whole or in part by any negligent act or omission of CONTRACTOR, its Subcontractors or Suppliers, or any person or organization directly or indirectly employed by any of them to perform or furnish any of the WORK or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by any negligence or omission of a person or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Law and Regulations regardless of the negligence of any such person or entity. The CONTRACTOR and OWNER agree that by exchange of Ten Dollars ($10.00) of the Contract Price payable by the OWNER to the CONTRACTOR for performance of the WORK that the Contractor acknowledges the specific consideration of the indemnification provided herein.

Obligation Not Limited by Employee Benefits Acts

6.32 In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors or employees by any employee (or the survivor or personal representatives of such employee) of CONTRACTOR, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the WORK, or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.31 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for CONTRACTOR or any such Subcontractor, Supplier or other person or organization under workers' compensation acts, disability benefit acts or other employee benefit acts.

ENGINEER's Errors and Omissions

6.33 The indemnification obligations of CONTRACTOR under paragraph 6.31 shall not extend to the liability of ENGINEER, ENGINEER's Consultants, officers, directors, agents or employees caused by the professional negligence, errors or omissions of any of them.

Survival of Obligations

6.34 All representations, indemnifications, warranties and guarantees made in, required by or given in accordance with the Contract Documents, as well as all continuing obligations
indicated in the Contract Documents, will survive final payment, completion and acceptance of the WORK and termination or completion of the Agreement.

ARTICLE 7 - OTHER WORK

Related Work at Site

7.1 OWNER may perform other work related to the Project at the site with OWNER's own forces, or let other direct contracts therefor which shall contain General Conditions similar to these, or have other work performed by utility owners. If the fact that such other work is to be performed was not noted in the Contract Documents, written notice thereof will be given to CONTRACTOR prior to starting any such other work.

CONTRACTOR's Obligations

7.2 CONTRACTOR shall afford any other contractor who is a party to such a direct contract and each utility owner (and OWNER, if OWNER is performing the additional work with OWNER's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly connect and coordinate the WORK with theirs. Unless otherwise provided in the Contract Documents, CONTRACTOR shall do all cutting, fitting and patching of the WORK that may be required to make its several parts come together properly and integrate with such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of ENGINEER and others whose work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other contractors.

Inspection of Related Work by Others

7.3 If the proper execution or results of any part of CONTRACTOR's WORK depends upon work performed by others under this Article 7, 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 make such report will constitute an acceptance of such other work as fit and proper for integration with CONTRACTOR's WORK except for latent or non-apparent defects and deficiencies in such other work.

Coordination
7.4 If OWNER contracts with others for the performance of other work on the Project at the site, the following will be set forth in Supplementary Conditions:

7.4.1 The person, firm or organization that will have authority and responsibility for coordination of the activities among the various prime contractors will be identified,

7.4.2 The specific matters to be covered by such authority and responsibility will be itemized,

7.4.3 The extent of such authority and responsibilities will be provided.

If the above is not provided in the Supplementary Conditions, OWNER shall have sole authority and responsibility in respect of such coordination.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

Communication with CONTRACTOR

8.1 Except as otherwise provided in the Contract Documents, OWNER will issue all communications to CONTRACTOR through ENGINEER.

Replacement of ENGINEER

8.2 In case of termination of the employment of ENGINEER, OWNER will appoint a person, firm or corporation whose status under the Contract Documents shall be that of the former ENGINEER.

Prompt Payments

8.3 OWNER will furnish the data required of OWNER under the Contract Documents promptly and will make payments to CONTRACTOR promptly when they are due as provided in paragraphs 14.4 and 14.13.

Lands and Data

8.4 OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.4. Paragraph 4.2 refers to OWNER's identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions at the site and drawings of physical conditions in existing structures at or contiguous to the site which have been utilized by ENGINEER in preparing the Contract Documents.
8.5 OWNER is obligated to execute Change Orders as indicated in paragraph 10.4.

Inspections and Tests

8.6 OWNER's responsibility in respect of certain inspections, tests and acceptances is set forth in paragraph 13.4.

Suspension or Termination of Work

8.7 In connection with OWNER's right to stop WORK or suspend WORK, see paragraphs 13.10 and 15.1. Paragraph 15.2 deals with OWNER's right to terminate services of CONTRACTOR under certain circumstances.

Responsibilities Not OWNER's

8.8 The OWNER will 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 furnishing or performance of the WORK. OWNER will not be responsible for CONTRACTOR's failure to perform or furnish the WORK in accordance with the Contract Documents.

Hazardous Materials

8.9 OWNER's responsibility in respect of undisclosed Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Materials uncovered or revealed at the site is set forth in paragraph 4.5.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

Owner's Representative

9.1 ENGINEER (or ENGINEER's assistant or project representative at the site) 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 Documents and shall not be extended without written consent of OWNER and ENGINEER.

Visits to Site

9.2 ENGINEER will make visits to the site at intervals appropriate to the various stages of construction to observe as an experienced and qualified design professional the progress and quality of the various aspects of the executed WORK. Based on information
obtained during such visits and observations, ENGINEER will endeavor for the benefit of OWNER to determine, in general, if the WORK is proceeding in substantial accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the WORK. On the basis of such visits and on-site observations, ENGINEER will keep OWNER informed of the progress of the WORK and will endeavor to guard OWNER against defects and deficiencies in the WORK. ENGINEER's visits and on-site observations are subject to all the limitations on ENGINEER's authority and responsibility set forth in paragraph 9.13, and particularly, but without limitation, during or as a result of ENGINEER's on-site 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 furnishing or performance of the WORK.

Project Representation

9.3 If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project Representative (RPR) or Engineers Representative to assist ENGINEER in providing more continuous observation of the WORK. If OWNER designates another representative or agent to represent OWNER at the site who is not ENGINEER's Consultant, agent or employee, the responsibilities and authority and limitations thereon of such other person will be as provided at that time.

Clarifications and Interpretations

9.4 ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as ENGINEER may determine necessary, which shall be consistent with the intent of and reasonably inferable from the Contract Documents. Such written clarifications will be binding on OWNER and CONTRACTOR. If CONTRACTOR believes that a written clarification or interpretation justifies an adjustment in the Contract Price or the Contract Times and the parties are unable to agree to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Article 11 or Article 12.

Authorized Variations in Work

9.5 ENGINEER may authorize minor variations in the WORK from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are consistent with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on OWNER, and also on CONTRACTOR who shall
perform the WORK involved promptly. If CONTRACTOR believes that a Field Order justifies an adjustment in the Contract Price or the Contract Times and the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Article 11 or 12.

**Rejecting Defective Work**

9.6 ENGINEER will have authority to reject WORK which ENGINEER believes to be defective, or that ENGINEER believes will not produce a completed project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. ENGINEER will also have authority to require special inspection or testing of the WORK as provided in paragraph 13.9, whether or not the WORK is fabricated, installed or completed. ENGINEER will notify the CONTRACTOR in writing of any disapproval and/or rejection.

**Shop Drawings and Samples**

9.7 In connection with ENGINEER's authority as to Shop Drawings and Samples, see paragraphs 6.24 through 6.28 inclusive.

**Change Orders**

9.8 In connection with ENGINEER's authority as to Change Orders, see Articles 10, 11 and 12.

**Certification of Payments**

9.9 In connection with ENGINEER's authority as to Applications for Payment, etc., see Article 14.

**Determination for Unit Prices**

9.10 ENGINEER will verify and/or determine the actual quantities and classifications of Unit Price WORK performed by CONTRACTOR. ENGINEER will review with CONTRACTOR the preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). ENGINEER's written decisions thereon will be final and binding upon OWNER and CONTRACTOR.

**Decisions on Disputes**

9.11 ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the WORK thereunder. Claims, disputes and other
matters relating to the acceptability of the WORK or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the WORK and claims under Articles 11 and 12 in respect of changes in the Contract Price or Contract Times shall be referred initially to ENGINEER in writing with a request for a formal decision in accordance with this paragraph, which ENGINEER will render in writing within a reasonable time. Written notice of each such claim, dispute and other matter shall be delivered by the claimant to ENGINEER and the other party to the Agreement promptly (but in no event later than thirty days) after the start of such occurrence or event giving rise thereto, and written supporting data shall be submitted to ENGINEER and the other party within sixty days after the start of such occurrence or event unless ENGINEER allows an additional period of time for the submission of additional or more accurate data in support of the claim, dispute or other matter. The opposing party shall submit any response to ENGINEER and the claimant within thirty days after receipt of the claimant's last submittal (unless ENGINEER allows additional time). ENGINEER will render a formal decision in writing within thirty days after receipt of the opposing party's submittal, if any, in accordance with this paragraph. ENGINEER's written decision on such claim, dispute or other matter will be final and binding upon OWNER and CONTRACTOR.

ENGINEER's Liability

9.12 When functioning as interpreter under paragraphs 9.10 and 9.11, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to paragraphs 9.10 and 9.11 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.16) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter.

9.13 Limitations on ENGINEER's Responsibilities

9.13.1 Neither ENGINEER's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise or performance of any authority or responsibility by ENGINEER shall create, impose or give rise to any duty owed by ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization, or to any surety for or employee or agent of any of them.

9.13.2 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 furnishing or performance of the WORK. ENGINEER will not be responsible for CONTRACTOR's failure to perform or furnish the WORK in accordance with the Contract Documents.

9.13.3 ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the WORK.

9.13.4 ENGINEER's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds and certificates of inspection, tests and acceptances and other documentation required to be delivered by paragraph 14.12 will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests and acceptances that the results certified indicate compliance with, the Contract Documents.

9.13.5 The limitations upon authority and responsibility set forth in this paragraph 9.13 shall also apply to ENGINEER's Consultants, Resident Project Representative and assistants.

ARTICLE 10 - CHANGES IN THE WORK

OWNER's Option to Change Scope

10.1 Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions or revisions in the WORK. Such additions, deletions or revisions will be authorized by a Change Order, or a WORK Change Directive. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the WORK involved which shall be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided). Within five (5) days after receipt of a WORK Change Directive authorizing additions, deletions or revisions to the WORK, the CONTRACTOR shall submit therefor a price proposal and a proposal for adjustment of Contract Time, if any.

Disagreement as to Adjustments

10.2 If OWNER and CONTRACTOR are unable to agree as to the extent, if any, of an adjustment in the Contract Price or Contract Times that should be allowed as a result of a WORK Change Directive, a claim may be made therefor as provided in Article 11 or Article 12.

Limits of Adjustments
10.3 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 and supplemented as provided in paragraphs 3.5 and 3.6, except in the case of an emergency as provided in paragraph 6.23, or in the case of uncovering WORK as provided in paragraph 13.9.

Change Orders

10.4 OWNER and CONTRACTOR shall execute appropriate Change Orders (or Written Amendments) covering:

10.4.1 changes in the WORK which are ordered by OWNER pursuant to paragraph 10.1, are required because of acceptance of defective WORK under paragraph 13.13 or correcting defective WORK under paragraph 13.14, or are agreed to by the parties;

10.4.2 changes in the Contract Price or Contract Times which are agreed to by the parties; and

10.4.3 changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 9.11;

provided that, in lieu of executing any such Change Order (or Written Amendment), an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the WORK and adhere to the progress schedule as provided in paragraph 6.29.

10.5 At anytime, ENGINEER may request a quotation from CONTRACTOR for a proposed change in the WORK. Within twenty-one (21) calendar days after receipt of a request for a quotation for a proposed change, CONTRACTOR shall submit a written and detailed proposal for an increase or decrease in the Contract Price or Contract Time for the proposed Change. Engineer shall have twenty-one (21) calendar days after receipt of the detailed proposal to respond in writing. The proposal shall include an itemized estimate of all costs and time for performance that will result directly or indirectly from the proposed change. Unless otherwise directed, itemized estimates shall be in accordance with Articles 11 and 12 and in sufficient detail reasonably to permit an analysis by ENGINEER of all material, labor, equipment, subcontract, and overhead costs and fees and shall cover all WORK involved in the change, whether such WORK was deleted, added, changed, or impacted. Any amount claimed for subcontracts shall be similarly supported. Itemized schedule adjustments shall be in sufficient detail to permit an analysis of the impact in accordance with Section 01310 of the Bid Documents. Notwithstanding the request for quotation, CONTRACTOR shall carry on the WORK
and maintain the progress schedule. Delays in the submittal of the written and detailed quotation will be considered non-prejudicial as defined in the Supplementary Conditions.

10.6 The adjustment in Contract Price and/or Contract Time stated in a Change Order shall comprise the total price and/or time adjustment due or owed the CONTRACTOR for the work or changes defined in the Change Order. By executing the Change Order, the CONTRACTOR acknowledges and agrees that the stipulated price and/or time adjustments include the costs and delays for all work contained in the Change Order, including costs and delays associated with the interruption of schedules, extended including costs and delays associated with the interruption of schedules, extended overheads, delay, and cumulative impacts or ripple effect on all other non-affected work under this contract. Signing of the Change Order constitutes full and mutual accord and satisfaction for the adjustment in contract price or time as a result of increases or decreases in costs and time of performance caused directly and indirectly from the change, subject to the current scope of the entire work as set forth in the Contract Documents. Acceptance of the waiver constitutes an agreement between OWNER and CONTRACTOR that the Change Order represents an equitable adjustment to the Contract, and that CONTRACTOR will waive all rights to file a claim on this Change Order after it is properly executed.

Notification of Surety

10.7 If notice 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) is required by the provisions of any Bond to be given to a surety, the giving of any such notice shall be CONTRACTOR's responsibility, and the amount of each applicable Bond shall be adjusted accordingly.

ARTICLE 11 - CHANGES OF THE CONTRACT PRICE

Contract Price

11.1 The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to CONTRACTOR for performing the WORK. All duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR shall be at his expense without change in the Contract Price.

Price Adjustment Procedure

11.2 The Contract Price may only be changed by a Change Order or by a Written Amendment. Any claim for an adjustment in the Contract Price shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the start of the occurrence or the event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the
claim with supporting data shall be delivered within sixty days after such occurrence or event (unless ENGINEER allows an additional period of time for claimant to submit additional or more accurate data in support of the claim) and shall be accompanied by claimant's written statement that the adjustment claimed covers all known amounts (direct, indirect and consequential) to which the claimant is entitled as a result of said occurrence or event. All claims for adjustment in the Contract Price shall be determined by ENGINEER in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree on the amount involved. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with paragraph 11.2.

**Value of Price Adjustment**

11.3 The value of any WORK covered by a Change Order or of any claim for an adjustment in the Contract Price shall be determined in one of the following ways:

11.3.1 Where the WORK involved is covered by unit prices contained in the Contract Documents, by application of unit price to the quantities of the items involved (subject to the provisions of paragraphs 11.9.1 through 11.9.3, inclusive).

11.3.2 Where the WORK involved is not covered by unit prices contained in the Contract Documents, by mutual acceptance of a lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 11.6.2.1).

11.3.3 Where the WORK involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under paragraph 11.3.2, on the basis of the Cost of the WORK (determined as provided in paragraphs 11.4 and 11.5) plus a CONTRACTOR's Fee for overhead and profit (determined as provided in paragraph 11.6).

**Cost of the Work**

11.4 The term Cost of the WORK means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the WORK. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in paragraph 11.5;

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

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

11.4.3 Payments made by CONTRACTOR to the Subcontractors for WORK performed or furnished by Subcontractors. If required by OWNER, CONTRACTOR shall obtain competitive bids from Subcontractors acceptable to OWNER and CONTRACTOR and shall deliver such bids to OWNER who will then determine, with the advice of ENGINEER, which bids, if any, will be accepted. If a 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 shall be determined in the same manner as CONTRACTOR's Cost of the WORK and fee as provided in paragraphs 11.4, 11.5, 11.6 and 11.7. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.

11.4.4 Cost of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys and accountants) employed for services specifically related to the WORK.

11.4.5 Supplemental costs including the following:

11.4.5.1 The proportion of necessary transportation, travel and subsistence expenses of CONTRACTOR's employees incurred in discharge of duties connected with the WORK.

11.4.5.2 Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by the workers, which are consumed in the performance of the WORK, and cost less market value of such items used but not consumed which remain the property of CONTRACTOR.
11.4.5.3 Rentals of all construction equipment and machinery and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements, approved by OWNER with the advice of ENGINEER, and the costs of transportation, loading, unloading, installation, dismantling and removal thereof, all in accordance with terms of said rental agreements. The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the WORK. Rental of CONTRACTOR's equipment at the site shall be for hours used only. Rental of non-owned equipment shall be the minimum rental costs plus costs of transportation, unloading, etc. for the day or period in which the equipment is used, plus the hours used beyond the minimum number included in the minimum rental costs.

11.4.5.4 Sales, consumer, use or similar taxes related to the WORK, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

11.4.5.5 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.

11.4.5.6 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 and furnishing of the WORK, provided they have resulted from causes other than the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages and expenses shall be included in the Cost of the WORK for the purpose of determining CONTRACTOR's Fee. If, however, any such loss or damage requires reconstruction and CONTRACTOR is placed in charge thereof, CONTRACTOR shall be paid for services a fee proportionate to that stated in paragraph 11.6.2.

11.4.5.7 The cost of utilities, fuel and sanitary facilities at the site.

11.4.5.8 Minor expenses such as faxes, telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the WORK.

11.4.5.9 Cost of premiums for additional Bonds and insurance required because of changes in the WORK.
Cost of the Work Exclusions

11.5 The term Cost of the WORK shall not include any of the following:

11.5.1 Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), 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 a branch office for general administration of the WORK and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.4.1 or specifically covered by paragraph 11.4.4, all of which are to be considered administrative costs covered by the CONTRACTOR's Fee.

11.5.2 Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the site.

11.5.3 Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the WORK and charges against CONTRACTOR for delinquent payments.

11.5.4 Cost of premiums for all Bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by subparagraph 11.4.5.9 above).

11.5.5 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.

11.5.6 Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 11.4.

CONTRACTOR's Fee

11.6 The CONTRACTOR's Fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:

11.6.1 a mutually acceptable fixed fee; or

11.6.2 if a fixed fee is not agreed upon, a fee based on the following percentages of the various portions of the Cost of the WORK;
11.6.2.1 for costs incurred under paragraphs 11.4.1 and 11.4.2, the CONTRACTOR's Fee shall be fifteen percent;

11.6.2.2 for costs incurred under paragraph 11.4.3, the CONTRACTOR's Fee shall be five percent;

11.6.2.3 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 11.4.1, 11.4.2, 11.4.3 and 11.6.2 is that the Subcontractor who actually performs or furnishes the WORK, at whatever tier, will be paid a fee of fifteen percent of the costs incurred by such Subcontractor under paragraphs 11.4.1 and 11.4.2 and that any higher tier Subcontractor and CONTRACTOR will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

11.6.2.4 no fee shall be payable on the basis of costs itemized under paragraphs 11.4.4, 11.4.5, and 11.5;

11.6.2.5 the amount of credit to be allowed by CONTRACTOR to OWNER for any such change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in CONTRACTOR's Fee by an amount equal to the percentage of Paragraphs 11.6.2.1 through 11.6.2.4 of such net decrease; and

11.6.2.6 when both additions and credits are involved in any one change, the adjustment in CONTRACTOR's Fee shall be computed on the basis of the net change in accordance with paragraphs 11.6.2.1 through 11.6.2.4 inclusive.

Cost of the Work Records

11.7 Whenever the cost of any WORK is to be determined pursuant to paragraph 11.4 or 11.5, CONTRACTOR shall establish and maintain records thereof in accordance with generally accepted accounting practices and submit in form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

Cash Allowances

11.8 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 furnished and performed for such sums as may be acceptable to OWNER and ENGINEER. CONTRACTOR agrees that:
11.8.1 The 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

11.8.2 CONTRACTOR's costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances. No demand for additional payment on account of any of the foregoing will be valid.

Prior to final payment, an appropriate Change Order will be issued as recommended by ENGINEER to reflect actual amounts due CONTRACTOR on account of WORK covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.9 Unit Price Work

11.9.1 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 established unit prices for each separately identified item of Unit Price WORK times the estimated quantity of each item as indicated in the Agreement. 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. Determinations of the actual quantities and classifications of Unit Price WORK performed by CONTRACTOR will be made by ENGINEER in accordance with Paragraph 9.10

11.9.2 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.

11.9.3 If the actual quantity of any item of Unit Price WORK performed by CONTRACTOR varies from the estimated quantity of such item by twenty-five percent (25%) or less, payment for the Unit Price WORK will be made at the Contract Unit Price. If the actual quantity varies by more than twenty-five percent (25%), the compensation payable to the CONTRACTOR will be the subject of review by the CONTRACTOR and the ENGINEER and an equitable adjustment will be made in accordance with Article 11 to credit the OWNER with any reduction in cost or to compensate the CONTRACTOR for any increase in cost resulting from variations between estimated and actual quantities.
ARTICLE 12 - CHANGE OF CONTRACT TIME

Notice of Time Change Claim

12.1 The Contract Times (or Milestones) may only be changed by a Change Order or a Written Amendment. Any claim for an adjustment of the Contract Times (or Milestones) shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within sixty days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Times (or Milestones) shall be determined by ENGINEER in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Times (or Milestones) will be valid if not submitted in accordance with the requirements of this paragraph 12.1.

Contract Time

12.2 All time limits stated in the Contract Documents are of the essence of the Agreement. The provisions of Article 12 shall exclude recovery for damages for delay by either party.

Delays Beyond Control of CONTRACTOR

12.3 Where CONTRACTOR is prevented from completing any part of the WORK within the Contract Times (or Milestones) due to delay beyond the control of the CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to time lost due to such delays if a claim is made therefor as provided in paragraph 12.1. Such delays shall include, but not be limited to, acts or neglect by OWNER or utility owners or other contractors performing other work as contemplated by Article 7, or to fires, floods, labor disputes, epidemics, abnormal weather conditions or acts of God. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of the CONTRACTOR.

Delays Beyond Control of CONTRACTOR and OWNER

12.4 Where CONTRACTOR is prevented from completing any part of the WORK within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay. In no event shall OWNER be liable to CONTRACTOR, any Subcontractor, any Supplier, any other person or organization, or to any surety for or
employee or agent of any of them, for damages arising out of or resulting from (i) delays caused by or within the control of CONTRACTOR, or (ii) delays beyond the control of both parties including but not limited to fires, flood, epidemics, abnormal weather conditions, acts of God or acts or neglect by utility owners or other contractors performing other work as contemplated by Article 7.

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

Notice of Defects

13.1 Prompt notice of all defective WORK of which the OWNER or ENGINEER have actual knowledge will be given to CONTRACTOR. All defective WORK may be rejected, corrected or accepted as provided in this Article 13.

Access to Work

13.2 OWNER, ENGINEER, ENGINEER's Consultants, other representatives and personnel of OWNER, independent testing laboratories and governmental agencies with jurisdictional interests will have access to the WORK at reasonable times for their observation, inspecting and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's site safety procedures and programs so that they may comply therewith as applicable.

Tests and Inspections

13.3 CONTRACTOR shall give ENGINEER timely notice of readiness of the WORK for all required inspections, tests or acceptances, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

Independent Testing Laboratory

13.4 OWNER will employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or acceptances required by the Contract Documents except:

13.4.1 for inspections, tests or acceptances covered by paragraph 13.5 below;

13.4.2 that costs incurred in connection with tests or inspections conducted pursuant to paragraph 13.9 below shall be paid as provided in said paragraph 13.9; and

13.4.3 as otherwise specifically provided in the Contract Documents.

Statutory Inspections and Tests
13.5 If Laws or Regulations of any public body having jurisdiction require any WORK (or part thereof) to specifically be inspected, tested or accepted by an employee or other representative of such public body, CONTRACTOR shall assume full responsibility for arranging and obtaining such inspections, tests or acceptances, pay all costs in connection therewith and furnish ENGINEER the required certificates of inspection, testing or acceptance. CONTRACTOR shall also be responsible for arranging and obtaining and, unless otherwise specified in the General Requirements, shall pay all costs in connection with any inspections, tests or acceptances required for OWNER's and ENGINEER's acceptance of materials or equipment to be incorporated in the WORK, or of materials, mix designs or equipment submitted for acceptance prior to CONTRACTOR's purchase thereof for incorporation in the WORK. The cost of all inspections, tests and acceptances in addition to the above which are required by the Contract Documents shall be paid by OWNER (unless otherwise specified).

Work Covered Before Inspection

13.6 If any WORK (including the work of others) that is to be inspected, tested or accepted is covered without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation. Such uncovering WORK shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

CONTRACTOR's Responsibility

13.7 Neither observations by ENGINEER nor inspections, tests or acceptances by others shall relieve CONTRACTOR from CONTRACTOR's obligations to perform the WORK in accordance with the Contract Documents.

Uncovering Work

13.8 If any WORK is covered contrary to the requirements of the Contract Documents and/or directive of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observations and replaced at CONTRACTOR's expense.

Payment for Uncovering Work

13.9 If WORK has been completed and the CONTRACTOR has satisfied all requirements and responsibilities as identified in Articles 13.2 through 13.8 and the ENGINEER considers it necessary or advisable that covered WORK be observed by ENGINEER or inspected or tested by others, 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, furnishing all necessary labor, material
and equipment. If it is found that such WORK is defective, CONTRACTOR shall pay all claims, costs, losses and damages caused by, arising out of or resulting from such uncovering, exposure, observation, inspection and testing and of satisfactory replacement or reconstruction, (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and costs of repair or replacement of work of others), and OWNER shall be entitled to an appropriate decrease in the Contract Price and, if the parties are unable to agree as to the amount thereof, may make a claim therefor as provided in Article 11. If, however, such WORK is not found to be defective, CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Times (or Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

Owner May Stop the Work

13.10 If the WORK is defective, or CONTRACTOR fails to supply sufficient skilled workers to maintain the accepted progress schedule, intermediate milestones and Contract completion date or fails to supply suitable materials or equipment, or fails to furnish or perform the WORK in such a way that the completed WORK will conform to the Contract Documents, OWNER may order CONTRACTOR to stop the WORK, or any portion thereof, until the cause for such order has been eliminated; however, this right of OWNER to stop the WORK shall not give rise to any duty on the part of OWNER to exercise this right for the benefit of CONTRACTOR or any other party.

Correction or Removal of Defective Work

13.11 If required by ENGINEER, CONTRACTOR shall promptly, as directed, either correct all defective WORK, whether or not fabricated, installed or completed, or, if the WORK has been rejected by ENGINEER, remove it from the site and replace it with WORK that is not defective. CONTRACTOR shall pay all claims, costs, losses and damages caused by or resulting from such correction or removal (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and all costs of repair or replacement of work of others).

13.11.1 The CONTRACTOR shall not be entitled to an extension of the Contract Time for correcting or removing defective work.

13.12 Correction Period

13.12.1 If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any

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specific provision of the Contract Documents, any WORK is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions, (i) correct such defective WORK, or, if it has been rejected by OWNER, remove it from the site and replace it with WORK that is not defective and (ii) satisfactorily correct or remove and replace any damage to other WORK or the work of others resulting therefrom. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the defective WORK corrected or the rejected WORK removed and replaced, and all claims, costs, losses and damages caused by or resulting from such removal and replacement (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and all costs of repair or replacement of work of others) will be paid by CONTRACTOR.

13.12.2 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 Contract Documents.

13.12.3 Where defective WORK (and damage to other WORK resulting therefrom) has been corrected, removed or replaced under this paragraph 13.12, 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.

Acceptance of Defective Work

13.13 If, instead of requiring correction or removal and replacement of defective WORK, OWNER, upon ENGINEER's evaluation and recommendation, prefers to accept it, OWNER may do so. 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 accepted by ENGINEER as to reasonableness and to include but not limited to fees and charges of engineers, architects, attorneys and other professionals). If any such acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the WORK, and Owner shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefor as provided in Article 11. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.

OWNER May Correct Defective Work
13.14 If CONTRACTOR fails within a reasonable time after written notice of ENGINEER to proceed to correct and to correct defective WORK or to remove and replace rejected WORK as required by ENGINEER in accordance with paragraphs 13.11, or if CONTRACTOR fails to perform the WORK in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER may, after seven days' written notice to CONTRACTOR, correct and remedy any such deficiency. In exercising the rights and remedies under this paragraph OWNER shall proceed expeditiously. To the extent necessary to complete corrective and 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, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the site 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 as may be necessary to enable OWNER to exercise the rights and remedies under this paragraph. All claims, costs, losses and damages incurred or sustained by OWNER in exercising such rights and remedies will be charged against CONTRACTOR in an amount accepted as to reasonableness by ENGINEER, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the WORK; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefor as provided in Article 11. Such claims, costs, losses and damages will include but not be limited to fees and charges of engineers, architects, attorneys and other professionals, all court costs and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of CONTRACTOR's defective WORK. CONTRACTOR will not be allowed an extension of the Contract Times (or Milestones) because of any delay in performance of the WORK attributable to the exercise by OWNER of OWNER's rights and remedies hereunder.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

Schedule of Values

14.1 The schedule of values established as provided in paragraph 2.8 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to ENGINEER. Progress payments on account of Unit Price WORK will be based on the number of units completed.

Application for Progress Payment

14.2 At least twenty days before the date established for each progress payment (but not more often than once a month), CONTRACTOR shall submit to ENGINEER for review an
Application for Payment filled out and signed by CONTRACTOR covering the WORK completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the WORK but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation warranting that OWNER has received the materials and equipment free and clear of all liens, charges, security interests and encumbrances (which are hereinafter in these General Conditions referred to as "Liens") and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect OWNER's interest therein, all of which will be satisfactory to OWNER. The amount of retainage with respect to progress payments will be 10 percent except as otherwise provided in the Supplementary Conditions.

**CONTRACTOR's Warranty of Title**

14.3 CONTRACTOR warrants and guarantees that title to all WORK, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER no later than the time of payment free and clear of all Liens.

**Review of Applications for Progress Payment**

14.4 ENGINEER will, within ten days after receipt of each Application for Payment, 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. Thirty days after presentation of the Application for Payment with ENGINEER's recommendation, the amount recommended will (subject to the provisions of the last sentence of paragraph 14.7) become due and when due will be paid by OWNER to CONTRACTOR.

**ENGINEER's Recommendation of Payment**

14.5 ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based on ENGINEER's on-site observations of the WORK in progress as an experienced and qualified design professional and on ENGINEER's review of the Application for Payment and the accompanying data and schedules that the WORK has progressed to the point indicated; that, to the best of ENGINEER's knowledge, information and belief;

14.5.1 the WORK has progressed to the point indicated,
14.5.2 the quality of the WORK is in substantial accordance with the Contract Documents (subject to an evaluation of the WORK as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent test called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price WORK under paragraph 9.10, and to any other qualifications stated in the recommendation); and

14.5.3 the conditions precedent to CONTRACTOR's being entitled to such payment appear to have been fulfilled insofar as it is ENGINEER's responsibility to observe the WORK.

However, by recommending any such payment ENGINEER will not thereby be deemed to have represented that (i) exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the WORK beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents or (ii) that 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.

ENGINEER Not Responsible for Performance

14.6 ENGINEER's recommendation of any payment, including final payment, shall not mean that ENGINEER is 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 furnishing or performance of WORK, or for any failure of CONTRACTOR to perform or furnish WORK in accordance with the Contract Documents.

Refusal to Recommend or Make Payment

14.7 ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER's opinion, it would be incorrect to make such representations to OWNER. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

14.7.1 the WORK is defective, or completed WORK has been damaged requiring correction or replacement,

14.7.2 the Contract Price has been reduced by Written Amendment or Change Order,

14.7.3 OWNER has been required to correct defective WORK or complete WORK in accordance with paragraph 13.14, or
14.7.4 ENGINEER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 15.2.1 through 15.2.4 inclusive.

OWNER may refuse to make payment of the full amount recommended by ENGINEER because:

14.7.5 claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the WORK,

14.7.6 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,

14.7.7 there are other items entitling OWNER to a set-off against the amount recommended,

14.7.8 OWNER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.7.1 through 14.7.3 or paragraphs 15.2.1 through 15.2.4 inclusive;

but OWNER must give CONTRACTOR within seven days written notice (with a copy to ENGINEER) stating the reasons for such action and promptly pay CONTRACTOR the amount so withheld, or any adjustment thereto agreed to by OWNER and CONTRACTOR, when CONTRACTOR corrects to OWNER's satisfaction the reasons for such action.

Substantial Completion

14.8 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 (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, 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. If ENGINEER considers the WORK substantially complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. OWNER shall have seven days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the WORK is not substantially complete,
ENGINEER will within fourteen days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefor. If, after consideration of OWNER's objections, ENGINEER considers the WORK substantially complete, ENGINEER will within said fourteen days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. At the time of delivery of the tentative certificate of Substantial Completion ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, heat, utilities, insurance and warranties and guarantees. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform ENGINEER in writing prior to ENGINEER's issuing the definitive certificate of Substantial Completion, ENGINEER's aforesaid recommendation will be binding on OWNER and CONTRACTOR until final payment.

OWNER's Right to Exclude CONTRACTOR

14.9 OWNER will have the right to exclude CONTRACTOR from the WORK after the date of Substantial Completion, but OWNER will allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

Partial Utilization

14.10 Use by OWNER at OWNER's option of any substantially completed part of the WORK, which (i) has specifically been identified in the Contract Documents, or (ii) which OWNER, ENGINEER and CONTRACTOR agree constitutes a separately functioning and useable part of the WORK that can be used by OWNER for its intended purpose without significant interference with CONTRACTOR's performance of the remainder of the WORK, may be accomplished prior to Substantial Completion of all the WORK subject to the following:

14.10.1 OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the WORK which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees that such part of the WORK is substantially complete, CONTRACTOR will certify to OWNER and ENGINEER that said part of the WORK is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the WORK. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the WORK ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the WORK. 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 paragraphs 14.8 and 14.9 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.

14.10.2 OWNER may at any time request CONTRACTOR in writing to permit OWNER to take over operation of any such part of the WORK although it is not substantially complete. A copy of such request will be sent to ENGINEER and within a reasonable time thereafter OWNER, CONTRACTOR and ENGINEER shall make an inspection of that part of the WORK to determine its status of completion and will prepare a list of items remaining to be completed or corrected thereon before final payment. If CONTRACTOR does not object in writing to OWNER and ENGINEER that such part of the WORK is not ready for separate operation by OWNER, ENGINEER will finalize the list of items to be completed or corrected and will deliver such list to OWNER and CONTRACTOR together with a written recommendation as to the division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, utilities, insurance, warranties and guarantees for that part of the WORK which will become binding upon OWNER and CONTRACTOR at the time when OWNER takes over such operation (unless they shall have otherwise agreed in writing and so informed ENGINEER). During such operation and prior to Substantial Completion of such part of the WORK, OWNER shall allow CONTRACTOR reasonable access to complete or correct items on said list and to complete other related WORK.

14.10.3 No occupancy or separate operation of part of the WORK will be accomplished prior to compliance with the requirements of paragraph 5.5 in respect of property insurance.

Final Inspection

14.11 Upon written notice from CONTRACTOR that the entire WORK or an agreed portion thereof is complete, ENGINEER will 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 is incomplete or defective. CONTRACTOR shall immediately take such measures as are necessary to complete such WORK or to remedy such deficiencies.
Final Application for Payment

14.12 After CONTRACTOR has completed all such corrections to the satisfaction of ENGINEER and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates or other evidence of insurance required by paragraph 5.4, certificates of inspection, marked-up record documents (as provided in paragraph 6.19) and other documents, all as required by the Contract Documents, and after ENGINEER has indicated that the WORK is acceptable (subject to the provisions of paragraph 14.16), CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied (except as previously delivered) by: (i) all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by paragraph 5.4, (ii) consent of surety, if any, to final payment, and (iii) complete and legally effective releases or waivers (satisfactory to OWNER) of all Liens arising out of or filed in connection with the WORK. In lieu of such releases or waivers of liens and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full and an affidavit of CONTRACTOR that (i) the releases and receipts include all labor, services, material and equipment for which a Lien could be filed, and (ii) that all payrolls, material and equipment bills, and other indebtedness connected with the WORK for which OWNER or OWNER's property might in any way be responsible, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish a release or receipt in full, CONTRACTOR may furnish a Bond or other collateral satisfactory to OWNER to indemnify OWNER against any Lien.

14.12.1 Notwithstanding any other provision of these Contract Documents to the contrary, OWNER and ENGINEER are under no duty or obligation whatsoever to any vendor, materials provider, subcontractor, laborer or other party to ensure that payments due and owing by the CONTRACTOR to any of them are or will be made. Such parties shall rely only on the CONTRACTOR's surety bonds for remedy of nonpayment by him.

Final Payment and Acceptance

14.13 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 Documents have been fulfilled, ENGINEER will, within ten days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application to OWNER for payment. At the same time ENGINEER will also give written notice to OWNER and CONTRACTOR that the WORK is acceptable subject to the provisions of paragraph 14.16. Otherwise, ENGINEER will return the Application 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. Thirty days after presentation to OWNER of the Application and accompanying documentation, in appropriate form and substance, and with ENGINEER's recommendation and notice of acceptability, the amount recommended by ENGINEER will become due and will be paid by OWNER to CONTRACTOR.

Delayed Final Completion

14.14 If, through no fault of CONTRACTOR, final completion of the WORK is significantly delayed and if ENGINEER so confirms, OWNER will, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the WORK fully completed and accepted. If the remaining balance to be held by OWNER for WORK not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.1, the written consent of the surety to the payment of the balance due for that portion of the WORK fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment will be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

CONTRACTOR's Continuing Obligation

14.15 CONTRACTOR's obligation to perform and complete the WORK in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by ENGINEER, nor the issuance of a certificate of Substantial Completion, nor any payment by OWNER to CONTRACTOR under the Contract Documents, nor any use or occupancy of the WORK or any part thereof by OWNER, nor any act of acceptance by OWNER nor any failure to do so, nor any review and acceptance of a Shop Drawing or sample submission, nor the issuance of a notice of acceptability by ENGINEER pursuant to paragraph 14.13, nor any correction of defective WORK by OWNER will constitute an acceptance of WORK not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents (except as provided in paragraph 14.16).

Waiver of Claims

14.16 The making and acceptance of final payment will constitute:

14.16.1 a waiver of all claims by OWNER against CONTRACTOR, except claims arising from unsettled Liens, from defective WORK appearing after final inspection pursuant to paragraph 14.11, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from CONTRACTOR's continuing obligations under the Contract Documents; and
14.16.2 a waiver of all claims by CONTRACTOR against OWNER other than those previously made in writing and still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

OWNER May Suspend Work

15.1 OWNER may, at any time and without cause, suspend the WORK or any portion thereof for a period of not more than ninety days by notice in writing to CONTRACTOR and ENGINEER which will fix the date on which WORK will be resumed. CONTRACTOR shall resume the WORK on the date so fixed. CONTRACTOR shall be allowed an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if CONTRACTOR makes an approved claim therefor as provided in Articles 11 and 12.

OWNER May Terminate For Cause

15.2 Upon the occurrence of any one or more of the following events:

15.2.1 if CONTRACTOR commences a voluntary case under any chapter of the Bankruptcy Code (Title 11, United States Code), as now or hereafter in effect, or if CONTRACTOR takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such time relating to the bankruptcy or insolvency;

15.2.2 if a petition is filed against CONTRACTOR under any chapter of the Bankruptcy Code as now or hereafter in effect at the time of filing, or if a petition is filed seeking any such equivalent or similar relief against CONTRACTOR under any other federal or state law in effect at the time relating to bankruptcy or insolvency;

15.2.3 if CONTRACTOR makes a general assignment for the benefit of creditors;

15.2.4 if a trustee, receiver, custodian or agent of CONTRACTOR is appointed under applicable law or under contract, whose appointment or authority to take charge of property of CONTRACTOR is for the purpose of enforcing a Lien against such property or for the purpose of general administration of such property for the benefit of CONTRACTOR's creditors;

15.2.5 if CONTRACTOR admits in writing an inability to pay its debts generally as they become due;
15.2.6 if CONTRACTOR persistently fails 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 established under paragraph 2.8 as revised from time to time);

15.2.7 if CONTRACTOR disregards Laws or Regulations of any public body having jurisdiction;

15.2.8 if CONTRACTOR disregards the authority of ENGINEER; or

15.2.9 if CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents;

OWNER may, after giving CONTRACTOR (and the surety, if any) seven days' written notice and provided that CONTRACTOR does not remedy such occurrence and to the extent permitted by Laws and Regulations, terminate the services of CONTRACTOR, exclude CONTRACTOR from the site and take possession of the WORK and of all CONTRACTOR's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), 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 finish the WORK as OWNER may deem expedient. In such case CONTRACTOR shall not be entitled to receive any further payment until the WORK is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses and damages sustained by OWNER arising out of or resulting from completing the WORK (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court costs) such excess will be paid to CONTRACTOR. If such claims, costs, losses and damages exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such claims, costs, losses and damages incurred by OWNER will be reviewed as to reasonableness by ENGINEER and when accepted, incorporated in a Change Order, provided that when exercising any rights or remedies under this paragraph OWNER will not be required to obtain the lowest price for the WORK performed.

**OWNER's Rights After Termination**

15.3 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. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

**OWNER May Terminate Without Cause**
15.4 Upon seven days' written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy of OWNER, elect to abandon the WORK and terminate the Agreement. In such case, CONTRACTOR will be paid (without duplication of any item):

15.4.1 for 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;

15.4.2 for 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;

15.4.3 for all costs, described in paragraphs 15.4.1 and 15.4.2 that are incurred in settlement of terminated contracts with Subcontractors, Suppliers and others; and

15.4.4 for reasonable expenses directly attributable to termination.
CONTRACTOR will not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

CONTRACTOR May Stop Work or Terminate

15.5 If, through no act or fault of CONTRACTOR, the WORK is suspended for a period of more than ninety days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within thirty days after it is submitted, or OWNER fails for thirty days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days' written notice to OWNER and ENGINEER, and provided OWNER or ENGINEER do not remedy such suspension or failure within that time, terminate the Agreement and recover from OWNER payment on the same terms as provided in paragraph 15.4. In addition and in lieu of terminating the Agreement and without prejudice to any other right or remedy, if ENGINEER has failed to act on an Application for Payment within thirty days after it is submitted, or OWNER has failed for thirty days to pay CONTRACTOR any sum finally determined to be due, CONTRACTOR may upon seven days' written notice to OWNER and ENGINEER stop the WORK until payment of all such amounts due CONTRACTOR, including interest thereon. The provisions of this paragraph 15.5 are not intended to preclude CONTRACTOR from making claim under Articles 11 and 12 for an increase in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to CONTRACTOR's stopping WORK as permitted by this paragraph.

ARTICLE 16 - MISCELLANEOUS
Giving Notice

16.1 Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

16.2 Computation of Time

16.2.1 When any period of time is referred to in the Contract Documents 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.

16.2.2 A calendar day of twenty-four hours measured from midnight to the next midnight shall constitute a day.

Notice of Claim

16.3 Should OWNER or CONTRACTOR suffer injury or damage to person or property because of any error, omission or act of the other party or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The provisions of this paragraph 16.3 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose.

Cumulative Remedies

16.4 The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon CONTRACTOR by paragraphs 6.12, 6.16, 6.30, 6.31, 6.32, 13.1, 13.12, 13.14, 14.3 and 15.2 and all of the rights and remedies available to OWNER and ENGINEER thereunder, 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 Documents, and 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. All representations, warranties and guarantees made in the Contract Documents will survive final payment and termination or completion of the Agreement.
Submittals

16.5 The form of all submittals notices, change orders and other documents permitted or required to be used or transmitted under the Contract Documents shall be determined by the ENGINEER. Reference is made to Section 00830 for the forms which shall be conformed under this Contract.

16.6 Photographic Records

16.6.1 The Contractor shall provide a monthly color aerial photographic record of construction progress, disturbed areas, and the general area of construction. This record shall consist of three (3) sets of four (4) pictures (north, south, east, and west) each 8" x 10" on 8-1/2" x 11" soft card stock, with left margin for three hole punch, color professional quality photographs. ENGINEER shall reserve the right to select the views to be photographed. A gummed label, 1" wide, shall be attached to the front of each picture in a lower corner, with typed record of date picture was taken, ENGINEER's project number or contract number, and brief description of times and activity covered in the picture. The back of each photo shall include project name, view orientation, date of photo and name of photographer.

16.6.2 The first sets of photographs to be submitted with Application for payment No. 1 will show: (1) The site prior to beginning construction; and (2) Construction progress for Payment No. 1. The flight date for each payment request shall be within 5 days or less before the end of the pay request period. After construction is complete and accepted by the Owner, Contractor will provide one final set of photographs of the completed project with his final application for payment.

The cost of this work shall be pro rata included in the Contractor's bid. There is no separate bid line item for this work.

16.6.3 Polaroid or similar instant type photographs will not be acceptable.

Disputes

16.7 Disputes between OWNER and CONTRACTOR shall be arbitrated only if and to the extent agreed to by the parties at the time each dispute arises. The CONTRACTOR will carry on the WORK and maintain the progress schedule during any dispute, regardless of how resolved, unless otherwise mutually agreed in writing. Venue for any litigation, at law or equity or arbitration, shall lie exclusively in New Hanover County, North Carolina. This Contract, or any provision hereof, shall be construed and interpreted, and any litigation arising therefrom, shall be governed by the laws of North Carolina.
Professional Fees and Court Costs Included

16.8 Whenever reference is made to "claims, costs, losses and damages," it shall include in each case, but not be limited to, all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs.

END OF SECTION
SECTION 00800
SUPPLEMENTARY CONDITIONS

1. INTRODUCTION

1.1 These Supplementary Conditions amend or supplement the General Conditions of the Construction Contract and other provisions of the Contract Documents as indicated below.

2. PRECONSTRUCTION CONFERENCE

2.1. In addition to the provisions of the General Conditions, Article 2.5, the following parties will be asked to attend the Preconstruction Conference; North Carolina Department of Environmental Quality, Solid Waste Section.

3. CONSTRUCTION DETAILS

3.1 When reference is made to Drawings in the Technical Specifications, the reference shall include both the Drawings included under separate cover and the Drawings of Construction Details included herein.

4. COORDINATION OF PLANS, SPECIFICATIONS AND SPECIAL PROVISIONS

4.1 In case of discrepancy, computed dimensions shall govern over scaled dimensions; supplemental specifications shall govern over Standard Specifications; and Special Provisions shall govern over Drawings, Supplemental and Standard Specifications.

5. SUBSTITUTION OF EQUIPMENT

5.1 For all major equipment supplied, an affidavit signed by a corporate official must be submitted with the shop drawings stating that their equipment is equal to or exceeds the requirements of the specifications prepared by the Engineer and that its lifetime performance will be no less than equal to that obtainable from competitive equipment functioning in the same type of application and as manufactured by those companies identified in the specifications by the ENGINEER.

6. NOTICES

6.1 In conformance with the requirements of the General Conditions all notices or other papers required to be delivered by the CONTRACTOR to the OWNER shall be delivered to the office of the OWNER's ENGINEER, SCS Engineers, PC, 3922 Coconut Palm Dr., Suite 102, Tampa, FL 33619.
7. BORROW PIT

7.1 The on-site borrow pit is for OWNER use only. All soil for the proposed closure shall be obtained by the CONTRACTOR and brought in from an off-site borrow pit that has scales to weigh the soil.

END OF SECTION
SECTION 00830

CONTRACT FORMS

NOTICE OF AWARD
NOTICE TO PROCEED
CONTRACTOR’s VERIFICATION OF EXISTING CONDITIONS, DRAWINGS AND
SPECIFICATIONS
REQUEST FOR INFORMATION
REQUEST FOR PROPOSAL
NON-COMPLIANCE NOTICE
FIELD ORDER FORM
WORK CHANGE DIRECTIVE
CHANGE ORDER FORM
WARRANTY OF TITLE
CERTIFICATE OF SUBSTANTIAL COMPLETION
SUBCONTRACTOR/VENDOR FINAL RELEASE OF LIEN
SHOP DRAWING SUBMITTAL
APPLICATION FOR PAYMENT
SUBCONTRACTOR’S/SUPPLIER’S CERTIFICATION
FINAL RELEASE OF LIEN
SALES TAX REPORT
NOTICE OF AWARD

Contractor: __________ Date: __________
Project: CELLS 2-6E PARTIAL CLOSURE PHASE 3

Date of Bid Opening: __________

You are notified that your bid dated ______________________ for the above Contract has been considered. You are the apparent successful Bidder and the OWNER, New Hanover County Board of County Commissioners, expects to award you a Contract for

(Indicate total Work, Alternates or sections of Work awarded)

The Contract Price of your contract is __________________________ Dollars ($ _______).

Six (6) copies of each of the following proposed Contract Documents (except Project Manual and Drawings) accompany this Notice of Award.

☐ Construction Contract Between OWNER and CONTRACTOR
☐ Performance Bond
☐ Payment Bond
☐ Certificate of Insurance and Endorsement - Worker’s Compensation
☐ Certificate of Insurance and Endorsement - Liability
☐ Certificate of Insurance and Endorsement - Contractual Liability
☐ Notice of Award

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

1. You must deliver to the OWNER six (6) fully executed counterparts of the Agreement.
2. You must deliver with the executed Agreement the payment and performance bonds in the form specified in the Bidding and Contract Documents.
3. You must provide in writing the correct name and address of the surety which is providing the payment and performance bonds AND the correct name and address of the surety's resident agent for service of process in North Carolina.
4. You must deliver with the executed Agreement completed certificates and endorsements of insurance in the form specified in the Bidding Documents. Failure to comply with these conditions within the time specified will entitle OWNER to consider your Bid abandoned, to annul this Notice of Award, and to declare your Bid Security forfeited. Within ten (10) days after you comply with these conditions, OWNER will return to you one fully signed counterpart of the agreement with the Contract documents attached.

OWNER: __________
BY: __________
____________________________________       ______________________________________
(Authorized Signature)       (Authorized Signature)
____________________________________       ______________________________________
(Title)       (Title)
Acknowledgment Receipt of Notice

Acct. No. __________
BY: __________
Contractor

DATE: __________

Copy to Engineer (Use Certified Mail, Return Receipt Requested)

END OF NOTICE OF AWARD
NOTICE TO PROCEED

Date: _____________

Re: Notice to Proceed on: Cells 2-6E Partial Closure Phase 3

You are notified that the Contract Time under the above Contract will commence to run on ______________ 20__. On that date you are to start performing the Work and your other obligations under the Contract Documents. Based on the Contract Time stated in the Agreement, we calculate that the date of Final Completion is ______________ 20__. Work at the site must be started by ______________ 20__, as indicated in the Contract Documents.

Enclosed is one set of Drawings and one bound copy of the Project Manual containing:
- Information to Bidders
- Proposal Schedule
- Bid Bond
- Executed Agreement
- Performance Bond
- Payment Bond
- Contract Forms
- Certificates of Insurance and Insurance Endorsements
- General Conditions
- Supplementary Conditions
- Notice of Award
- Specifications
- Addenda Numbers __ through __ original bid
- General Requirements

FOR OWNER: New Hanover County Board of County Commissioners

FOR CONTRACTOR:

______________________________________ _________________________
(Authorized Signature)   (Authorized Signature)

______________________________________ _________________________
(Name and Title)    (Name and Title)

______________________________________ _________________________
(Acknowledge Receipt of Notice)  (Acknowledge Receipt of Notice)

Acct. No.

Copy to Engineer (Use Certified Mail, Return Receipt Requested)

END OF NOTICE TO PROCEED
CONTRACTOR’s VERIFICATION
OF THE EXISTING CONDITIONS AND THE ACCURACY OF DRAWINGS AND SPECIFICATIONS

(This form shall be submitted to the Engineer prior to the start of Construction)

STATE OF ______________________________

COUNTY OF _______________________________

________________________________________, being first duly sworn, deposes and certifies that:

1. Prior to the start of work on the site, Affiant has carefully studied and compared the Drawings and Specifications and checked and verified all pertinent figures shown thereon and all applicable field measurements;

2. Affiant hereby verifies that the Reports, Drawings and Specifications in the Contract Documents for the New Hanover County Secure Landfill, Partial Closure/South Slope Cells 2-6 accurately represents the existing site conditions and do not contain any conflicts, errors, ambiguities, or discrepancies with the following itemized exceptions:

   Number of exceptions _________ (if none, please indicate zero in the space provided).
   _________ additional sheets are attached.

   __________________________________

   Affiant

BY: __________________________________

Sworn and subscribed before me this ______ day of _____________, 20___.

___________________________________

Notary Public

My Commission Expires: ________________

END OF CONTRACTOR VERIFICATION FORM
## DISTRIBUTION

<table>
<thead>
<tr>
<th>DISTRIBUTION</th>
<th>No. Copies</th>
<th>CONTRACTOR REQUEST FOR INFORMATION (RFI) NO. ______</th>
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## PROJECT DATA

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<td>Contractor:</td>
<td>Specification Section:</td>
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QUESTION:

____________________________________________________________________________________________________________
____________________________________________________________________________________________________________
____________________________________________________________________________________________________________
____________________________________________________________________________________________________________
__________________________________________________________________________________________________________

Prepared by: ____________________________
Date: ________________________________
Received by: __________________________
Date: ________________________________

REPLY:

____________________________________________________________________________________________________________
____________________________________________________________________________________________________________
____________________________________________________________________________________________________________
____________________________________________________________________________________________________________

SCS Engineers, PC                    Project Number: ______________

Issued by: __________________________  Date: ______________

END OF REQUEST FOR INFORMATION FORM
REQUEST FOR PROPOSAL

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LOCATION: New Hanover County Secure Landfill

OWNER: New Hanover County Board of County Commissioners

DATE: ____________

CONTRACTOR DATA

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TO: (Contractor)

Please provide the undersigned a proposal for the following change in the work within ten (10) calendar days from the above date of this request. The written proposal must clearly delineate the scope of the proposed change in work by providing an itemized estimate of time and costs broke down by materials, labor (by trade), subcontracts, overhead costs and profit. Any amount claimed for subcontracts must be similarly supported in detail. If this proposal is accepted and approved by the OWNER, a change order will be issued for changes in the work of the Contract in accordance with the Contract Documents.

Description of change in work:

____________________________________________________________________________________________________

____________________________________________________________________________________________________

Change Order Type: (Deletion) (Addition) (Revision) ( ) ( )

Initiated by: _______________________________________________________________________________________

Proposal must be received by: ________________________________________________________________________ (30 days from date above)

Attachments (listing of attached documents that support description):

1. Contractor Request for Information No.: __________________________________________________________________________
2. __________________________________________________________________________
3. __________________________________________________________________________
4. __________________________________________________________________________
5. __________________________________________________________________________

SCS Engineers, PC

Project Number: ____________

Issued by: ____________________

Date: ____________________

END OF REQUEST FOR PROPOSAL FORM
You are hereby notified that the following work or materials does not conform to the requirements of the Contract Documents noted above. Non-complying work may be required to be removed and replaced at no cost to the OWNER. It shall be your responsibility to determine the corrective action necessary, and to determine whether you wish to discontinue operations until additional investigation by the OWNER or Engineer confirm or refute the initial findings.

Description of Non-Conforming Work or Materials:

____________________________________________________________________________________________________________
____________________________________________________________________________________________________________
________________________________________________________________________________________________________

Prepared by: ___________________________   Date: ___________________________

Proposed Correction:

____________________________________________________________________________________________________________
____________________________________________________________________________________________________________
____________________________________________________________________________________________________________

Failure to comply with directions to remedy deficiencies in this area will result in rejection of this portion of the work.

SCS Engineers, PC

Reviewed by: ___________________________   Project Number: ___________________________

Date: ___________________________   Date: ___________________________

END OF NON-COMPLIANCE FORM
FIELD ORDER

DISTRIBUTION

| OWNER: New Hanover County Board of County Commissioners | No. Copies | CONTRACTOR REQUEST FOR INFORMATION (RFI) NO. ______
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<td>Contractor:</td>
<td>Specification Section:</td>
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To: (Contractor) _____________________________________________________________________________

You are hereby directed to execute promptly this Field Order that interprets the Contract Documents or orders minor changes in the work without change in contract price or contract time.

If CONTRACTOR determines that a change in Contract Price or Contract Time is required as a result of this FIELD ORDER, CONTRACTOR must make such a claim prior to starting the Work in accordance with Articles 11 and 12 of the General Conditions of the Contract Documents. If a Change Order is issued in accordance with Article 10 of the Contract Documents, this FIELD ORDER will be invalidated, otherwise, CONTRACTOR shall promptly proceed with the Work described in this FIELD ORDER pursuant to the applicable conditions of the Contract Documents.

Description of Change in work:
____________________________________________________________________________________________________________
____________________________________________________________________________________________________________
____________________________________________________________________________________________________________
____________________________________________________________________________________________________________

Attachments (listing of attached documents that support description):
1. Contractor Request for Information No.: ___________________________________________________________________________
2. __________________________________________________________________________________________________
3. __________________________________________________________________________________________________
4. __________________________________________________________________________________________________
5. __________________________________________________________________________________________________

SCS Engineers, PC    Project Number: __________

Issued by: _________________    Date: _________________

END OF FIELD ORDER
WORK CHANGE DIRECTIVE

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To: (Contractor) __________________________________________

You are hereby directed to execute promptly this WORK CHANGE DIRECTIVE which orders an addition, deletion or revision in the Work, or responding to differing or unforeseen physical conditions under which the Work is to be performed as provided in Article 4.2 or 4.3 of the General Conditions, or emergencies as provided in Article 6.24 of the General Conditions, without change in Contract Price or Contract Time.

If CONTRACTOR determines that a change in Contract Price or Contract Time is required as a result of this WORK CHANGE DIRECTIVE, CONTRACTOR must make such a claim prior to starting the Work in accordance with Articles 11 and 12 of the General Conditions of the Contract Documents. If a Change Order is issued in accordance with Article 10 of the Contract Documents, this WORK CHANGE DIRECTIVE will be invalidated, otherwise, CONTRACTOR shall promptly proceed with the Work described in this WORK CHANGE DIRECTIVE pursuant to the applicable conditions of the Contract Documents.

Description of Change in work:

____________________________________________________________________________________________________________
____________________________________________________________________________________________________________
____________________________________________________________________________________________________________
__________________________________________________________________________________________________________
____________________________________________________________________________________________________________

Attachments (listing of attached documents that support description):

1. Contractor Request for Information No.:________________________________________________________
2. ________________________________________________________________________________________
3. ________________________________________________________________________________________
4. ________________________________________________________________________________________
5. ________________________________________________________________________________________

New Hanover County, North Carolina                          Project Number: _____________

Issued by: ___________________________    Date: ___________________________

END OF WORK CHANGE DIRECTIVE FORM
CHANGE ORDER FORM

PROJECT: Cells 2-6E Partial Closure Phase 3

CHANGE ORDER NO.

DATE: ________________  CONTRACTOR: ______________________

OWNER: New Hanover County Board of County Commissioners

AGREEMENT DATE __________________________

The following changes are hereby made to the CONTRACT DOCUMENTS:

Original CONTRACT PRICE $____________________

Current CONTRACT PRICE ADJUSTED by previous CHANGE ORDER(S): $____________________

Net (Increase)(Decrease) Resulting from this CHANGE ORDER $____________________

The current CONTRACT PRICE including this $____________________

CHANGE ORDER

ORIGINAL CONTRACT TIME: ________________ Date: ________________

Current CONTRACT TIME adjusted by previous CHANGE ORDERS Date: ________________

Net (Increase)(Decrease) Resulting from this CHANGE ORDER Days: ________________

Current CONTRACT TIME Including this CHANGE ORDER Date: ________________

CHANGES ORDERED:

I. GENERAL

This change order is necessary to cover changes in the work to be performed under this Contract. The GENERAL CONDITIONS, SUPPLEMENTARY CONDITIONS, SPECIFICATIONS and all parts of the Project Manual listed in Article 1, Definitions, of the GENERAL CONDITIONS apply to and govern all work under this change order.

Change Order No. ______________________

Page 1 of 2
II. REQUIRED CHANGES

III. JUSTIFICATION

IV. PAYMENT

V. APPROVAL AND CHANGE AUTHORIZATION
Acknowledgments:

The aforementioned change, and work affected thereby, is subject to all provisions of the original Contract not specifically changed by this Change Order; and,

It is expressly understood and agreed that the approval of the Change Order shall have no effect on the original Contract other than matters expressly provided herein.

Change Order Request by: New Hanover County Secure Landfill

Change(s) Ordered by: _____________________________, Director

RECOMMENDED BY: SCS Engineers, PC

ACCEPTED BY: _____________________________

Engineer Contractor

By: _____________________________ By: _____________________________
Signature Date Signature Date

Title: _____________________________ Title: _____________________________

APPROVED BY: COUNTY

ATTEST: BOARD OF COUNTY COMMISSIONERS of

NEW HANOVER COUNTY, NORTH CAROLINA

__________________________ By: _____________________________
Clerk of the Chairman
Board of County Commissioners
of New Hanover County, North Carolina

This _____ day of ________, 20____.
As approved by the Board on ________________________
WARRANTY OF TITLE

STATE OF NORTH CAROLINA
COUNTY OF NEW HANOVER

_______________________________________________________ being first duly sworn, deposes and says as follows:

Affiant is _______________________________ of _______________________________

a __________________ corporation which is named in the Construction Contract dated the ______ day of __________, 20__, between said corporation as the CONTRACTOR and the New Hanover County Board of County Commissioners as the OWNER, for the New Hanover County Secure Landfill, : Partial Closure/South Slope Cells 2-6and Affiant is authorized to make this Affidavit as, or in behalf of, the Contractor as named above.

Title to all work, materials and equipment covered by the attached Periodical Estimate for Payment dated ______________, 20__ passes to the OWNER at the time of payment free and clear of all liens; and all laborers, materialman and subcontractors have been paid for performing or furnishing the work, labor or materials upon said Contract WORK covered by the aforesaid Periodical Estimate for Payment.

This statement under oath is given in compliance with Section _______ North Carolina Statutes.

________________________________________
AFFIANT

Sworn to and subscribed before me this ____ day of ________, 20__.

________________________________________
Notary Public, State of North Carolina At Large
My Commission Expires:

END OF WARRANTY OF TITLE
CERTIFICATE OF SUBSTANTIAL COMPLETION

OWNER's Project No.____________________ ENGINEER's Project No.____________________

Project: NEW HANOVER COUNTY SECURE LANDFILL - Cells 2-6E Partial Closure Phase 3

CONTRACTOR _________________________________________________________________

Contract Date ___________________ This Certificate of Substantial Completion applies to all Work under
the Contract Documents or to the following specified parts thereof.

To: NEW HANOVER COUNTY BOARD OF COUNTY COMMISSIONERS,
OWNER

And To: ________________________________
CONTRACTOR

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONSTRUCTION and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. When this Certificate applies to a specified part of the Work the items in the tentative list shall be completed or corrected by CONTRACTOR within ___________ (____) days of the above date of Substantial Completion. The date of Final Completion is the date upon which all guarantees and warranties begin, except as follows:

_________________________
Date of Substantial Completion

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities and insurance shall be as follows:

RESPONSIBILITIES:

OWNER:

__________________________________________

__________________________________________

CONTRACTOR:

__________________________________________

Certificate of Substantial Completion

Page 1 of 2
The following documents are attached to and made a part of this Certificate:

_________________________________________________________________________

_________________________________________________________________________

Executed by ENGINEER on ________________, 20__.

SCS Engineers, PC
(Engineer)

By ____________________________________________

The CONTRACTOR accepts this Certificate of Substantial Completion on:

______________ ________________, 20__.

(Contractor)

By
SUBCONTRACTOR / VENDOR
FINAL RELEASE OF LIEN

KNOW ALL MEN BY THESE PRESENTS:

that the undersigned, for and in consideration of the payment of the sum of
___________________________________________________________ and ________/100 Dollars ($__________), paid by ____________________________________________, receipt of which is hereby acknowledged, hereby releases and quit claims to the New Hanover County Board of County Commissioners, the OWNER, all lien rights, claims or demands of any kind whatsoever, which the undersigned now has or might have against the Bonds for Work on premises described as the New Hanover County Secure Landfill, Partial Closure/South Slope Cells 2-6.

On account of labor, equipment, and/or material furnished for the construction of any improvements thereon. That all labor, equipment and materials used by the undersigned in the erection of said improvements have been fully paid for.

Affiant hereby acknowledges that he/she is the          of ______________________________________, that he/she is duly authorized to make this affidavit as, or on behalf of said corporation, and that the statements contained herein are true and correct.

IN WITNESS WHEREOF, I have hereunto set my hand and seal this ______ day of ______________________, 20__.  

__________________________  
Affiant

BY:__________________________

State of ______________________

County of ____________________

Sworn and subscribed before
me this _____ day of ______________, 20__.

__________________________  
Notary Public

My Commission Expires: ______________

END OF SUBCONTRACTOR / VENDOR RELEASE OF LIEN
# SHOP DRAWING SUBMITTAL

Owner: ______________________________  Project: New Hanover County Cells 2-6E Partial Closure Phase 3

Contractor: ______________________________

SCS Engineers, PC
Project No.: ______________________________

Owner's Project No.: ______________________________

Contractor's Project No.: ______________________________

Contractor’s Submittal No.: ______________________________

Specification No.: ______________________________

Resubmittal Yes ☐ No ☐

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<tr>
<th>ITEM NO.</th>
<th>RESUBMITTAL NO.</th>
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<th>VENDOR</th>
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<th>ENGINEER'S ACTION</th>
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**ACTION CODE**

- R REVIEWED, NO COMMENTS
- RN REVIEWED, COMMENTS AS NOTED
- RRR REJECTED, REVISE, AND RESUBMIT
- NR NOT REVIEWED

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<th>SUBMITTED BY:</th>
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<td>Contractor</td>
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**ENGINEERS COMMENTS:**

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<th>Discipline Review:</th>
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New Hanover County Secure Landfill
Cells 2-6E Partial Closure Phase 3  00830 - 16  Contract Forms  January 2020
APPLICATION FOR PAYMENT NO. __________

PROJECT NO. __________

PROJECT NAME:  Cells 2-6E Partial Closure Phase 3

OWNER:  ________________________________

CONTRACTOR:  ________________________________

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<tr>
<td>1. Original Contract Amount</td>
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<tr>
<td>2. Value of original contract work performed to date:</td>
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<td>3. Extra work completed to date:</td>
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<td>4. Materials accepted and stored at site:</td>
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<td>5. Gross value to date:</td>
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<td>6. Ten percent retained:</td>
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<td>7. Net amount due to date:</td>
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<td>8. Less previous net amount paid:</td>
<td>(-) $___________</td>
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<td>9. Balance due this payment:</td>
<td>$___________</td>
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Note: This Application must be accompanied with the Certification of Contractor Form.

RECOMMENDED FOR PAYMENT

_______________________________
SCS Engineers, PC

By: ________________________________
CERTIFICATION OF CONTRACTOR

According to the best of my knowledge and belief, I certify that all items and amounts shown on Application for Payment No. ____ are correct, that all work has been performed and/or materials supplied in full accordance with the terms and conditions of this Contract, dated _________________, 20__, between

_________________________________________ (Owner)

and ________________________________________ (Contractor)

I further certify that all just and lawful bills against the undersigned and his subcontractors and suppliers for labor, material and equipment employed in the performance of this Contract have been paid in full accordance with their terms and conditions; that all taxes imposed by North Carolina Statutes (Sales and Use Tax Act), as amended, have been paid and discharged; and that there are no Vendor's, Mechanic's or other Liens or rights to liens or conditional sales contracts which should be satisfied or discharged before such payment is made.

Date: ________________________ Contractor:

STATE OF NORTH CAROLINA)

ss
COUNTY OF NEW HANOVER)

Personally appeared before me this ____ day of __________, 20__,

_________________________________________ known (or made known) to me to be the

(Owner) (Partner) (Corporate Officer - Give Title)

of ____________________________________________ Contractor(s), who subscribed and swore to the above instrument in my presence.

Notary Public - (Type Name)

My Commission Expires:

____________________, 20__.

The Contractor shall execute this Certificate and attach it to each Application For Payment.

END OF FORM
SUBCONTRACTOR'S/SUPPLIER'S CERTIFICATION

According to the best of my knowledge and belief, I certify that payment for all billings to
__________________ (Contractor) for work under the Contract entitled:

CELLS 2-6 PARTIAL CLOSURE.

is current and the Contractor has been making satisfactory payment for services, equipment,
supplies and materials.

Date:__________ Subcontractor and/or Supplier ______________________________
Signed

____________________________________
(Type Name)

____________________________________
(Company)

____________________________________
(Address)

____________________________________
(Telephone No.)

Subcontractors and/or Suppliers to complete, and Contractor to return with each Application For
Payment.

END OF FORM
FINAL RELEASE OF LIEN

KNOW ALL MEN BY THESE PRESENTS, that

for and in consideration of the sum of __________________________ Dollars ($ ________) paid to
_________________________ by the ____________________, North Carolina, receipt of which is hereby acknowledged, do(es) hereby release and quitclaim to New Hanover County, North Carolina, the OWNER, its successors or assigns, all liens, lien rights, claims or demands of any kind whatsoever which __________________________ now has (have) or might have against the property, building, and/or improvements, on account of labor performed, material furnished, and/or for any incidental expense for the construction of:

New Hanover County Secure Landfill
Cells 2-6E Partial Closure Phase 3

thereon or in otherwise improving said property situated as above described.

IN WITNESS WHEREOF _____________ have (has) hereunto set _____________ hand and seal this ___ day of _____________, 20__, A.D.

WITNESS:

_________________________________ (Seal)

SWORN AND SUBSCRIBED TO BEFORE ME THIS ___ day of _____________, 20__, A.D.

Notary Public
State of North Carolina-at-Large

My Commission Expires: ________________, 20__. 
AFFIDAVIT

STATE OF NORTH CAROLINA

COUNTY OF NEW HANOVER

Before me, the undersigned authority, authorized to administer oaths and take acknowledgments, personally appeared ______________________________, who, after being first duly sworn, upon oath deposes and says that all lienors contracting directly with, or directly employed by (him, them, it) and that all taxes imposed by North Carolina Statutes have been paid and discharged, and that all bills, wages, fees, claims and other charges incurred by ______________________________ in connection with the construction of:

NEW HANOVER COUNTY SECURE LANDFILL
Cells 2-6E Partial Closure Phase 3

SIGNED: ______________________________

By: ______________________________

WITNESSES:

_______________________________

_______________________________

_______________________________

SWORN AND SUBSCRIBED TO BEFORE ME THIS _____ day of _________, 20__ A.D.

State of North Carolina-at-Large

My Commission Expires: ______________________, 20__.

END OF FORM
SALES TAX REPORT

Cells 2-6E Partial Closure Phase 3

COMPANY NAME ____________________________________ PROJECT _______________________________

AND ADDRESS _____________________________________ FOR PERIOD ____________ THRU ____________

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<th>ADDRESS</th>
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being duly sworn, certifies that the foregoing statement of sales tax paid in the connection with the referenced contract is true to the best of his or her knowledge and belief.

__________________________
Title

Sworn to before me this ___________ day of ________________, 20__.  
My commission expires __________________________, 20__.
PART 1 - GENERAL

1.01 SCOPE AND INTENT

The project generally consists of the closure of sections of the Cells 2-6E Partial Closure Phase 3 disposal area as delineated on the plans. The edge of the existing closure liners are located to the west, south, and at the toe of slope. At the toe of slope the primary liner will be exposed and cleaned to provide for the welding of the cap to the bottom liner and the same process will be conducted on the existing closure slope liners in order to seal the waste. Vegetation and mulch are to be stripped within the construction area with loose grass/weeds, stones, and other non-soil material to be removed. The OWNER has conducted depth checks on which the intermediate cover grading plan has been developed. Some erosion of the existing slopes has occurred after the OWNER had established the depth checks. The CONTRACTOR will be required to fill in accordance with the top of intermediate cover plan. All soil must come from off-site borrow pit locations. The soil is to be weighed at the borrow pit scales and trip tickets provided to confirm quantities for conformance testing purposes only.

Seep Management trenches will be excavated on the terrace and side slope and backfilled with course grained sand. The cap liner system will be installed in accordance with the drawings, including all necessary pipe boots and it shall be welded to the existing bottom liner as well as the existing liners to the west and south.

Installation of cleanout extension, new blind flanges and plates with stainless steel handles will be conducted both within and outside the closure area as shown on the drawings.

Stormwater management GFFR spillways, GFFR Swales and 12 inch HDPE Downchutes will be installed as identified on the drawing some of which will discharge into an open throat drop-inlet(s) with associated piping and perimeter diversion swales. The repair of three existing GFFR spillways outside the closure area is also included, the size of each repair is to be field verified. The piping for the stormwater system will be located and constructed in accordance with the plans.

The Gas Collection and Control System improvements include drilling new vertical gas wells, a new force main, condensate, air and gas lines, valve
assemblies, dual extraction and remote well heads, caps, hoses, new condensate sump and pneumatic pumps.

Once the liner is in place a geocomposite drainage net will be placed with associated toe drains at the terrace level, at the bottom of the slope, and at a mid-slope location as per the drawings. 18 inches of drainage/protective cover will be placed over the geocomposite and 6-inches of topsoil will be placed over the protective layer and the thickness of the protective layer will be thicker at the terrace level, road and as part of the stormwater berms. Sod will be placed in accordance with the drawings. The CONTRACTOR will coordinate with the OWNER any temporary closure of the road to accommodate the construction.

The CONTRACTOR will be responsible for controlling drainage during the construction period. Coordination with the OWNER on placement of temporary management practices is required. Damage to the existing grading or new grading due to erosion will be the responsibility of the CONTRACTOR to repair.

Note that existing roadway access to the landfill including some paved areas are located adjacent to the proposed construction area. The CONTRACTOR is responsible to replace any areas damaged during construction.

Final seeding and sodding as per the plans will be required.

The CONTRACTOR will be responsible for providing any needed construction support and associated health and safety requirements for excavation, earthwork, installation of liner and, connecting to the existing liner. The CONTRACTOR is required to provide a plan of the proposed approach to providing for the safety features.

A. Work Included:

1. The CONTRACTOR shall furnish all supervision, labor, materials, power, light, heat, fuel, water, tools, appliances, equipment, supplies, and means of construction necessary for proper performance and completion of the WORK. CONTRACTOR shall obtain and pay for all required permits beyond those already obtained by the OWNER. CONTRACTOR shall perform and complete the WORK in the manner best estimated to promote rapid construction consistent with safety of life and property and to the satisfaction of the OWNER, and in strict accordance with the Contract Documents. The CONTRACTOR shall clean up the WORK and maintain it during and after construction, until accepted, and shall do all WORK and pay all costs incidental thereto. CONTRACTOR shall repair or
1. Restore all structures and property that may be damaged or disturbed during performance of the WORK.

2. The cost of incidental work described in these General Requirements, for which there are no specific Contract Items, shall be considered as part of the general cost of doing the WORK and shall be included in the prices for the various Contract Items. No additional payment will be made therefor.

3. The CONTRACTOR shall provide and maintain such modern materials, tools, and equipment as may be necessary, in the opinion of the ENGINEER, to perform in a satisfactory and acceptable manner all the WORK required by this Contract. Only equipment of established reputation and proven efficiency shall be used. The CONTRACTOR shall be solely responsible for the adequacy of his workmanship, materials and equipment, prior acceptance of the ENGINEER notwithstanding.

B. Public Utility Installations and Structures:

1. Public utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, vaults, manholes and all other appurtenances and facilities pertaining thereto whether owned or controlled by the OWNER, other governmental bodies or privately owned by individuals, firms or corporations, used to serve the public with transportation, traffic control, gas, electricity, telephone, sewerage, drainage, water or other public or private property which may be affected by the WORK shall be deemed included hereunder.

2. The Contract Documents may contain data relative to existing public utility installations and structures above and below the ground surface. This data is not guaranteed as to their completeness or accuracy and it is the responsibility of the CONTRACTOR to make investigations to fully understand the character, condition and extent of all such installations and structures as may be encountered and as may affect the construction operations.

3. The CONTRACTOR shall protect all public utility installations and structures from damage during the WORK. Access across any buried public utility installation or structure shall be made only in such locations and by means accepted by the ENGINEER. The CONTRACTOR shall so arrange the operations as to avoid any damage to these facilities. All required protective devices and construction shall be provided by the CONTRACTOR at no additional expense to the OWNER or ENGINEER. All existing public utilities damaged by the CONTRACTOR which are
shown on the Drawings or have been located in the field by the utility shall be repaired by the CONTRACTOR, at their expense, as directed by the ENGINEER. No separate payment shall be made for such protection or repairs to public utility installations or structures.

4. Public utility installations or structures owned or controlled by the OWNER or other governmental body which are shown on the Drawings to be removed, relocated, replaced or rebuilt by the CONTRACTOR shall be considered as a part of the general cost of doing the WORK and shall be included in the prices bid for the various Contract items. No separate payment shall be made therefor.

5. Where public utility installations of structures owned or controlled by the OWNER or other governmental body are encountered during the course of the WORK, and are not indicated on the Drawings or in the Specifications, and when, in the opinion of the ENGINEER, removal, relocation, replacement or rebuilding is necessary to complete the WORK under this Contract, such WORK shall be accomplished by the utility having jurisdiction, or such WORK may be ordered, in writing by the ENGINEER, for the CONTRACTOR to accomplish. If such WORK is accomplished by the CONTRACTOR, it will be paid for as extra WORK as provided in the Agreement.

6. The CONTRACTOR shall, at all times in performance of the WORK, employ accepted methods and exercise reasonable care and skill so as to avoid unnecessary delay, injury, damage or destruction of public utility installations and structures; and shall, at all times in the performance of the WORK, avoid unnecessary interference with, or interruption of, public utility services, and shall cooperate fully with the owners thereof to that end.

7. The CONTRACTOR shall give written notice to the OWNER, other governmental utility departments and other owners of public utilities of the location of his proposed construction operations, at least forty-eight (48) hours in advance of breaking ground in any area or on any unit of the WORK.

8. The maintenance, repair, removal, relocation or rebuilding of public utility installations and structures, when accomplished by the CONTRACTOR as
herein provided, shall be done by methods approved by the owners of such utilities.

9. Utilities that may be encountered, can be contacted as follows:
   Duke Energy
   No Cuts
   On-site County Staff

10. The CONTRACTOR shall make provisions to avoid impacting existing facilities operation or maintenance activities. If an impact is anticipated, the CONTRACTOR shall propose a means to maintain existing activities, subject to approval by the OWNER. The OWNER will not be responsible for any costs associated with such proposed modification.

1.02 DRAWINGS AND PROJECT MANUAL

A. Drawings: When obtaining data and information from the Drawings, figures shall be used in preference to scaled dimensions, and large scale drawings in preference to small scale drawings.

B. Copies Furnished to Contractor:

1. After the Contract has been executed, the CONTRACTOR will be furnished one (1) sets of plans (24 inches by 36 inches), one (1) electronic copy of the plans, and one (1) copy of the Project Manual (Contract Requirements and Specifications) and all addenda.

2. The CONTRACTOR shall furnish each of the subcontractors, manufacturers, and material suppliers such copies of the Contract Documents as may be required for their WORK. All copies of the Contract Documents shall be printed from the reproducible sets furnished to the CONTRACTOR. All costs of reproduction and printing shall be borne by the CONTRACTOR.

C. Supplementary Drawings:

1. When, in the opinion of the ENGINEER, it becomes necessary to explain more fully the WORK to be done or to illustrate the WORK further or to show any changes which may be required, drawings known as Supplementary Drawings, with specifications pertaining thereto, will be prepared by the ENGINEER and the CONTRACTOR will be furnished one (1) CD of revised documents, one (1) set of plans and one (1) copy of the Project Manual (Contract Requirements and Specifications) and all addenda.
2. The Supplementary Drawings shall be binding upon the CONTRACTOR with the same force as the Drawings. Where such Supplementary Drawings require either less or more than the estimated quantities of WORK, credit to the OWNER or compensation therefor to the CONTRACTOR shall be subject to the terms of the Agreement.

D. Contractor to Check Drawings and Data:

1. The CONTRACTOR shall verify all dimensions, quantities and details shown on the Drawings, Supplementary Drawings, schedules, Specifications or other data received from the ENGINEER, and shall notify him of all errors, omissions, conflicts, and discrepancies found therein. Failure to discover or correct errors, conflicts or discrepancies shall not relieve the CONTRACTOR of full responsibility for unsatisfactory WORK, faulty construction or improper operation resulting therefrom nor from rectifying such conditions at no additional expense to OWNER or ENGINEER. CONTRACTOR will not be allowed to take advantage of any errors or omissions, as full instructions will be furnished by the ENGINEER, should such errors or omissions be discovered.

2. All schedules are given for the convenience of the OWNER and the CONTRACTOR and are not guaranteed to be complete. The CONTRACTOR shall assume all responsibility for the making of estimates of the size, kind, and quality of materials and equipment included in WORK to be done under the Contract and additional WORK claimed by CONTRACTOR.

E. Specifications: The Technical Specifications consist of three parts: General, Products, and Execution. The General Section contains General Requirements which govern the WORK. Products and Execution modify and supplement these by detailed requirements for the WORK and shall always govern whenever there appears to be a conflict.

F. Intent:

1. All WORK called for in the Specifications applicable to this Contract, but not shown on the Drawings in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. WORK not specified in either the Drawings or in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the WORK, is required and shall be performed by the CONTRACTOR as though it were specifically delineated or described.
2. The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any WORK to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these Specifications shall be made upon that basis.

1.03 MATERIALS AND EQUIPMENT

A. Manufacturer:

1. The names of proposed manufacturers, material suppliers, and dealers who are to furnish materials, fixtures, equipment, appliances or other fittings shall be submitted to the ENGINEER for acceptance, prior to construction, to afford proper investigation and checking. No manufacturer will be accepted for any materials to be furnished under this Contract unless he shall be of good reputation and have a plant of ample capacity. CONTRACTOR shall, upon the request of the ENGINEER, be required to submit evidence that he has manufactured a similar product to the one specified and that it has been previously used for a like purpose for a sufficient length of time to demonstrate its satisfactory performance.

2. All transactions with the manufacturers or subcontractors shall be through the CONTRACTOR, unless the CONTRACTOR shall request, in writing to the ENGINEER, that the manufacturer or subcontractor deal directly with the ENGINEER. Any such transactions shall not in any way release the CONTRACTOR from his full responsibility under this Contract and will not impose any liability on the OWNER or ENGINEER.

3. Any two or more pieces of material or equipment of the same kind, type or classification, and being used for identical types of service, shall be made by the same manufacturer.

B. Delivery:

1. The CONTRACTOR shall deliver materials to the site in ample quantities to insure the most speedy and uninterrupted progress of the WORK so as to complete the WORK within the scheduled time. However, the CONTRACTOR shall not store materials on-site for more than thirty (30) days before installation unless adequately covered and protected. This will not supersede more stringent requirements noted in Division 2.

2. The CONTRACTOR shall also coordinate deliveries in order to avoid delay in, or impede, the progress of the WORK of any related Contractor.
3. All materials and equipment shall be properly stored on site in accordance with these specifications and the manufacturer's recommendations.

C. Tools and Accessories:

1. The CONTRACTOR shall, unless otherwise stated in the Contract Documents, furnish with each type, kind or size of equipment, one complete set of suitably marked high grade special tools and appliances which may be needed to adjust, operate, maintain or repair the equipment. Such tools and appliances shall be furnished in accepted painted steel cases, properly labeled and equipped with good grade cylinder locks and duplicate keys.

2. Spare parts shall be furnished as specified in the specifications.

3. Each piece of equipment shall be provided with a substantial nameplate, securely fastened in place and clearly inscribed with the manufacturer's name, year of manufacture, serial number, weight and principal rate data.

D. Service of Manufacturer's Engineer:

1. The Contract prices for equipment shall include the cost of furnishing a competent and experienced engineer or superintendent who shall represent the manufacturer and shall assist the CONTRACTOR, when required, to install, adjust, test and place in operation, the equipment in conformity with the Contract Documents.

2. Prior to the equipment being placed in permanent operation by the OWNER, such engineer or superintendent shall make all adjustments and tests required by the ENGINEER to prove that such equipment is in proper and satisfactory operating condition, and shall instruct such personnel as may be designated by the OWNER in the proper operation and maintenance of such equipment.

1.04 INSPECTION AND TESTING

A. General:

1. Inspection and testing of materials will be provided by the CONTRACTOR unless otherwise specified.

2. For tests specified to be made by the CONTRACTOR, the testing personnel shall make the necessary inspections and tests and the reports thereof shall be in such form as will facilitate checking to determine
compliance with the Contract Documents. Two (2) originally executed and five (5) copies of the reports shall be submitted and authoritative certification thereof shall be furnished to the ENGINEER as a prerequisite for the acceptance of any material or equipment.

3. If, in the performing of any test of any material or equipment, it is ascertained by the ENGINEER that the material or equipment does not comply with the Contract Documents, the CONTRACTOR will be notified thereof and he will be directed to refrain from delivering said material or equipment, or to remove it promptly from the site or from the WORK and replace it with acceptable material, without cost to the OWNER or ENGINEER.

4. Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with recognized test codes of the ANSI, ASME, or the IEEE, except as may otherwise be stated herein.

5. The CONTRACTOR shall be fully responsible for the proper operation of equipment during tests and instruction periods and shall neither have nor make any claim for damage which may occur to equipment prior to the time when the OWNER executes final acceptance of the WORK.

B. Costs:

1. The cost of preliminary shop and field tests of equipment and certain other tests specifically called for in the Contract Documents shall be borne by the CONTRACTOR and such costs shall be deemed to be included in the Contract price.

2. Materials and equipment submitted by the CONTRACTOR as the equivalent to those specifically named in the Contract may be tested by the OWNER for compliance. The CONTRACTOR is responsible for providing sufficient information to allow ENGINEER to determine that the item of material or equipment proposed is equivalent to that specifically named and an acceptable substitute therefor. If in the sole discretion of the ENGINEER, tests of the proposed substitute items are necessary for ENGINEER’s review, the substitute items will be tested by the CONTRACTOR at no additional cost to the OWNER.

C. Inspection of Materials:

1. The CONTRACTOR shall give notice in writing to the ENGINEER, sufficiently in advance of his intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or
as part of the permanent construction. Such notice shall contain a request for inspection, the date of commencement and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, the ENGINEER will arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials or ENGINEER will notify the CONTRACTOR that the inspection will be made at a point other than the point of manufacture.

2. The CONTRACTOR must comply with these provisions before shipping any material. Such inspection shall not release the CONTRACTOR from the responsibility for furnishing materials meeting the requirements of the Contract Documents.

D. Certificate of Manufacture:

1. The CONTRACTOR shall furnish to ENGINEER authoritative evidence in the form of Certificate of Manufacture that the materials to be used in the WORK have been manufactured and tested in conformity with the Contract Documents.

2. These certificates shall be notarized and shall include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product to be provided by the manufacturer. Two (2) original and five (5) copies are to be provided to the ENGINEER.

E. Shop Tests:

1. Testing for pressure, duty, capacity, rating, efficiency, performance, function or special requirements which are specified shall be tested in the shop of the manufacturer in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents.

2. No such equipment or materials shall be shipped to the worksite until the ENGINEER notifies the CONTRACTOR, in writing, that the results of such tests are acceptable.

3. Two (2) signed original and five (5) copies of the manufacturer's actual test data and interpreted results thereof, accompanied by two (2) signed original and five (5) copies of a certificate of authenticity sworn to by a responsible official of the manufacturing company and/or independent laboratory, shall be forwarded to the ENGINEER for acceptance.
4. The cost of shop tests and of furnishing manufacturer's preliminary and shop test data of operating equipment shall be borne by the CONTRACTOR.

F. Final Field Tests:

1. Upon completion of the WORK and prior to final payment, all equipment and piping installed under this Contract shall be subjected to acceptance tests as specified or required to provide compliance with the Contract Documents. Two (2) original signature and five (5) copies of Letter of Compliance and test results shall be provided by the CONTRACTOR.

2. The CONTRACTOR shall furnish labor, fuel, energy, water and all other materials, equipment and instruments necessary for all acceptance tests, at no additional cost to the OWNER or ENGINEER. The CONTRACTOR shall assist in the final field tests.

G. Final Inspection: During such final inspections, the WORK shall be clean and functional. In no case will the final estimate be prepared until the CONTRACTOR has complied with all requirements set forth and the ENGINEER and OWNER have made their final inspection of the entire WORK and are satisfied that the entire WORK is properly and satisfactorily constructed in accordance with the requirements of the Contract Documents.

1.05 TEMPORARY STRUCTURES

A. Temporary Fences: If, during the course of the WORK, it is necessary to remove or disturb any fence or part thereof, the CONTRACTOR shall provide a suitable temporary fence at no additional cost to OWNER or ENGINEER.

B. Responsibility for Temporary Structures: In executing the Contract, the CONTRACTOR assumes full responsibility for the sufficiency and safety of all temporary structures or WORK and for any damage which may result from their failure or their improper construction, maintenance or operation and will indemnify and hold harmless the OWNER and ENGINEER from all claims, suits or actions and damages or costs of every description arising by reason of failure to comply with the above provisions.

1.06 ACCIDENT PREVENTION

A. Precautions shall be exercised at all times for the protection of person and property. The safety provisions of applicable laws, building and construction codes shall be observed.
B. The CONTRACTOR shall comply with the U.S. Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596), and under Hours and Safety Standards Act Section 107 of the contract WORK. Hours and Safety Standards Act (PL 91-54), except where state and local safety standards exceed the federal requirements and except where state safety standards have been approved by the Secretary of Labor in accordance with provisions of the Occupational Safety and Health Act, shall be complied with. Updates of the referenced regulations also shall apply.

C. First Aid: The CONTRACTOR shall keep upon the site, at each location where WORK is in progress, a completely equipped first aid kit and shall provide ready access thereto at all times when people are employed on the WORK.

1.07 LINES AND GRADES

A. Grade:

1. All WORK under this Contract shall be constructed in accordance with the lines and grades shown on the Drawings, or as provided by the ENGINEER. The full responsibility for keeping alignment and grade shall rest upon the CONTRACTOR.

2. The OWNER will provide available information regarding bench marks and base line controlling points on the drawings. Reference marks for lines and grades as the WORK progresses will be located by CONTRACTOR to cause as little inconvenience to the prosecution of the WORK as possible. The CONTRACTOR shall so place excavation and other materials as to cause no inconvenience in the use of the reference marks provided. The CONTRACTOR shall remove any obstructions placed contrary to this provision.

B. Surveys:

1. The CONTRACTOR shall furnish and maintain, at no additional expense to OWNER or ENGINEER, stakes, temporary benchmarks and other such materials.

2. The CONTRACTOR shall check such reference marks by such means as he may deem necessary and, before using them, shall provide written notification to ENGINEER's regarding presumed inaccuracies.

3. The CONTRACTOR shall, at no additional expense to OWNER or ENGINEER, establish all working or construction lines and grades as required from the reference marks made available by the OWNER, and
shall be solely responsible for the accuracy thereof. Field engineering shall be in accordance with Section 01050.

C. Safeguarding Marks:

1. The CONTRACTOR shall safeguard all points, stakes, grade marks, monuments and bench marks made or established on the WORK, bear the cost of reestablishing them if disturbed, and bear the entire expense of rectifying WORK improperly installed due to not maintaining or protecting or to removing without authorization such established points, stakes and marks.

2. The CONTRACTOR shall safeguard all existing and known property corners, monuments and marks adjacent to but not related to the WORK and, if required, shall bear the cost of reestablisment them if disturbed or destroyed.

1.08 ADJACENT STRUCTURES AND LANDSCAPING

A. Responsibility:

1. The CONTRACTOR shall also be entirely responsible and liable for all damage or injury as a result of his operations to all other adjacent public and private property, structures of any kind and appurtenances thereto met with during the progress of the WORK.

2. The cost of protection, replacement in their original locations and conditions or payment of damages for injuries to such adjacent public and private property and structures affected by the WORK, whether or not shown on the Drawings, and the removal, relocation and reconstruction of such items called for on the Drawings or specified shall be included in the various Contract Items and no separate payments will be made therefore.

3. CONTRACTOR is expressly advised that the protection of buildings, structures, road, tanks, pipelines, etc. and related WORK adjacent and in the vicinity of his operations, wherever they may be, is solely his responsibility.

4. Conditional inspection of buildings or structures in the immediate vicinity of the project which may reasonably be expected to be affected by the WORK shall be performed by and be the responsibility of the CONTRACTOR.
5. CONTRACTOR shall, before starting operations, make an examination of the adjacent structures, buildings, facilities, etc., and record by notes, measurements, photographs, etc., conditions which might be aggravated by open excavation and construction. Repairs or replacement of all conditions disturbed by the construction shall be made to the satisfaction of the OWNER and ENGINEER. This does not preclude conforming to the requirements of the insurance underwriters. Copies of surveys, photographs, reports, etc., shall be provided to the OWNER.

6. Prior to the beginning of any excavations the CONTRACTOR shall advise the OWNER of all structures on which he intends to perform WORK or which performance of the WORK will affect.

B. Protection of Trees: All trees and shrubs shall be adequately protected by the CONTRACTOR with boxes and in accordance with ordinances governing the protection of trees. Excavated materials shall be placed so as not to injure such trees or shrubs. Trees or shrubs destroyed by negligence of the CONTRACTOR or his employees shall be replaced by CONTRACTOR with new stock of similar size and age, at its proper season and at the sole expense of the CONTRACTOR.

C. Lawn Areas: Lawn areas shall be left in as good condition as before the starting of the WORK. Where sod is to be removed, it shall be carefully removed, and later replaced, or the area where sod has been removed shall be restored with new sod.

D. Restoration of Fences:

1. Any fence, or part thereof, that is damaged or removed during the course of the WORK shall be replaced or repaired by the CONTRACTOR unless specifically waived by the OWNER and shall be left in as good a condition as before the starting of the WORK.

2. The manner in which the fence is repaired or replaced and the materials used in such WORK shall be subject to the acceptance of the OWNER and ENGINEER.

3. The cost of all labor, materials, equipment, and WORK for the replacement or repair of any fence shall be deemed included in the appropriate Contract Item or items, or if no specific item is provided therefor, as part of the overhead cost of the WORK, and no additional payment will be made therefor.

E. Roadway: The existing roadway at the facility shall be left in as good condition as before the starting of the WORK. WORK performed near the existing roadway
shall be done carefully to prevent damage to the existing surface. Unless prior notification has been provided and permission is granted by the OWNER there shall be no closure of the roadway to impede continuing operations.

1.09 PROTECTION OF WORK AND PUBLIC

A. Barriers and Lights:

1. During the prosecution of the WORK, the CONTRACTOR shall put up and maintain at all times such barriers and lights as will effectually prevent accidents.

2. The CONTRACTOR shall provide suitable barricades, red lights, "danger" or "caution" or "street closed" signs and flagmen at all places where the WORK causes obstructions to the normal traffic or constitutes in any way a hazard to the public.

B. Noise:

1. The CONTRACTOR shall eliminate noise to as great an extent as practicable at all times. Air compressing equipment shall be equipped with silencers and the exhaust of all gasoline motors or other power equipment shall be provided with mufflers. The CONTRACTOR shall construct sound barriers as necessary to eliminate noise.

2. In the vicinity of hospitals and schools, special care shall be used to avoid noise or other nuisances. The CONTRACTOR shall strictly observe all local regulations and ordinances covering noise control.

3. Except in the event of an emergency, no WORK shall be done between the hours of 5:30 p.m. and 7:30 a.m., Monday through Saturday or on Sundays or New Hanover County observed Holidays. If the proper and efficient prosecution of the WORK requires operations during the night, the written permission of the OWNER shall be obtained before starting such items of the WORK.

C. Access to Public Services: Neither the materials excavated nor the materials or equipment used in the construction of the WORK shall be so placed as to prevent free access to all fire hydrants, valves or manholes.

D. Dust Prevention: The CONTRACTOR shall prevent dust nuisance from his operations or from traffic by keeping the roads and/or construction areas dampened with water at all times.
1.10 CUTTING AND PATCHING

A. The CONTRACTOR shall do all cutting, fitting or patching of the WORK that may be required to make the several parts thereof join and coordinate in a manner satisfactory to the ENGINEER and in accordance with the Drawings and Specifications.

B. The WORK must be done by competent workmen skilled in the trade required by the restoration.

1.11 CLEANING

A. During Construction:

1. During construction, the CONTRACTOR shall, at all times, keep the site of the WORK and adjacent premises as free from material, debris and rubbish as is practicable and shall remove the same from any portion of the site if, in the opinion of the OWNER or ENGINEER, such material, debris, or rubbish constitutes a nuisance or is objectionable.

2. The CONTRACTOR shall remove from the site all of his surplus materials and temporary structures when no further need therefore develops. CONTRACTOR shall be responsible and liable for all spillage and incur all associated costs including, but not limited to, costs related to repair and maintenance resulting from damages thereof, and fines that may be levied as a result of citations given by State or local regulatory agencies.

B. Final Cleaning:

1. At the conclusion of the WORK, all erection plant, tools, temporary structures and materials belonging to the CONTRACTOR shall be promptly removed, and shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances to a facility permitted to manage these materials.

2. The CONTRACTOR shall thoroughly clean all equipment and materials installed and shall deliver such materials and equipment undamaged in a bright, clean, polished and new operating condition.

1.12 MISCELLANEOUS

A. Protection Against Siltation and Bank Erosion:
1. The CONTRACTOR shall arrange his operations and construct erosion control devices to minimize siltation and bank erosion on construction sites and on existing or proposed water course and drainage channels.

2. The CONTRACTOR, at no additional expense to OWNER or ENGINEER, shall remove any siltation deposits and correct any erosion problems as directed by the ENGINEER which results from CONTRACTOR’s construction operations.

B. Protection of Wetland Areas:

1. The CONTRACTOR shall properly dispose of all surplus material, including soil, in accordance with local, state and federal regulations, and with OWNER’s instruction.

2. Under no circumstances shall surplus material be disposed of in wetland areas as defined by the Army Corps of Engineers or the North Carolina Department of Environment and Natural Resources.

C. Existing Facilities: The WORK shall be so conducted to maintain existing traffic lanes in operation.

D. Use of Chemicals: All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfection, polymer, reactant, or of other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with instructions. CONTRACTOR shall obtain written approval from OWNER prior to use of chemicals.

E. Cooperation With Other Contractors and Forces:

1. During progress of WORK under this Contract, it may be necessary for other contractors and persons employed by the OWNER to work in or about the project.

2. The OWNER reserves the right to put such other contractors to work and to afford such access to the work area to be performed at times as the OWNER deems proper.

3. The CONTRACTOR shall not impede or interfere with the WORK of such other contractors engaged in or about the WORK and shall so arrange and conduct the WORK that such other contractors may complete their WORK at the earliest date possible.
F. Fuels and oils stored on site shall have secondary containment.

G. Construction shall be conducted and shall result in construction of the improvements of this project in full accordance with the conditions of the permits granted for the project.

1.13 OWNER'S REPRESENTATIVES

A. The OWNER will appoint the Resident Project Representative (RPR) and Project Manager (PM) as the OWNER's representative as defined in the General Conditions.

1.14 PRE-EXISTING CONDITIONS

A. The OWNER will provide the most current annual aerial topographic survey flown at the time of bid for the proposed closure construction. The OWNER does not guarantee or warrant the accuracy of the survey. The CONTRACTOR may conduct a pre-existing conditions survey of each of the areas that are part of the construction area. If conducted, the survey shall establish the state of the property before construction as a basis for any claims of damage that may occur and an electronic version in AutoCAD will be provided to the OWNER.

B. This survey shall include comprehensive photography and video taping of the site, grounds, and structures; spot elevations of grades and tops of walls; side slopes; existing spillways; perimeter swales and roads; and shall make note of any identified previously damaged areas. Photos and videotape shall be submitted to ENGINEER/OWNER for review and acceptance prior to start of WORK.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

A. The work of this Contract consists of partial closing the remaining side slope area of the west slopes of the New Hanover County Secure Landfill Cells 2-6E. The work includes excavating, filling, stripping, fine grading, providing soil from off-site sources, construction of anchor trenches, stormwater appurtenances including piping, drop inlets, GFFR, repair of existing GFFR, toe drain systems, seep trenches, existing cleanout extensions, re-piping and reinstalling five new stainless steel flow meters, installation of the cap liner, installation of geocomposites, installation of vertical gas wells, installation of air, condensate and forcemain lines, installation of the final cover, installation of topsoil, seeding, mulching and sodding, associated quality assurance testing, and tie-ins to existing conditions.

B. CONTRACTOR shall be aware of the nature of the activities at a landfill which may restrict access to the portions of the site due to general landfill operations.

1.02 WORK BY OTHERS

A. WORK may be conducted at the site by other contractors during the performance of the work under this contract. The CONTRACTOR shall conduct its operations to minimize interference of other contractors, and shall cooperate fully with such contractors and the project representatives to provide continued safe access to perform their respective contracts. During the anticipated time of this work, no other contractors are anticipated to be also working in the area of the closure project.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION
SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

A. Payments to the CONTRACTOR shall be made on the basis of the Bid Items as full and complete payment for furnishing all material, labor, tools and equipment, and for performing all operations necessary to complete the Work included in the Contract Documents. This contract includes both lump sum and unit price items. The existing grades shown on the drawings were provided by a registered land surveyor as referenced on the drawings for the immediate area of the proposed closure. The survey provides a topographic map of this area that is the most recent survey available; however, due to erosion on the slopes following the field survey, the existing grades on the survey may not represent the existing conditions. The grading plan on Sheet 4 represents the finish grade for the intermediate cover. The CONTRACTOR will use the INTERMEDIATE COVER GRADING PLAN, found on sheet 4 of the drawings, for the establishment of the top of the intermediate grade. Note additionally that the final grade contours on FINAL COVER GRADING PLAN, found on Sheet 5 of the drawings, is conceptual and actual final elevations will be based on the actual elevation of the top of liner. The proposed contours provided on final grade drawings are concept elevations and may not be the actual final grades. The intent of the project is to provide the regulatory thickness of each layer of soil material with the establishment of the top of the intermediate level being the control. Once the one foot thickness of the intermediate cover is established the following layers of materials and soils will be constructed to the thicknesses as noted above. See the details for the specifics. If bidders choose to have a survey or take confirming elevations, that would be acceptable to the OWNER. Requests for access must be coordinated with the landfill staff.

B. The prices stated in the Bid Form include all costs and expenses for taxes, labor, equipment, material, commissions, transportation charges and expenses, patent fees and royalties, labor for handling material during inspection, together with any and all other costs and expenses for performing and completing the Work, as shown on the Plans and specified herein. The basis of payment for Bid Items at the price shown in the Bid Form shall be in accordance with its description of the item in this section and as related to the Work specified and shown on the Drawings. Unit prices where used will be applied to actual quantities furnished and installed in conformance with the Contract Documents.

C. The CONTRACTOR’s attention is called to the fact that the quotations for the various items of Work are intended to establish a total price for completing the Work in its entirety. The cost of Work for which there is not a separate Bid
Item shall be included in a related Bid Item, or shall be distributed over all Bid Items, such that the bid for the project reflects the total price for completing the Work in its entirety.

D. The OWNER will have the right to issue one or more Change Orders prior to Final Payment, which will reconcile actual quantities furnished and accepted with the estimated quantities found in the Bid Form. Force Account work performed may be included in the Change Orders.

E. Payment of any Bid Item, in part or in full, prior to Final Payment, shall not be regarded as acceptance of that item.

F. The CONTRACTOR’s attention is called to the fact that if shown, the estimated quantities appearing in the Bid Form consists of the ENGINEER’s opinion of what will be required to complete the Work as designed. Neither the OWNER nor the ENGINEER guarantees the accuracy or exactness of the figures. The actual quantities will be determined during and after construction, based upon the measurements herein described. Differences may exist between the estimated quantities and the actual quantities. The estimated quantities are not a guarantee of the magnitude of Work. The OWNER reserves the right to authorize additional amounts of any or all of the Bid Items, and to reduce or totally eliminate any of the Bid Items, without affecting any other Bid Items.

G. All existing grades shown on the drawings are approximate and the CONTRACTOR is responsible to field verify all grades.

H. The CONTRACTOR shall immediately report overpayment on any item.

I. The OWNER will have the right to deduct for overpayment of any item, when discovery of overpayment is made, and to adjust the amounts due the CONTRACTOR accordingly.

J. The OWNER will have the right to require the CONTRACTOR to excavate and expose any item which was covered after installation for the purpose of measuring, testing, or inspecting the item; and the CONTRACTOR shall comply with such request. No separate or additional payment will be made for such extra work. The CONTRACTOR shall, when accepted or directed to by the OWNER, restore and repair the Work in conformance to the Contract Documents.

K. Work required beyond the Contract requirements shall be approved by the ENGINEER or OWNER prior to the start and accepted before payment may be made. Mere knowledge by the OWNER or the ENGINEER that the CONTRACTOR has performed a task shall not constitute acceptance of the task.
for the purpose of payment, and the OWNER will not be under obligation to pay for the task.

L. The OWNER reserves the right to request of the CONTRACTOR a breakdown of any of the Lump Sum Bid Items, which the CONTRACTOR shall promptly provide. The breakdown shall consist of labor, equipment, and the cost of material for the Bid Item or the various components included within the Bid Item.

M. Lump Sum items have been established for all portions of the work except as previously noted. The term "Lump Sum" shall mean complete payment for the unit of work described. Where the unit measurement is described as "Lump Sum", the unit shall include all necessary appurtenances and incidentals required to complete the unit of work. Measurement of the lump sum work will be estimated by the values in the Schedule of Values as applied to the completed portion of work for purposes of monthly payment estimates.

N. Unit Price Items may be applied for specific items as noted above.

PART 2 - MEASUREMENTS

A. Progress payments for Lump Sum Bid Items will be considered on a percent completed basis. The Schedule of Values prepared as per the General Conditions will be used as the basis of the percent complete. The CONTRACTOR shall estimate the value of the work performed, subject to the review and acceptance by the ENGINEER.

B. The CONTRACTOR shall submit quantities for payment, with calculations, for the OWNER’s review and acceptance, in accordance with the Contract Documents.

C. The ENGINEER and OWNER will review these calculations prior to making payments. The CONTRACTOR shall give the ENGINEER and OWNER access to all field data, calculations, and computations. In the event of discrepancies or the need for additional field data to confirm quantities, the CONTRACTOR shall be responsible for the additional surveying cost.

D. Prior to submitting his first requisition for payment, the CONTRACTOR shall secure the ENGINEER’s and OWNER’s concurrence on the methods and procedures for making field measurements and the manner in which calculations will be performed in preparation of progress and final payment estimates.

E. Quantity estimates, field measurements, certifications, and related backup information that are submitted in support of payment request will be considered
by the OWNER as having been prepared by the CONTRACTOR, even when prepared by or submitted on behalf of the CONTRACTOR by others.

F. Earthwork quantities that result from unauthorized over-excavations, unauthorized overfilling, or from under-filling will not be considered for payment. These operations include excess volumes removed from on-site excavations, additional cover or clean fill material required to fill excess cuts, or to fill embankments that do not meet the base grade requirements.

G. The value of furnished materials, for which partial progress or full payment is made during the course of the Work that remain unused at the closing of the Contract, shall be deducted from the amounts due the CONTRACTOR in the Final Payment.

PART 3 - PAYMENT ITEMS (BY BID ITEM NO.)

A. GENERAL

Measurement: Mobilization and demobilization of equipment, personnel, and work forces to the work site; readying to commence construction by providing field offices, electric, telephone, water, and sanitary utilities; by obtaining permits, licenses, insurance, and bonds; and by submitting to the OWNER necessary information such as, but not limited to, schedules, safety plan, progress photographs, work plans, and shop drawings, will be considered for payment. Survey efforts not identified below are to be included under this section. Under this item, the CONTRACTOR shall be responsible for site preparation and filling the area for field offices and for parking.

Payment: Payment will be made in the Total Amount Bid under these items, said items not to exceed five (5) percent of the Total Bid Amount for the project, as reflected on the Bid Form, and no additional compensation exceeding the Total Amount Bid shall be made, under this item, for any reason. Payment for Bonds and Insurance can be requested on the first payment request based on the bid amount, or the documented actual payment amount, whichever is less. Payment for mobilization shall be full compensation for all materials, labor, equipment, tools, excavation, advance work in preparation, and physical improvements to the site necessary for complete mobilization.

B. SURVEY AND DEPTH CHECKS

Measurement: Measurement for the WORK specified in these Bid Item shall be based on the Bid Form and all Items related to survey the WORK shall be included in the CONTRACT Lump Sum Prices. Payment shall be full compensation for the preparatory WORK, establishing construction controls,
baseline surveys, location of utilities, stakeout of elevation and positional information required to complete the construction, excavation and backfill for depth checks, record keeping, and obtaining all survey information required to compile Record Drawings. Each Final Survey and the Record Drawings must be signed and sealed by a surveyor licensed in the State of North Carolina.

1. **Existing Conditions Survey:** The Existing Conditions survey shall include a survey of the existing conditions within the limits of construction of the PROJECT. The survey shall note all above grade structures, piping, and stormwater features which may or will be impacted by the WORK and shall include the areal extent of existing of the PROJECT.

2. **Post Stripping Survey:** Following completion of the Mulch Removal and Stripping the PROJECT area shall be surveyed to determine the thickness of soil material removed and to establish elevations of the new surface.

3. **Top of Intermediate Cover Survey:** Following completion of the Intermediate Cover soil placement the PROJECT area shall be surveyed to determine conformance with the design elevations and locations.

4. **Pre and Post Waste Excavation Surveys:** Prior to and again following completion of the waste excavation the area of waste to be removed shall be surveyed. The surveyor will provide a volume of material removed on the survey.

5. **Protective Cover Depth Checks:** Following placement of the Protective Cover and Top Soil, the CONTRACTOR will conduct the Depth Checks, and submit them to the ENGINEER.

6. **Final/Record Survey:** The Final Survey will include all features of the PROJECT installed and all existing features within the limits of construction. The survey will include, but is not limited to, the Protective Cover, stormwater structures, piping, LFG components, limits of liner, underground piping, forcemains, sod and/or seeding limits, berms and access roads, and all other features related to the PROJECT.

**Payment:** Payment for this Bid Item will be made at the CONTRACT Lump Sum Prices, for which price and payment shall be full compensation for surveying in accordance with the Contract Documents and Specifications and accepted by the ENGINEER.

**Partial Surveys of WORK:** It is understood the CONTRACTOR may elect to construct the PROJECT at different time intervals and survey sections separately. Partial surveys must be submitted to the ENGINEER to determine the section the CONTRACTOR is requesting to continue working in meets the design.
requirements. The CONTRACTOR may not continue WORK until the partial survey is approved by the ENGINEER. Partial surveys are not required to be signed and sealed at the time of submittal, however, the partial surveys used to compile the complete survey for each of the surveys listed above, must not deviate from the partial survey submitted and the complete survey must be certified for submittal. Payment for surveys will not be made until the complete, certified survey is submitted and approved. However, partial surveys may be used for payment of WORK items such as soil and piping upon review, agreement, and approval by the OWNER, ENGINEER, and CQA REPRESENTATIVE.

C. TEMPORARY EROSION AND SEDIMENTATION CONTROL

**Measurement:** Measurement for the work specified in this bid item shall be on a lump sum basis, wherein no measurement of various items for temporary erosion and sedimentation control will be made; all items shall be included in the lump sum contract price.

**Payment:** Payment for these bid items will be made at the contract lump sum price, which price and payment shall be full compensation for establishing new erosion and sedimentation controls as described in the specifications, maintaining temporary erosion and sedimentation controls for the duration of construction until the project site is stabilized, and removal of erosion and sedimentation controls at the completion of the work. Progress payments shall be made as a percentage of the Lump Sum Contract Price, in accordance with the Contract Documents and Specifications, and accepted by the ENGINEER.

D. MULCH REMOVAL AND STRIPPING

**Measurement:** Measurement for these Bid Items will be the acceptance of the complete removal of the existing mulch and Stripping in accordance with the requirements of the Contract Documents and shall include the entire project area. The CONTRACTOR shall be responsible for loading and transporting the materials generated from the WORK to a designated on-site area as directed by the OWNER for disposal.

**Payment:** Price and payment shall be full compensation for all costs associated with the WORK specified in these Bid Items including the CONTRACTOR providing all necessary labor; all equipment; establishing construction controls; surveying; excavation; loading; hauling; placement; stockpiling; disposal; and all other appurtenances and incidentals required to complete the WORK in accordance with the Contract Documents. The OWNER will not charge the CONTRACTOR a tipping fee and the material will not be required to be transported through the OWNER’S scale facility, but the CONTRACTOR shall be responsible for all other costs. Progress payments will be made as a percentage
of the WORK complete in compliance with the Contract Documents and accepted by the ENGINEER.

E. CLOSURE

Measurement: Complete closure will include but not be limited to site preparation, exposure of bottom liner on berm at toe of existing slope, providing grading to intercept existing intermediate cover. Intermediate cover system shall have one foot minimum depth after track-compaction, meeting the elevations shown on the drawings, installation of proposed liner system (40 mil LLDPE textured geomembrane, 350 mil geocomposite), installation of the side slope stormwater/erosion control pipe and structures, GFFR, boots for cleanouts and risers, etc.

During site preparation all excess excavated topsoil and unsuitable intermediate cover materials shall be transported to the active landfill working face for use as working cover. Excess sand and soil materials that may have deposited at the toe of slope should be redistributed to areas that lack sufficient intermediate cover. Prior to relocation of any material CONTRACTOR should coordinate and receive approval from the ENGINEER or CQA REPRESENTATIVE.

1. 40 Mil LLDPE Geomembrane: During the installation of the 40 mil LLDPE liner system, the CONTRACTOR shall include all work required for furnishing and installing the liner system and incidental work and equipment required to complete this item.

2. Geocomposite: For the Geocomposite Bid Item the CONTRACTOR shall include all work required for furnishing and installing the Geocomposite and any incidental work and equipment required to complete this item.

3. Seed and Mulch: Seed and Mulch will be at the discretion of the OWNER. This item does not include repairs to any areas disturbed or damaged by the CONTRACTOR. Any areas outside the project area disturbed or damaged by the CONTRACTOR during construction will be repaired at no cost to the OWNER. If Seed and Mulch is to be used it shall be in the areas as directed by the OWNER. The CONTRACTOR shall include all work required to furnish and install the Seed and Mulch and incidental work and equipment required to complete this item.

Payment: Payment for this Bid Item will be made to the nearest 0.10 acre basis of actual seed installed and accepted. This pay item shall include, but not limited to, materials, labor, equipment, conditioning topsoil with fertilizer and/or lime
application, supplying and installing seed, replanting, repair of erosion, maintaining areas seeded through final acceptance of the WORK, and any other WORK necessary to produce a uniform stand of grass. No payment will be made for seed placed outside of the limits of specified areas without prior approval of the ENGINEER or for areas disturbed by the CONTRACTOR that are not required as part of the performance of the WORK. Payment of seed shall not relieve the CONTRACTOR of the need to maintain seeded areas throughout warranty period.

4. **GFFR Spillways & Swales:** During the installation of the stormwater control and conveyance systems, the CONTRACTOR shall include all work required for furnishing and installing the GFFR Spillways, GFFR Swales, Concrete Swale Stops, Non-shrink grout and other incidental work and equipment required to complete this item.

5. **12” Downchute Pipe:** Following the placement of the Geocomposite the CONTRACTOR shall include all work required for furnishing and installing the 12” HDPE Downchute pipes, 12” HDPE inlets, Concrete Collars and other incidental work and equipment required to complete this item.

6. **4” Toe Drain Pipes:** For the installation of the 4” Toe Drain Pipes the CONTRACTOR shall include all work required for furnishing and installing the 4” HDPE Pipe, Rounded River Rock, Geotextile and other incidental work and equipment required to complete this item.

7. **Bollards:** The CONTRACTOR shall include all work required for furnishing and installing the Bollards and other incidental work and equipment required to complete this item.

**Payment:** Payment for Items 1, 2 and 4-7 shall be made at the Contract Lump Sum Price Bid for the item, all of which shall be full compensation for unloading, stockpiling, inventory, on-site handling, deployment, CQC testing, placement, protection, cleaning, patching, tie-ins with existing work, boots and connections, anchor trenches, seaming, repairs, as-built documentation, all equipment, materials, labor and appurtenances necessary to install the items as shown on the Contract Drawings and in accordance with the Specifications.

**F. OFFSITE SOIL MATERIALS, DELIVERY, AND PLACEMENT**

1. **Intermediate Cover:** For the Intermediate Cover bid item measurement shall be a lump sum for the offsite material, delivery and placement required to prepare the intermediate cover grades as shown on the Contract Drawings. Work for this item shall include preparation of the offsite material for the intermediate cover,
excavation, testing, delivery, placement, and compaction to provide 12 inches of intermediate cover as shown on the drawings.

2. **Protective Cover**: Measurement for the preparation of the offsite material for the Protective Cover will include excavation, testing, delivery, placement, and compaction to provide a post compaction minimum of 18 inches of protective cover and the depths required for the grading of the terrace, road, berms, etc., as shown on the Contract Drawings. The 18 inches are a minimum requirement and more than 18 inches of protective cover will be required in many locations to provide for stormwater flow and extend beyond the edge of liner to meet the elevations, slopes and grades as shown on the Contract Drawings.

3. **Topsoil**: Measurement of the Topsoil bid item shall be a lump sum for the offsite material, delivery and placement required to prepare the grades as shown on the Contract Drawings. WORK for this item shall include preparation of the offsite material for the topsoil, excavation, testing, delivery, placement, and compaction to provide 6 inches of topsoil and shall extend beyond the edge of liner to meet the elevations slopes and grades as shown on the Contract Drawings.

4. **Sod**: Measurement of the Sod bid item shall be a lump sum for the, delivery and placement required to sod the areas as shown on the Contract Drawings. This item does not include repairs to any areas disturbed or damaged by the CONTRACTOR. Any areas outside the project area disturbed or damaged by the CONTRACTOR during construction will be repaired at no cost to the OWNER.

**Payment**: Payment shall be made at the lump sum Contract prices which shall be payment in full to provide all labor, material, supplies and equipment necessary to complete the installation of the intermediate cover, protective cover, topsoil and sod in accordance with the Contract Documents. Payment shall be full compensation for all costs associated with establishing construction controls, excavation, loading, hauling, stockpiling, screening, and all other incidentals necessary to obtain and install offsite material for intermediate cover, protective cover, topsoil and sod.

G. **LFG EXPANSION**

**ITEM 1 - 8  PIPING**

Measured by linear feet (LF). All pipe is high density polyethylene pipe (HDPE).

Payment shall be full compensation for furnishing all labor, materials, equipment, and incidentals for installing pipe and fittings, bedding and backfill, compaction, removal of trench spoil, pressure testing, and all related incidentals. Additional backfill soil shall be from off-site source.
ITEM 9 CORRUGATED METAL PIPE (CMP) FOR LFG PIPE CASING

Measured by linear feet (LF).

Payment shall be full compensation for furnishing all labor, materials, equipment, and incidentals for installing CMP casing pipe for road and stormwater conveyance channel/swale crossings.

ITEM 10 DUAL CONTAINMENT FORCEMAIN PIPE CLEANOUT

Measured by each (EA).

Payment shall be full compensation for furnishing all labor, materials, equipment, and incidentals for the fabrication and installation of the cleanout as shown on the Construction Drawings.

ITEM 11 VERTICAL LFG EXTRACTION WELL

Measured by linear feet (LF) measured vertically from the existing grade (at time of installation) to the bottom of boring.

Payment shall be full compensation for furnishing all labor, materials, equipment, and incidentals for surveying and access to well locations, drilling, installation of casing, pipe, fittings, soil backfill, gravel backfill, bentonite plug, all quality control testing, waste removal to the landfill’s active waste disposal area, and all other related incidentals. Payment for well abandonment shall be at 50 percent of unit rate.

ITEM 12 WELL CASING PIPE GEOMEMBRANE BOOT

Measured by each (EA).

Payment shall be full compensation for furnishing all labor, materials, equipment, and incidentals for installing 40 MIL LLDPE boot around vertical LFG extraction well. Boot shall be welded to cap system liner and fastened to well casing pipe with two (2) stainless steel bands.

ITEM 13 - 20 VALVE ASSEMBLIES

Measured by each (EA).

Payment shall be full compensation for furnishing all labor, materials, equipment, and incidentals for installing valves and fittings, valve extension housings, valve operating stems, valve operating wheels, excavation and backfill, quality control testing, and all other related incidentals.
ITEM 21  CONDENSATE SUMP INCLUDING PNEUMATIC PUMP

Basis of Measurement: By each (EA).

Basis of Payment: Includes the purchase and installation of high density polyethylene landfill gas collection sump. Includes the supply and installation of a pneumatic pump in the sump and incidentals for a complete and operational liquids collection sump.

ITEM 22  VERTICAL LFG EXTRACTION WELL WELLHEAD, PNEUMATIC PUMP INCLUDING DUAL EXTRACTION WELL CAP, HOUSING, FITTINGS, AND CONNECTION TO COLLECTION PIPE

Basis of Measurement: By each (EA).

Basis of Payment: Includes the purchase and installation of a 2-inch wellhead and pneumatic pump in an existing and new landfill gas extraction well. Includes the supply and installation of dual extraction well cap, piping, tubing, fittings, stainless steel cable, valves, air pressure regulator, and incidentals for a complete and operational pump.

ITEM 23  LEACHATE CLEANOUT REMOTE WELLHEAD INCLUDING TIE-IN AND CONNECTION TO COLLECTION PIPING

Basis of Measurement: By each (EA).

Basis of Payment: Includes the purchase and installation of 2-inch LFG wellhead assembly and 6-inch riser piping. Includes UV resistant flexible hose and couplings for the wellhead and connection to either a leachate cleanout or gas collection pipe.

Payment: Price

H. ADDITIONAL ITEMS

1. Waste Relocation: Waste relocated under this line item will only include that waste discovered while grading the Intermediate Cover and the volume necessary to achieve 12” of cover over the waste at the Intermediate Cover Grades as shown on the Contract Drawings. All other waste relocation is included in the line items that generates the waste. The CONTRACTOR must coordinate time and volume of waste with OWNER before hauling any material to the active face to minimize disruption of landfill operations. The volume of Waste shall be based on...
the total surveyed volume. The volume will be determined with the pre-
excavation survey and a post excavation survey. The volume calculation will be
determined from the comparison between the two surveys as calculated by
AutoCAD. A volume will be provided to the ENGINEER prior to including the
waste relocation item on the pay application and will be accompanied by
AutoCAD files including a pre-excavation surface and a post excavation surface.
The ENGINEER will confirm the volume provided by the CONTRACTOR.
Should a difference in the volume arise, the volume calculated by the ENGINEER
in AutoCAD will be used.

2. **Cleanout Cap Replacement:** Existing threaded leachate cleanout caps shall be
replaced with HDPE blind flanges and 316 Stainless steel bolts and hardware as
shown and described in the Contract Documents. All sizes and locations shall be
field verified.

3. **6” Cleanout Extensions:** This item includes completing cleanout extensions at
the locations shown Contract Documents for the existing 6” HDPE leachate
cleanouts. Each cleanout extension will also include installation of a new HDPE
blind flange. 316 Stainless Steel bolts and hardware as shown and described in the
Contract Documents. Length of pipe shall be field verified.

4. **8” Cleanout Extensions:** This item includes completing cleanout extensions at
the locations shown Contract Documents for the existing 8” HDPE leachate
cleanouts. Each cleanout extension will also include installation of a new HDPE
blind flange. 316 Stainless Steel bolts and hardware as shown and described in the
Contract Documents. Length of pipe shall be field verified.

5. **10” Cleanout Extensions:** This item includes completing cleanout extensions at
the locations shown Contract Documents for the existing 10” HDPE leachate
cleanouts. Each cleanout extension will also include installation of a new HDPE
blind flange. 316 Stainless Steel bolts and hardware as shown and described in the
Contract Documents. Length of pipe shall be field verified.

6. **Leachate Seep Trench:** Measurement for the WORK specified in this Bid
Item will be on a Linear Foot basis for the trench excavation, waste hauling,
filling and compaction of the Protective Cover material from an approved off-site
source to the grades as shown and specified in the Contract Documents.

7. **GFFR Spillway Repair:** Measurement for the WORK specified in this Bid
Item will be on a Lump Sum basis for the repair of Damaged GFFR Spillways in
three separate locations. The existing GFFR shall be cut out and hauled to the
active landfill working face for disposal. The existing Protective Cover shall be
filled and regraded back to the original elevations and new GFFR will be placed
and grouted as shown and specified in the Contract Documents.
8. **Flow Meters Replacement**: Measurement shall include the two existing 1.5” secondary flow meters, one at Cell 6D and one at Cell 6E and three 3” flow meters, one at each pump station: 2 West, Cell 6D and Cell 6E shall be replaced with 316 stainless steel meters as described in these Contract Documents. CONTRACTOR will be responsible to repair any existing electrical wiring or signal cabling, that may be compromised, necessary for proper operation. All sizes shall be field verified.

9. **Pump Station 2W Misc. Equipment & Pipe Replacement**: Measurement shall be lump sum and shall include the replacement of all metal components (fittings, plumbing connections, bracing, nuts, bolts, flanges, check valves, adaptors, etc) with 316 stainless steel equivalents. This Item shall also include any fittings, bracing. All piping that must be replaced as a part of the Flow Meter Replacement shall be HDPE, and shall include all piping necessary to reconnect the system and reestablish proper operation.

10. **Pump Station 6D Misc. Equipment & Pipe Replacement**: Measurement shall be lump sum and shall include the replacement of all metal components (fittings, plumbing connections, bracing, nuts, bolts, flanges, check valves, adaptors, etc) with 316 stainless steel equivalents. This Item shall also include any fittings, bracing. The existing piping at Cell 6D is all PVC and shall be entirely replaced with HDPE SDR 17 pipe of equivalent size, and shall include all piping necessary to reconnect the system and reestablish proper operation.

11. **Pump Station 6E Misc. Equipment & Pipe Replacement**: Measurement shall be lump sum and shall include the replacement of all metal components (fittings, plumbing connections, bracing, nuts, bolts, flanges, check valves, adaptors, etc) with 316 stainless steel equivalents. This Item shall also include any fittings, bracing. All piping that must be replaced as a part of the Flow Meter Replacement shall be HDPE, and shall include all piping necessary to reconnect the system and reestablish proper operation.

12. **Leachate Seep Pipe Removal**: Measurement shall be Lump Sum for the complete removal of approximately 400’ of existing leachate seep piping and capping at the existing landfill gas well as shown on the Contract Documents.

**Payment**: For Items 1-8 payment shall be based on the Contract Unit Price as shown in the Bid Form. Items 9-12 shall be Lump Sum. Payment shall be made at the Contract price based on the Bid Form and any volumes shall be based on a signed and sealed survey, as calculated by AutoCAD. Payment shall be full
compensation for all costs associated with establishing construction controls, surveying, excavation, loading, hauling, stockpiling, disposal, installing, welding, hardware, grading, sod, and all other incidentals necessary to complete the WORK.

END OF SECTION
SECTION 01027

APPLICATIONS FOR PAYMENTS

PART 1 - GENERAL

1.01 PAY REQUEST SUBMISSION

Submit applications for payment to the ENGINEER in accordance with schedule established by General Conditions of the Contract and Contract between OWNER and CONTRACTOR. CONTRACTOR shall use the Application for Payment form provided in Section 00830 as the official pay request form. A spreadsheet will be provided with the payment request based on the schedule of values required in Section 01370. It is strongly suggested that the quantities/percentages listed on the pay request be reviewed with the field CQA representative prior to submitting to the engineer.

1.02 FORMAT AND DATA REQUIRED

A. Submit applications typed on forms provided in Section 00830, with itemized data typed on 8 ½” x 11” or 8 ½” x 14” white paper continuation sheets or as a PDF.

B. Provide itemized percent completed items according to WORK items listed in the schedule of values accepted by the Engineer.

C. Provide from each subcontractor/supplier, a subcontractor’s/Supplier’s Certification on form provided in Section 00830.

D. Provide construction photographs in accordance with Section 00700, paragraph 16.6.

E. Provide Sales Tax Report on form provided in Section 00830. This report shall include a list of sales tax paid during one pay period lagging the period described in the application for payment.

1.03 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

A. Application Form:

1. Fill in required information, including that for Change Orders executed prior to date of submittal of application.

2. Fill in summary of dollar values to agree with respective totals indicated on continuation sheets.
3. Execute certification with signature of a responsible officer of CONTRACTOR.

B. Continuation Sheets:

1. Fill in total list of all scheduled component items of WORK, with item number and scheduled dollar value for each item.

2. Fill in dollar value in each column for each scheduled line item when WORK has been performed or products stored. Round off values to nearest dollar, or as specified for Schedule of Values.

3. List each Change Order executed prior to date of submission or the pay request, at the end of the schedule of values. List by Change Order Number, and description, as thou an original component item of WORK.

4. To receive approval for payment on component material stored on site, submit copies of the original paid invoices with the application for payment. Any materials stored on site that are included in the pay request must be installed prior to the next pay request submitted.

5. As provided for in the "Certification of CONTRACTOR" form, the CONTRACTOR shall certify, for each current pay request, that all previous progress payment received from the Owner, under this Contract, have been applied by the CONTRACTOR to discharge in full all obligations of the CONTRACTOR in connection with WORK covered by prior Applications for Payment, and all materials and equipment incorporated into the WORK are free and clear of all liens, claims, security interest and encumbrances.

CONTRACTOR shall attach to each Application for Payment like affidavits by all Subcontractors.

6. CONTRACTOR will complete the sales tax form with each pay request and will maintain records of the sales taxes should the County need receipts for confirmation of the information.

1.04 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

A. When the OWNER or the ENGINEER requires substantiating data, CONTRACTOR shall submit suitable information, with a cover letter identifying:

1. Project.

2. Application number and date.
3. Detailed list of enclosures.

4. For stored products:
   a. Item number and identification as shown on application.
   b. Description of specific material.

B. Submit one copy of data and cover letter for each copy of application.

C. The CONTRACTOR is to maintain an updated set of drawings to be used as Record Drawings in accordance with Section 01720. As a prerequisite for monthly progress payments, the CONTRACTOR is to exhibit the updated record drawings for review by the OWNER and the ENGINEER.

1.05 PREPARATION OF APPLICATION FOR FINAL PAYMENT

A. Fill in Application form as specified for progress payments.

B. As a prerequisite for final payment, CONTRACTOR is to submit a "Consent of Surety" acknowledgement of final payment request letter showing amount of payment which the CONTRACTOR is requesting.

1.06 SUBMITTAL PROCEDURE

A. Provide draft values installed and stored to the CQA REPRESENTATIVE in the field.

B. Make corrections based on the review by the CQA REPRESENTATIVE.

C. Submit Applications for Payment to the ENGINEER at the time stipulated in the Agreement.

D. Number of copies for each Application for Payment:
   1. Owner: One (1) copy
   2. Engineer: One (1) copy
   3. Contractor: As required for their needs

E. When the ENGINEER finds Application properly completed and correct, he will transmit certificate for payment to OWNER, with copy for CONTRACTOR.
PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
SECTION 01030

SPECIAL PROVISIONS

PART 1 - GENERAL

1.01 UTILITIES

A. The CONTRACTOR is responsible for providing any water, power, and sanitary facilities required at the site for the performance of the WORK in accordance with the Contract Documents.

1.02 PERMITTING

A. The CONTRACTOR shall obtain all Federal, State, County and local permits as required.

1.03 ENVIRONMENTAL PROTECTION

A. The CONTRACTOR is specifically cautioned on the following items:

1. Excavations in and Around Landfills: All excavations shall be confined to the immediate area of the WORK for which the excavation is required.

2. Environmental Constraints:

   a. Dust Control: Trucked water or calcium chloride shall be used if necessary to prevent dust.

   b. Odors: Excavated materials causing odors shall be trucked to an area for disposal as designated by the OWNER. Emphasis shall be given to the reduction of any other circumstances causing odors.

   c. Explosion Protection: The CONTRACTOR shall be responsible for enforcing all explosion protection precautions according to the National Landfill Gas Committee Health and Safety Guidelines.

   d. Fire Control: The CONTRACTOR shall be responsible for fire control and submit a safety plan and fire control procedures (to which he will adhere during the entire Contract time) to the ENGINEER for review. The plan will address in detail those items listed in paragraph 1.04 of this section.

   e. Litter: The CONTRACTOR shall be required to control, collect, and truck all litter excavated or exposed by the WORK to an on-site disposal area as directed by the OWNER.
f. Fuel Containment: The CONTRACTOR shall provide for any temporary fuel stations for the operation of the equipment for this project. All tanks must have secondary containment consistent with current regulations to avoid impacting the site groundwater and soils.

3. Landfill Construction Procedures: CONTRACTOR operations shall not interfere with WORK performed by others.

1.04 SAFETY

A. Trench Safety - The CONTRACTOR shall comply with all of the requirements presented in the 0300 Section regarding trench safety. FAILURE TO COMPLY WITH THE REQUEST IN THIS SECTION SHALL RESULT IN THE BID BEING DECLARED NON-RESPONSIVE.

B. Work In and Around Landfills: All WORK shall be done in accordance with State and local requirements and OSHA Safety and Health Standards 29 CFR and shall conform to the Landfill Gas Division of the Solid Waste Association of North American (SWANA) A Compilation of Landfill Gas Field Practices and Procedures, most current version.

1. General

The Occupational Safety and Health Act (OSHA) of 1970 impose a duty on employers to furnish a safe and healthful job environment for all employees. The employees are required to comply with safety rules and regulations applicable to their activities and conduct. Employers have the obligation not only to eliminate recognized hazards and to comply with national safety and health standards, but also to provide information and training to create the necessary awareness on the part of the employees.

Landfill safety requires more than the common sense safety procedures common to all industry. Bacterial decomposition of trash results in the formation of methane, a colorless, odorless, explosive gas that together with other volatile materials evolves into the atmosphere and migrates through the soil into surrounding areas. Air quality studies consistently show that concentrations of potentially hazardous substances (OSHA "Priority Pollutants) in the ambient air in the vicinity of solid waste landfills are well below threshold limits. However, in confined or enclosed areas on or adjacent to landfills, dangerous concentrations of combustible and possibly toxic gases may accumulate. Oxygen depletion may also occur in these areas of confinement; therefore, safety procedures should be followed at all times.
2. **Safety Equipment** for Workers engaged in construction or maintenance of landfill gas (LFG) facilities should wear protective safety equipment as follows:

   a. Hard hats, if near moving mechanical equipment.
   
   b. Steel-toed, shoes or rubber boots with steel shank.
   
   c. Safety glasses or face shields, as appropriate.
   
   d. Protective gloves (rubber or plastic would work if working with wet solid waste or where exposure to leachate/condensate is expected).
   
   e. Hearing protection, depending on noise level of work environment.

3. **Safety Equipment** to be made available by CONTRACTOR at the job site in quantities sufficient to cover the CONTRACTOR’S construction crew:

   a. Clean water, soap and paper towels.
   
   b. First aid kit, eye wash station, stretcher, and blanket.
   
   c. Fire extinguisher (2) - 20:A-80:BC.
   
   d. No smoking signs.
   
   e. Acid vapor and particulate masks for all personnel.
   
   f. Parachute-type harnesses (2) and safety lines (for use in excavations, manholes, etc.).
   
   g. Self-contained breathing apparatus.
   
   h. Methane/oxygen indicator.
   
   i. Hydrogen sulfide indicator (Draeger Tubes).
   
   j. Additional monitoring equipment for toxic vapors and aerosols.
   
   k. Barricades.
   
   l. Covers for excavations that will remain open at end of working day.
m. Air-moving equipment that can provide ventilation if working in sub-standard air environment (trenches, condensate drain pits, etc.).

n. Fire blanket.

o. Organic vapor masks.

p. Construction equipment equipped with vertical exhaust or spark arrestors if within 2 feet of ground.

q. Flagging, traffic markers, and florescent orange safety vests for use when working around operating equipment or near public roadways.

4. Personal Health and Hygiene

a. Personal safety and the safety of fellow workers require that all employees are mentally alert and in good general health. No alcohol or drugs are permitted. Smoking is prohibited on the landfill site except in designated areas. No worker should handle excavated solid waste without wearing gloves. Parts of the body accidentally exposed to waste, leachate or condensate should be washed with soap and water immediately.

b. An annual medical examination also is recommended for workers whose activities include daily exposure to solid waste or LFG. Any cut or abrasion should be treated immediately as the chance of infection is high when working on a landfill. A tetanus shot and hepatitis B shot is recommended at specified intervals for all personnel involved in site construction.

c. Avoid contact with unfamiliar plants or those known to be hazardous growing on the landfill.

d. Animals, snakes, spiders, and other insects should be avoided. Be particularly careful around vaults and valve boxes.

e. The address, phone number, and location map of the local hospital and medical emergency room shall be prominently posted. In addition, the phone number of an ambulance and fire department/rescue unit should be posted.

f. Wash hands prior to eating and before leaving work area.

5. Landfill Safety Procedures
a. As a general rule LFG WORK shall be performed by a team composed of a minimum of two (2) people. In situations where hazards are minimal, and where it's necessary to allow an individual to work alone, another responsible individual must be aware of the lone workers task and scheduled time of completion/return, and if possible monitor the individual’s progress.

b. When working on (or within 1,000 feet of) an active or completed solid waste disposal area, be alert to the existence of (or potential for) hazardous conditions, i.e., the presence of LFG. The distance of 1,000 feet is used by some authorities as the maximum distance LFG will migrate through soils under average conditions. Migration distance, however, may be greater through underground conduits, or where surface conditions interfere with normal venting.

Hazards that might occur could be one or more of the following:

1) Fires may start spontaneously from exposed and/or decomposing solid waste.

2) Fires and explosions may occur in confined or enclosed spaces from the presence of methane gas.

3) LFG may cause an oxygen deficiency in underground trenches, vaults, conduits, and structures.

4) Hydrogen sulfide (H₂S) may be present. H₂S is a colorless, very flammable gas which, in low concentrations, has an offensive odor described as that of rotten eggs. H₂S, however, quickly numbs the olfactory senses so that reliance upon the sense of smell can lead to a very dangerous condition and even cause virtually instant death.

5) Sudden subsidence or collapse of the landfill surface.

c. A confined space is defined as a space where existing ventilation is insufficient to remove dangerous air contamination and/or oxygen deficiency, and where ready access/egress to escape, provide aid and to remove a disabled employee is difficult. In the case of flammable gases, such as methane, a hazardous concentration is defined as any concentration greater than 20 percent of the lower atmosphere containing less than 19.5 percent oxygen by volume.
(Cal-OSHA). In the absence of positive ventilation, a mixture of 5 percent LFG in air will exceed both of these limits.

d. Vaults and ditches greater than 3 feet and other non-ventilated confined spaces should not be entered unless tested for explosive concentrations, oxygen deficiency and H2S levels. Air blowers or fans should be available for positive ventilation. Self-contained breathing apparatus or supplied-air masks must be used when entering areas containing hazardous and/or oxygen deficient atmospheres. "Chemical" cartridge respirators can be used for gaseous contaminants (not H2S) if oxygen concentration is satisfactory. Mechanical filter respirators should be used only for protection against particulate matter.

e. Fires or explosions in confined spaces require a source of ignition. Smoking is strictly forbidden except in designated areas. Non-sparking and/or explosion proof tools should be used in vaults, trenches, or other enclosed areas. Positive ventilation is required in construction shacks or other structures on or near a landfill. Temporary structures on the landfill surface should be constructed on blocks or other supports with a ventilated area under the main floor. Construction equipment should be equipped with vertical exhaust and spark arrestors.

f. Hydrogen sulfide gas is always present in LFG in some concentrations, generally below 100 parts per million (ppm), in LFG. It is unlikely that hazardous concentrations of H2S will build up (see Table 1) except in vaults or other confined spaces where oxygen deficiency may be a major hazard. However in special circumstances, where there is a natural or manmade presence of gypsum along with high moisture, for example, very high (lethal) concentration levels of H2S gas could be encountered under certain circumstances. Personnel must be trained for, and alert to, these possibilities. Gas masks are not effective against H2S and fresh air breathing equipment is required.

g. Employees who wear beards shall not work in areas where air masks or respirators may be necessary. All employees should be fit-tested on the respirator that they will wear in order to assure a proper facepiece seal against the face. Fit-testing should reoccur at least annually.
### TABLE 1

**PHYSIOLOGICAL RESPONSE TO VARIOUS CONCENTRATIONS OF HYDROGEN SULFIDE**

<table>
<thead>
<tr>
<th>Response</th>
<th>Concentration/PPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum allowable concentration for Prolonged exposure</td>
<td>10</td>
</tr>
<tr>
<td>Slight symptoms after several hours.</td>
<td>70-150</td>
</tr>
<tr>
<td>Maximum concentrations for one hour without serious consequences</td>
<td>170-300</td>
</tr>
<tr>
<td>Dangerous after exposure of one-half to one hour.</td>
<td>400-700</td>
</tr>
</tbody>
</table>

**NOTES:**

1. Most landfills do not have H₂S in concentrations greater than 10 PPM. However, concentrations up to 250 PPM have been measured.

2. In many cases, laboratories do not know how to properly analyze for H₂S. Draeger tube check analyses are generally more accurate than most laboratories.

6. **Safety Procedures for Trenching and Pipe Installation**

   a. Excavation permits and shoring may be required for excavations deeper than 4 to 5 feet (into which workers will enter). Check state regulations as standards and requirements vary.

   b. One person, with the sole responsibility of assuring the observance of all safety procedures, should be present at all times during construction. This person should be trained in the use of all the recommended safety equipment.

   c. No smoking on the landfill except in designated areas.

   d. Prior to the entry of workers into an excavation deeper than 3 feet, and periodically during their work, the atmosphere in the excavation should be tested. If there are any doubts regarding safety, no worker shall be allowed to enter the excavation without at least a half-face or full-face OV/AG mask. If there is an oxygen deficiency, a concentration of any constituent with poor warning properties at a level greater than its TLV, or a concentration of
hydrogen sulfide greater than 10 ppm, a positive pressure SCBA or supplied air respirator with 5 minute emergency escape bottle should be used. If a combustible mixture of methane is present, further precautionary measures shall be taken; entry should be forbidden until the methane concentration is acceptable and at least below 1.0 percent by volume in air, or 20 percent of the LEL. If workers are not equipped with supplied air or pressure-demand SCBAs, then entry should be forbidden until the methane concentration is below 0.1 percent by volume in air, unless the Maximum Use Limitation (Mul) of the APR is greater. Workers required to work on an emergency basis, in any environment at or above the IDLH (the level immediately dangerous to life and health as declared and published by NIOSH) for any constituent component in the working environment, should be outfitted in pressure-demand SCBAs.

e. No worker should be allowed to work alone at any time in or near the excavation. Another worker should be present, beyond the area considered to be subject to the possible effects of LFG.

f. Periodically during construction the work area should be monitored for levels of methane and hydrogen sulfide.

g. No worker should handle excavated solid waste without wearing appropriate work gloves.

h. Construction equipment should be equipped with a vertical exhaust at least 5 feet above grade and with spark arrestors.

i. Electrical motors, if used in the excavation area, shall be explosion-proof or non-sparking, totally enclosed fan cooled (TEFC); and electrical controls should be explosion-proof or intrinsically safe and meet the requirements for Class I, Division 2, Group D, (Methane), rated equipment in accordance with the National Electric Code (NEC).

j. No welding should be permitted in, on, or immediately near the excavation area, unless previously and continuously monitored for methane and other combustible gases.

k. Soil should be stockpiled near the excavation, to be used to smother any solid waste combustion should it occur.

l. Solvent cleaning, gluing, or bonding of pipe should be performed to the extent possible, outside the trench. An organic vapor
respirator shall be worn by persons using PVC solvents or glues. Personnel using solvent and cement shall be familiar with the appropriate materials safety data sheets for those products.

m. Forced ventilation may be required for workers who must work in trenches deeper than 3 feet. Air blowers and fans may be used for positive ventilation. Dilution ventilation may address either an explosive gas hazard or a hazardous chemical health hazard. The amount of air required for ventilation must be determined based on the concentrations of explosive LFG or hazardous chemical constituents, the LEL for methane or the TLVs for the hazardous chemical constituents in question, the volume to be protected, ambient conditions, and an appropriate safety factor. These calculations should be performed by a qualified individual.

n. During piping assembly, all valves should be closed immediately after installation.

o. As construction progresses, all valves should be closed as installed to prevent the migration of gases through the pipeline and gas collection system.

p. All piping shall be capped at the end of each working day.

7. General Construction/Maintenance

a. When using alternating-current powered power tools, a portable ground-fault current interrupter (GFCI) should be used.

b. When welding near gas recovery process equipment, suitable procedures and precautions should be employed including:

1) Processing a "hot work" permit. (A self-issued serial numbered permit is required in many states.)

2) Designate a specific, dedicated individual, by name, as a fire watch.

3) Verify that explosive concentrations are not present using an explosimeter.

4) Have adequate fire extinguishers (20:A-80:BC) and fire blankets on hand.

5) Sandbag all drains.
6) Provide the appropriate purge and inert blanket on process equipment and piping.

7) Procedures for safe welding and purging of process equipment are available from the American Petroleum Institute (API).

8. Field Sampling for Health and Safety
   a. The following instruments will remain at the job and be continuously employed by a qualified person:

   1) H₂S chemical reagent diffusion tube indicator or direct reading instrument.

   2) Oxygen Analyzer

   3) CGA (methane analyzer).

   b. CGAs and other electronic portable monitoring instruments should be rated explosion-proof or intrinsically safe. It is also recommended that they be Factory Mutual rated.

   c. It is important that any site always be initially characterized so that correct information can be available to make appropriate decisions about personnel exposure safety.

   d. To accomplish Item C, a gas sample should be collected prior to the beginning of WORK or as soon as possible, and should be analyzed for volatile organic chemicals. If historical information or preliminary field screening indicate a need, the sample should also be analyzed for heavy metals capable of volatizing, acid gases, and other inorganic compounds. Proper instructions and close coordination with the laboratory are important to properly characterize the gas. Several composite samples will provide a more uniform representation of LFG at the site. Several non-composited samples, may however, provide a better indication of peak concentrations and show chemicals which would not be indicated in the composite samples.

   e. Monitoring for vinyl chloride, benzene, or other constituent chemicals may also need to be conducted during drilling operations. A written record of monitoring should be maintained daily.

9. Respiratory Protection
a. All employees who may be required to wear respirators shall be trained in the proper use of respirators. Such individuals will have an appropriate physical examination for use of respirators. Each individual will be approved by a qualified physician for such respirator use. All personnel who wear respirators shall come under the jurisdiction of their employer's written respiratory protection program, and will follow and be knowledgeable about the program. Personnel will be individually fit-tested wearing their assigned respirator. Fit-testing should be performed annually.

b. Persons with interfering facial hair shall not be permitted in areas where respiratory protection equipment is required; i.e., beards are prohibited.

c. Permanent damage to the eyes (cornea) from acid gases and particulates may result if contact lenses are worn. Therefore, wearing contact lenses on site shall be prohibited. Those persons shall have prescription spectacle inserts installed in their respiratory protective equipment.

d. All NIOSH procedures and guidelines for respirator selection and use should be adhered to. Only equipment certified by NIOSH in its most recent certified equipment list will be used. APRs with chemical cartridges can only be used for acid gas/organic solvent vapors under the following conditions:

1) If the oxygen concentration is satisfactory.

2) If the chemical contaminants have been identified.

3) The concentrations are monitored.

4) The chemical filter cartridges are effective in removing the contaminants.

5) The cartridges are approved for such use (by NIOSH).

6) The contaminants have good warning properties.

If all of the above conditions cannot be satisfied, then Level B protection using positive-pressure SCBAs or supplied air is required. APRs with chemical cartridges/canisters will not be used for protection in environments containing constituents which have poor warning properties, and which are at or above, or can reasonably be expected to be near, at, and/or above the limitation of the protection factor (PF) for the respirator. The maximum working environment shall be
determined by multiplying the PF for the type of respirator by the TLV for the chemical substance under consideration, \( \text{MUC} = \text{PF} \times \text{TLV} \). A list of PFs is shown in Table 2.

e. Positive-pressure SCBA or supplied-air full-face masks shall be used when entering areas containing oxygen-deficient atmospheres, unknown atmospheres, or atmospheres considered to be at or above IDLH levels. Personnel (with appropriate SCBA apparatus) will not enter IDLH environments without emergency justification by and acceptance of a site safety manager or responsible project manager. An emergency is constituted by an already existing life threatening situation.

f. The length of time an APR canister or cartridge is effective in removing hazardous material from the ambient air will depend on the type and concentration of hazardous material in the air and the level of effort required for a worker to accomplish his assigned tasks. The higher the breathing rate, the more frequently canisters will need to be replaced. These maximum operating periods vary according to manufacturer, so it will be necessary to monitor the total usage of cartridges and canisters during all work requiring a respirator.

**TABLE 2**

**TABLE OF RESPIRATORY PROTECTION EQUIPMENT PROTECTION FACTORS**

<table>
<thead>
<tr>
<th>Type of Air Purifying Respirator</th>
<th>Protection Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Half-face APR</td>
<td>10</td>
</tr>
<tr>
<td>Full-face APR</td>
<td>100</td>
</tr>
<tr>
<td>When employed for protection from benzene. See Note 1.</td>
<td>50</td>
</tr>
<tr>
<td>When employed for protection from vinyl chloride using vinyl chloride rated specific canister with a 4 hour service life. See Notes 2 and 3.</td>
<td>25</td>
</tr>
<tr>
<td>Positive-Pressure SCBA or supplied air-line respirators</td>
<td>10,000</td>
</tr>
</tbody>
</table>

**NOTES:**


3: Because respirator cartridges/canisters meeting the service life requirements listed in 29 CFR1910.1017 (g) are not normally available, work involving vinyl chloride concentrations above the action level of 0.5 ppm will require use of pressure-demand SCBAs.

10. Special Conditions

Certain types of work may present unusual problems at certain sites with special conditions. Examples include the following:

a. For protection against infectious waste, a coated Tyvek or Sentex suit, appropriate gloves and boots, and a NIOSH-approved respirator with a high-efficiency particulate filter (HEPA) incorporated in the mask canister or cartridge, are suggested. Personnel should avoid or minimize contact with any waste, and be cautioned about possible contact with sharp objects such as needles. The HEPA filter may be combined with an OV/AG cartridge or canister.

b. For protection against gas vapors while drilling or while working around an open well casing, a NIOSH-approved full-face air-purifying respirator with an OV/AG canister including a HEPA filter may be necessary. The Saranex or Tyvek suit is also required. Also, appropriate gloves and boots. Appropriate measures may be taken to prevent heat stress.

c. For protection from asbestos fibers, the minimum required includes a respirator with a HEPA filter and a Tyvek suit. The Tyvek suit may either be coated or uncoated. Special regulations exist for asbestos, for complete requirements see the Asbestos Standard, 29 CFR 1910.1001.

d. A determination may need to be made regarding whether additional protection will be required, if significant levels of vinyl chloride or benzene (or other more toxic chemicals) are found during characterization. The action levels for vinyl chloride and benzene are one-half of 1 ppm. The maximum threshold limit value of benzene or vinyl chloride to which workers may be exposed over an 8-hour period is 1 ppm. The maximum concentration of vinyl chloride to which workers may be exposed in any given period is 5 ppm. If higher levels of vinyl chloride are found, respiratory protection levels may need to be adjusted to Level B (SCBA or supplied air) if engineering controls cannot reduce these levels. Because vinyl chloride and benzene are both
regulated carcinogens, it is imperative and required that exposure be limited where at all possible; if not, then exposure must be reduced to the minimum possible extent through appropriate respiratory protection (i.e., vinyl chloride and benzene exposure should be held to zero whenever possible). For the Vinyl Chloride Standard, see 29 CFR 1910.1017. For the Benzene Standard, see 29 CFR 1910.1028.

e. Special compliance requirements apply for personnel who must work with potential exposure to certain chemicals including vinyl chloride, benzene, and asbestos above action levels. Compliance requirements may vary with each compound and by state, but will likely include:

1) Mandatory training
2) Medical record keeping
3) Exposure monitoring, and record keeping
4) Certifications
5) Specific protective equipment requirements

11. Shoring and Bracing

a. No person shall enter any trench five (5) feet or more in depth unless that trench has been shored, braced, sloped, or other provisions made to prevent cave-in. Shoring shall be engineered by a qualified and licensed civil or structural engineer or engineering geologist. Drawings, specifications, and calculations shall be signed by CONTRACTOR’s ENGINEER.

b. Special consideration must be given to the less stable conditions represented by refuse in comparison with compacted soil. Refuse must be considered more prone to instability that may cause slope or side wall failure. This is due to the high void ratio, irregularity of material composing the refuse, and a typically lesser degree of compaction than soil.

12. Safety Management

a. No safety program can be effective without management support and interest. It is recommended that all companies involved in the LFG industry initiate a safety program for the protection of the health and safety of the personnel involved.
b. Safety procedures shall be reviewed with all workers to insure that they are aware of requirements and safety concerns.

c. The Safety Officer shall be adequately qualified to insure that they are aware of requirements and safety concerns.

d. Weekly meetings shall be held to review unsafe acts.

e. Unsafe acts shall be stopped if discovered by the Safety Officer.

f. Required safety equipment shall be on-site and shall be checked to verify completeness and function.

g. Contracts for landfill gas testing, construction or operation should include a safety procedure clause.

h. All employees on the job site should sign a document of their awareness of their work environment.

i. Appropriate local authorities (fire department, air quality, etc.) should be notified prior to drilling or flaring.

j. A safety checklist should be maintained at the job site.

13. NOTE THAT THE COUNTY HAS A HEALTH AND SAFETY DOCUMENT THAT THE CONTRACTOR WILL BE REQUIRED TO REVIEW AND ENDORSE.

END OF SECTION
SECTION 01041

PROJECT COORDINATION

PART 1 - GENERAL

1.01 OBSTRUCTIONS

A. All water pipes, storm drains, force mains, telephone or power cables or conduits, and all other obstructions, whether or not shown, shall be temporarily removed from or supported across pipeline excavations. Before disconnecting any pipes or cables, the CONTRACTOR shall obtain permission from the OWNER, or shall make suitable arrangements for their disconnection by the OWNER. The CONTRACTOR shall coordinate these operations with the OWNER. The CONTRACTOR shall be responsible for any damage to any such pipes, conduits or cables, and shall restore them to service promptly as soon as the work has progressed past the point involved. Approximate locations of known water, sanitary, drainage, power and telephone installations along route of new pipelines or in vicinity of new work are shown, but must be verified in the field. The CONTRACTOR shall uncover these pipes, ducts, cables, etc., carefully, by hand, prior to installing new piping. Any discrepancies or differences found shall be brought to the attention of the OWNER in order that necessary changes may be made to permit installation of new pipe. These conditions are supplemental to general requirements elsewhere in these specifications.

B. Around the toe of slope outside of the disposal area are two pipes. One is an abandoned forcemain and the other is conduit for control wiring no longer is use. If either or both of these interfere with the project then they will be removed in the area of interference and disposed of at the working face.

1.02 DAMAGE TO EXISTING STRUCTURES AND UTILITIES

A. The CONTRACTOR shall be responsible for and make good all damage to roads beyond the limits of this Contract, buildings, telephone or other cables, water pipes, sanitary pipes, or other structures which may be encountered, whether or not shown on the Drawings.

B. Information shown on the Drawings as to the location of existing utilities has been prepared from the most reliable data available to the ENGINEER. This information is not guaranteed, however, and it shall be the CONTRACTOR's responsibility to determine the location, character and depth of any existing utilities. He shall assist the utility companies, by every means possible to determine said locations. Extreme caution shall be exercised to eliminate any possibility of any damage to utilities resulting from his activities.
PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
SECTION 01050

FIELD ENGINEERING AND SURVEY

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: Provide and pay for field engineering services for the Project. Since the bid items are lump sum, the CONTRACTOR has the option of performing a topographical survey of the proposed section of Cells 2-6 Closure prior to the bid date to confirm the elevations indicated on the drawings. The OWNER has conducted a field survey of the existing conditions in the immediate areas. This is the information that is shown on the drawings. Based on the survey and field depth checks by the OWNER, a grading plan has been developed for the top of intermediate cover that may be utilized to prepare the area for the capping systems.

B. The CONTRACTOR shall provide civil, structural or other professional engineering services specified or required to execute the CONTRACTOR’s construction methods.

1.02 SURVEY REFERENCE POINTS

A. CONTRACTOR shall locate survey reference points prior to starting work and CONTRACTOR shall protect and preserve all permanent survey reference points during construction.

1. CONTRACTOR shall make no changes or relocate any survey reference point without prior written notice to the ENGINEER.

2. CONTRACTOR shall report to the ENGINEER when any survey reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

3. CONTRACTOR, at no additional cost to the OWNER, shall replace and re-survey reference points that have been lost or destroyed. The replaced survey reference point shall be surveyed by a registered professional land surveyor licensed in the State of North Carolina. Replacement will be based on original survey control.

B. Prior to any work, the CONTRACTOR shall immediately notify the ENGINEER of any discrepancies with the survey reference points from the coordinates and elevations provided.
1.03 RECORD DRAWINGS

A. All survey record documents, submitted for approval by the ENGINEER, shall be signed and sealed by a professional land surveyor licensed in the State of North Carolina.

B. Submitted record documents shall include the following:

1. As stages of the WORK are completed, CONTRACTOR will submit a site survey, signed and sealed by a professional land surveyor licensed in the State of North Carolina. The Record Drawing information shall be submitted on 24-inch by 36-inch sheets, as well as AutoCAD Drawing files on USB 3.0 Flash Drive.

2. AutoCAD Drawing file requirements: Contour lines shall be continuous, unbroken polylines with a width of zero and an elevation (z-coordinate) assigned according to the elevation of the contour line. All spot elevations shall have horizontal controls with vertical z-coordinates. Contours shall be at one foot intervals, with index contours at every fifth interval. Objects in the Record Drawings shall be drawn to scale. Unless otherwise stated, all surveys shall be at a scale of 1” = 50’.

3. All survey information submitted shall be on the State Plane Coordinate System.

4. All submitted Final Record Drawings shall have survey control monuments shown on the Drawings for the purposes of orientation, both horizontally and vertically.

5. All stormwater horizontal and vertical datum, structures, and inverts of underground piping shall be surveyed as a component of the record drawings.

C. If multiple sheets are required for the Record Drawings, each sheet shall include match lines.

1.04 SUBMITTALS

A. The CONTRACTOR shall submit the name and address of the registered professional land surveyor licensed in the State of North Carolina to the ENGINEER.

B. Upon request of the ENGINEER, the CONTRACTOR shall submit documentation signed by the licensed surveyor in the State of North Carolina, certifying that elevations and locations of improvements are in conformance with...
the Contract Documents, or if not in conformance, certify as to variances from the Contract Documents.

C. Record Drawings - The CONTRACTOR shall provide and submit to the ENGINEER, for approval, signed and sealed Record Drawing surveys for all work (to include any areas outside the limits of construction disturbed by the CONTRACTOR) as follows:

1. Prior to performing any earthwork beyond the excavations for the edge of liner, the Existing Conditions survey will be submitted by the CONTRACTOR and approved by the ENGINEER. Utilizing the 50 foot grid provided by the ENGINEER plus any grade changes or anomalies. The survey shall include the work within and 25 feet beyond the limits of construction as defined in the Contract documents. The CONTRACTOR shall excavate the edge of existing liner at each end of the tie-in as shown on the drawings and at 50 foot intervals and survey each location around the entire edge of liner where a tie-in to existing liner is required and these points will be labeled as “EOL” and provided on the Pre-Construction survey.

2. The Post Striping Survey will be conducted after removal of the mulch and stripping of the vegetative cover. The survey shall utilizing the same 50 foot grid plus any grade changes or anomalies. The survey shall include the work within and 25 feet beyond the limits of construction as defined in the Contract documents.

3. After the vegetative cover has been stripped the CONTRACTOR shall bring in off-site soil and compact the soil to establish the Top of Intermediate Cover. The Top of Intermediate Cover survey shall utilize the same 50 foot grid, be submitted by the CONTRACTOR and approved by the ENGINEER after the grading is complete and prior to the placement of any geosynthetics.

4. Top of Liner Survey will be conducted after the installation of the liner and geocomposite. The survey will utilize the same 50 foot grid and be submitted by the CONTRACTOR and approved by the ENGINEER prior to the placement of any other material on the liner system. The Edge of Liner as defined by these contract documents and shown on the Contract Drawings will be surveyed every 50 feet around the entire perimeter of the liner system. The Edge of Liner points will be labeled as “EOL” and will be clearly shown on the Top of Liner Survey.

5. Depth checks of the protective cover and topsoil, providing for a minimum of 24 inches of material as per the details in the drawings, shall be submitted by the CONTRACTOR and approved by the ENGINEER.
Depth checks shall be obtained on the same 50 foot grid and at the same 50 foot spacing along the edge of liner as the Top of Liner Survey points.

6. A Final Site survey shall be prepared using the same 50 foot grid pattern plus any grade changes, anomalies, final cover penetrations and at the same 50 foot spacing along the edge of liner. The survey shall identify culverts, gas risers, the edge of access roads, the centerline of swales, the inlet structures and inverts, perimeters of all GFFR, the edge of liner, etc. The survey shall include any electrical, underground piping and the work within and 25 feet beyond the limits of construction as defined in the Contract documents.

D. All partial field surveys are to include photocopies of the field surveyor’s log which have been signed and dated by the surveyor performing the survey.

E. All surveys shall include the work within and 25 feet beyond the limits of construction as defined in the Contract documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 CONTRACTOR RESPONSIBILITIES

A. The CONTRACTOR shall retain the services of a registered land surveyor licensed in the State of North Carolina to identify existing control points and maintain survey control during construction.

B. The CONTRACTOR shall identify survey reference points.

C. The CONTRACTOR shall provide civil, structural or other professional engineering services specified or required to execute the CONTRACTOR’s construction methods.

D. The CONTRACTOR shall be responsible for the preservation of all benchmarks, stakes, and marks. If any benchmarks, stakes, or marks are disturbed by the CONTRACTOR, the CONTRACTOR shall not proceed with any work until such points, marks, lines and elevations as may be necessary for the execution of the WORK have been established.

1. The accuracy of any method of staking shall be the responsibility of the CONTRACTOR. All engineering for vertical and horizontal control shall be the responsibility of the CONTRACTOR.

E. The surveyor shall maintain a complete, accurate log of all control and survey work as it progresses. This log shall be available for periodic review by the ENGINEER.
F. Grade elevations and locations will be required periodically during the execution of the WORK. The CONTRACTOR’s North Carolina licensed land surveyor will provide and maintain as-built notes and a finished Record Drawing updated as construction is completed. Record Drawings reflecting elevations and location information shall be submitted to the ENGINEER.

G. Surveys shall include (but are not limited to) grading, elevations, structure locations, pipe inverts, piping, and other permanent structures.

H. The elevation and grades shall be within an accuracy of 0.01 feet vertical and 0.5 feet horizontal as shown in the Contract Documents. Unless otherwise stated, all surveys shall be at a scale of 1” = 50’, with contours at one foot intervals. However, any measurement noted in the specifications on the drawing as “Minimum” requires the minimum dimension noted. Note that minimum applies to the cover sections over the closure liner.

I. The final topographic information shall be collected on a 50-foot by 50-foot grid, at a minimum, and as necessary (i.e., spot elevations, grade breaks, ditches, mounds, etc.) so as to provide an accurate representation of the contour topography. For ditches, spot elevations shall be taken, at a minimum, every 50 linear feet to include, at a minimum, the centerline of the ditch, the toe and top of ditch slopes, and any grade breaks.

J. No geomembrane installation shall occur until the location map of the surface upon which the geomembrane is to be installed has been completed and approved by the ENGINEER.

K. All piping shall be surveyed every 50 feet and at each fitting and the fittings shall be labeled on the survey.

END OF SECTION
SECTION 01065

PERMITS AND FEES

PART 1 - GENERAL

1.01 GENERAL

A. The OWNER has obtained the necessary permits for the WORK included in the project from State regulatory agencies having jurisdiction over such activities.

B. Copies of these permits may be furnished to the CONTRACTOR at his request. The CONTRACTOR shall conduct his operations to conform to the requirements of the permits, if applicable.

C. Where permits require that certain work is to be performed only in the presence of a representative of the permitting entity, the CONTRACTOR shall provide all coordination and notification required to assure the permit conditions are not violated.

1.02 PERMITS

A. All other permits and licenses including COUNTY building permits (electric, water connection, borrow, hauling, office trailer utilities, etc.) required to perform the WORK included in the Contract are the responsibility of the CONTRACTOR.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
SECTION 01070

ABBREVIATIONS AND SYMBOLS

PART 1 - GENERAL

1.01 ABBREVIATIONS

A. References in the specifications to technical societies, organizations, or bodies are made in accordance with the following abbreviations:

- AASHTO - American Association of State Highway & Transportation Officials
- AISC - American Institute of Steel Construction
- ANSI - American National Standard Institute
- ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers
- ASME - American Society of Mechanical Engineers
- ASTM - American Society for Testing and Materials
- AWS - American Welding Society
- AWWA - American Water Works Association
- CFR - Code of Federal Regulations
- CRSI - Concrete Reinforcing Steel Institute
- CS - Commercial Standard
- NCDOT - North Carolina Department of Transportation
- FS - Federal Specifications
- IEEE - Institute of Electrical and Electronic Engineers
- NBFU - National Board of Fire Underwriters
- NBS - National Bureau of Standards
- NFPA - National Fire Protection Association
- NSF - National Sanitation Foundation
- OSHA - U.S. Department of Labor, Occupational Safety and Health Association
- PCA - Portland Cement Association
- UL - Underwriter's Laboratories, Inc.
- SWANA - Solid Waste Association of North America

B. In the event that a complete title and abbreviation for a society, organization or body is not listed herein, references to specifications or standards of the unlisted society, organization or body will be made using the full title of the society, organization or body.

PART 2 – PRODUCTS (NOT USED)
PART 3 – EXECUTION (NOT USED)

END OF SECTION
SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. The ENGINEER shall schedule and administer a Pre-Construction meeting, periodic progress meetings, and specially called meetings throughout the progress of the work. The ENGINEER shall:
   a. Prepare agenda for meetings
   b. Make physical arrangements for meetings
   c. Preside at meetings

2. Representatives of CONTRACTORS, subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

3. The CONTRACTOR shall attend meetings to ascertain that work is expedited consistent with Contract Documents and construction schedules. CONTRACTOR shall record the Pre-Construction meeting and each Progress meeting in their entirety, and shall provide the ENGINEER such recordings, having good quality and clarity, and a typed transcript of the minutes of each meeting. A copy of the minutes of each progress meeting shall be available forty-eight (48) hours before the next scheduled meeting.

B. Related Requirements Described Elsewhere:

1. Construction Schedules: Section 01310

2. Shop Drawings, Working Drawings, and Samples: Section 01340

3. Project Record Documents: Section 01720

1.02 PRECONSTRUCTION MEETING

A. A preconstruction meeting shall be scheduled in conjunction with the Notice to Proceed date or no later than five (5) days after date of Notice to Proceed.

B. Location: The OWNER's office.
C. Attendance:

1. OWNER's representative
2. ENGINEER and his professional consultants
3. Resident project representative
4. CONTRACTOR's superintendent
5. Major subcontractors
6. Major suppliers
7. Utilities
8. Others as appropriate

D. Suggested Agenda:

1. Distribution and discussion of:
   a. List of major subcontractors and suppliers
   b. Projected schedules
2. Critical work sequencing: Relationships and coordination with other contracts and/or work.
3. Major equipment deliveries and priorities.
4. Project coordination: Designation and responsible personnel.
5. Procedures and processing of:
   a. Field decisions
   b. Proposal requests
   c. Submittals
   d. Change orders
   e. Applications for payment
6. Submittal of Shop Drawings, project data and samples.
7. CQA Representative – A deduct will be made to the final pay app for CQA hours in excess of 60 hours per week (per representative Monday-Sunday).


10. Use of premises:
   a. Office, work and storage areas.
   b. OWNER's requirements.
   c. Access and traffic control.

11. Construction facilities, controls and construction aids.

12. Temporary utilities.


14. Check of required Bond and Insurance certifications.

15. Completion time for contract and liquidated damages.

16. Request for extension of contract time.

17. Request for a weekly job meeting for all involved.

18. Security Procedures


20. Guarantee on completed work.

21. Equipment to be used.

22. Staking of work.

23. Project inspection

24. Labor requirements.

25. Laboratory testing of material requirements.

26. Inventory of material stored on site provisions.
27. Housekeeping procedures.
28. Posting of signs.
29. Pay request submittal dates.
30. Equal opportunity requirements.

1.03 PROGRESS MEETINGS

A. Schedule regular periodic meetings. The progress meetings will be held every thirty (30) days or less with the first meeting thirty (30) days after the preconstruction meeting or thirty (30) days or less after the date of Notice to Proceed.

B. Hold called meetings as required by progress of the work.

C. Location of the meetings: Project field office of CONTRACTOR.

D. Attendance:

1. ENGINEER and his professional consultants as needed
2. CONTRACTOR
3. OWNER's representative
4. Resident project representative
5. Subcontractors as appropriate to the agenda
6. Suppliers as appropriate to the agenda
7. Others as appropriate

E. Suggested Agenda:

1. Review approval of minutes of previous meeting.
2. Review of work progress since previous meeting.
3. Field observations, problems, conflicts.
4. Problems which impede Construction Schedule.
5. Review of off-site fabrication, delivery schedules.
6. Corrective measures and procedures to regain projected schedule.
7. Revisions to Construction Schedule.
8. Progress schedule during succeeding work period.
9. Coordination of schedules.
10. Review submittal schedules; expedite as required.
12. Pending changes and substitutions.
13. Review proposed changes for:
   a. Effect on Construction Schedule and on completion date.
   b. Effect on other contracts of the Project.
14. Other business.
15. Construction schedule.
16. Critical/long lead items.

F. The CONTRACTOR is to attend progress meetings and is to study previous meeting minutes and current agenda items to be prepared to discuss pertinent topics such as deliveries of materials and equipment, progress of the work, etc.

G. The CONTRACTOR is to provide a current submittal log at each progress meeting in accordance with Section 01340.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
SECTION 01310
CONSTRUCTION SCHEDULES

PART 1 - GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall develop a network plan demonstrating complete fulfillment of all contract requirements and shall utilize the Critical Path Method (hereinafter referred to as CPM) in planning, coordinating and performing the work under this contract (including all activities of subcontractors, equipment vendors and suppliers). The principles and definition CPM terms used herein shall be as set forth in the Associated General Contractors of America (AGC) publication, The Use of CPM in Construction, A Manual for General Contractors and the Construction Industry, Copyright 1976, but the provisions of this section shall govern the planning, coordinating and performance of the work.

1.02 ARROW DIAGRAM REQUIREMENTS

A. The arrow diagram shall show the sequence and interdependence of activities required for complete performance. In preparing the arrow diagram, the CONTRACTOR shall break up the work into activities of duration of no longer than fifteen working days each, except as to non-construction activities (such as procurement of materials, delivery of equipment and concrete curing) and any other activities for which the ENGINEER may approve the showing of longer duration. The diagram shall show not only the activities for actual construction work for each trade category of the project, but also such activities as the CONTRACTOR'S work of submittal of shop drawings, equipment schedules, coordination drawings, templates, fabrication, delivery and the like, and ENGINEER'S review and approval of shop drawings. Activities related to a specific physical area of the project shall be grouped on the diagram for ease of understanding and simplification. Activity duration (i.e. the single best estimate, considering the scope of the activity, and the resources planned for the activity) shall be shown on each activity on the diagram. To the extent that the arrow diagram or any revised arrow diagram shows anything not jointly agreed upon or fails to show anything jointly agreed upon, it shall not be deemed to have been approved by the ENGINEER. Failure to include any element of work required for the performance of this Contract shall not excuse the CONTRACTOR from completing all work required within any applicable completion date, notwithstanding the ENGINEER's approval of arrow diagrams.

B. The arrow diagram shall include a cost estimate for each activity which cumulatively equals the total Contract cost. Estimated overhead and profit shall be prorated throughout all activities. The partial payments, as defined under the General Conditions, will be based on these approved activity costs.
C. With each request for a partial payment, the CONTRACTOR shall submit a copy of the arrow diagram marked to show the activities completed and partially completed, for which payment is requested.

1.03 SUBMITTAL

A. CONTRACTOR shall make available at or before the preconstruction meeting for the ENGINEER's review, an arrow diagram describing the activities to be accomplished and their dependency relationships, showing starting and completion dates for each activity in terms of the number of days after receipt of Notice to Proceed. All completion dates shown shall be within the period specified for contract completion.

B. Within ten (10) calendar days after receipt of the initial arrow diagram, the ENGINEER shall coordinate with the CONTRACTOR for joint review, correction or adjustment of the proposed plan and schedule. Within five (5) calendar days after the joint review, the CONTRACTOR shall revise the arrow diagram in accordance with agreements reached during the joint review and shall submit two (2) copies of each of the revised arrow diagram to the ENGINEER. After the CONTRACTOR has received both the Notice to Proceed and the approved copy of the arrow diagram, he shall immediately add calendar dates to the arrow diagram in lieu of the number of days from the date of Notice to Proceed and shall furnish two (2) copies of the revised arrow diagram to the ENGINEER.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
SECTION 01340

SHOP DRAWINGS, WORKING DRAWINGS, AND SAMPLES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. The CONTRACTOR shall submit to the ENGINEER for review and exception, if any, such working drawings, shop drawings, test reports and data on materials and equipment (hereinafter in this article called data), and material samples (hereinafter in this article called samples) materials list, certificates and affidavits as are required for the proper control of work, including but not limited to those working drawings, shop drawings, data and samples for materials and equipment specified elsewhere in the Specifications and in the Contract Drawings.

2. Within thirty (30) calendar days after the Effective Date of the Agreement, the CONTRACTOR shall submit to the ENGINEER a complete materials list of preliminary data on items for which Shop Drawings are to be submitted. Included in this materials list shall be the names of all proposed manufacturers furnishing specified items. Review of this list by the ENGINEER shall in no way expressed or implied relieve the CONTRACTOR from submitting complete Shop Drawings and providing materials, equipment, etc., fully in accordance with the Specifications. This procedure is required in order to expedite final review of Shop Drawings. The Contractor’s expedition of the Shop Drawings will be a critical path issue to complete the project within the allotted time.

3. The CONTRACTOR is to maintain an accurate updated submittal log and will bring this log to each scheduled progress meeting with the County and the ENGINEER. This log should include the following items:

   a. Submittal-Description and Number assigned.

   b. Date to ENGINEER.

   c. Date returned to CONTRACTOR (from ENGINEER).

   d. Status of Submittal (Reviewed No Comments, Reviewed Comments as Noted, Rejected, Revise and Resubmit, and Not Reviewed).

   e. Date of Resubmittal and Return (as applicable).
f. Date material release (for fabrication).

g. Projected date of fabrication.

h. Projected date of delivery to site.

i. Specification Section.

j. Drawings Sheet Number.

B. Related Requirements Described Elsewhere:


2. Project Record Documents: Section 01720.

1.02 CONTRACTOR'S RESPONSIBILITY

A. It is the duty of the CONTRACTOR to check all drawings, data and samples prepared by or for him before submitting them to the ENGINEER for review. Each and every copy of the Drawings and data shall bear CONTRACTOR's stamp showing that they have been so checked. Shop drawings submitted to the ENGINEER without the CONTRACTOR's stamp will be returned to the CONTRACTOR for conformance with this requirement. Shop drawings shall indicate any deviations in the submittal from requirements of the Contract Documents. If the CONTRACTOR takes exception to the specifications, the CONTRACTOR shall note the exception in the letter of transmittal to the ENGINEER.

B. Determine and verify:

1. Field measurements.

2. Field construction criteria.

3. Catalog numbers and similar data.

4. Conformance with Specifications.

C. The CONTRACTOR shall furnish the ENGINEER a schedule of Shop Drawings submittals fixing the respective dates for the submission of shop and working drawings, the beginning of manufacture, testing and installation of materials, supplies and equipment. This schedule shall indicate those that are critical to the progress schedule.
D. The CONTRACTOR shall not begin any of the work covered by a drawing, data, or a sample returned for correction until a revision or correction thereof has been reviewed and returned to him, by the ENGINEER, with approval.

E. The CONTRACTOR shall submit to the ENGINEER all drawings and schedules sufficiently in advance of construction requirements to provide no less than thirty (30) calendar days for checking and appropriate action from the time the ENGINEER receives them.

F. Each submittal shall be for an individual material. All submittals shall be accompanied with a transmittal letter prepared containing the following information:

1. Shop Drawing cover page (see Contract Forms: Section 00830).
2. Date.
3. Project Title and Number.
4. CONTRACTOR's name and address.
5. The number of each Shop Drawings, Project Data, and Sample submitted.
7. Submittal Log Number conforming to Specification Section Numbers.

G. The CONTRACTOR shall make all submittals electronically in PDF format unless otherwise requested. Each submittal shall be a single PDF file including all the required pages. If other file types are required (AutoCAD, Excel, etc…) they may be separate but a PDF of the file shall be included in the submittal. Submittals not following this format will not be reviewed and will be returned marked as “Rejected - Resubmit”. If hardcopies are requested four (4) copies of descriptive or product data submittals to complement shop drawings for the ENGINEER plus the number of copies which the Contractor requires returned. The ENGINEER will retain four (4) sets. All shop drawings, when practical, shall be 24-inch by 36-inch in size.

H. The CONTRACTOR shall be responsible for and bear all costs of damages which may result from the ordering of any material or from proceeding with any part of work prior to the completion of the review by ENGINEER of the necessary Shop Drawings.

I. The CONTRACTOR shall be fully responsible for observing the need for and making any changes in the arrangement of piping, connections, wiring, manner of
installation, etc., which may be required by the materials/equipment he proposed to supply both as pertains to his own work and any work affected under other parts, headings, or divisions of drawings and specifications.

1.03 ENGINEER'S REVIEW OF SHOP DRAWINGS

A. The ENGINEER's review of drawings, data and samples submitted by the CONTRACTOR will cover only general conformity to the Specifications, external connections, and dimensions which affect the installation. The ENGINEER's review and exceptions, if any, will not constitute an approval of dimensions, quantities, and details of the material, equipment, device, or item shown.

B. The review of drawings and schedules will be general, and shall not be construed:

1. as permitting any departure from the Contract requirements;

2. as relieving the CONTRACTOR of responsibility for any errors, including details, dimensions, and materials;

3. as approving departures from details furnished by the ENGINEER, except as otherwise provided herein.

C. If the drawings or schedules as submitted describe variations per paragraph 1.04.E., and show a departure from the Contract requirements which ENGINEER finds to be in the interest of the OWNER and to be so minor as not to involve a change in Contract Price or time for performance, the ENGINEER may return the reviewed drawings without noting an exception.

D. When reviewed by the ENGINEER, each of the Shop Drawings will be identified as having received such review being so stamped and dated. Shop Drawings stamped "REVISE AND RESUBMIT" and with required corrections shown will be returned to the CONTRACTOR for correction and resubmittal.

E. Resubmittals will be handled in the same manner as first submittals. On resubmittals the CONTRACTOR shall direct specific attention, in writing or on resubmitted Shop Drawings, to revisions other than the corrections requested by the ENGINEER on previous submissions. The CONTRACTOR shall make any corrections required by the ENGINEER.

F. If the CONTRACTOR considers any correction indicated on the drawings to constitute a change to the Contract Drawings or Specifications, the CONTRACTOR shall give written notice thereof to the ENGINEER.

G. Shop drawings and submittal data shall be reviewed by the ENGINEER for each original submittal and first and second resubmittal; thereafter review time for
subsequent resubmittals shall be charged to the CONTRACTOR in accordance with the terms of the ENGINEER's Agreement with the OWNER.

H. When the Shop Drawings have been completed to the satisfaction of the ENGINEER, the CONTRACTOR shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the ENGINEER.

I. Partial submittals will not be reviewed. Submittals not complete will be returned to the CONTRACTOR for resubmittal. Unless otherwise specifically permitted by the ENGINEER, make all submittals in groups containing all associated items for:

2. Processes.
3. As indicated in specific specifications sections.

All drawings, schematics, manufacturer's product data, certifications and other shop drawing submittals required by a system specification shall be submitted at one time as a package to facilitate interface checking.

1.04 SHOP DRAWINGS

A. When used in the Contract Documents, the term "Shop Drawings" shall be considered to mean CONTRACTOR's plans for materials and equipment which become an integral part of the Project. These drawings shall be complete and detailed. Shop Drawings shall consist of fabrication, erection and setting drawings and schedule drawings, manufacturer's scale drawings, and wiring and control diagrams. Cuts, catalogs, pamphlets, descriptive literature, and performance and test data, shall be considered only as supportive to required Shop Drawings as defined above. As used herein, the term "manufactured" applies to standard units usually mass-produced; and "fabricated" means items specifically assembled or made out of selected materials to meet individual design requirements.

B. Manufacturer's catalog sheets, brochures, diagrams, illustrations and other standard descriptive data shall be clearly marked to identify pertinent materials, product or models. Delete information which is not applicable to the Work by striking or cross-hatching.

C. Drawings and schedules shall be checked and coordinated with the work of all trades involved, before they are submitted for review by the ENGINEER and shall bear the CONTRACTOR's stamp of approval as evidence of such checking.
and coordination. Drawings or schedules submitted without this stamp of approval shall be returned to the CONTRACTOR for resubmission.

D. Each Shop Drawing shall have a blank area 3-1/2 inches by 3-1/2 inches, located adjacent to the title block. The title block shall display the following:

1. Project Title and Number.
2. Name of project building or structure.
3. Number and title of the shop drawing.
4. Date of shop drawing or revision.
5. Name of CONTRACTOR and subcontractor submitting drawing.
6. Supplier/manufacturer.
7. Separate detailer when pertinent.
8. Specification title and number.
10. Application Contract Drawing Number.

E. If drawings show variations from Contract requirements because of standard shop practice or for other reasons, the CONTRACTOR shall describe such variations in his letter of transmittal. If acceptable, proper adjustment in the Contract shall be implemented where appropriate. If the CONTRACTOR fails to describe such variations, he shall not be relieved of the responsibility for executing the work in accordance with the Contract, even though such drawings have been reviewed.

F. Data on materials and equipment include, without limitation, materials and equipment lists, catalog data sheets, cuts, performance curves, diagrams, materials of construction and similar descriptive material. Materials and equipment lists shall give, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, size, finish and all other pertinent data.

G. For all mechanical and electrical equipment furnished, the CONTRACTOR shall provide a list including the equipment name, and address and telephone number of the manufacturer's representative and Service Company so that service and/or spare parts can be readily obtained.
H. All manufacturers or equipment suppliers who proposed to furnish equipment or products shall submit an installation list to the ENGINEER along with the required shop drawings. The installation list shall include at least five (5) installations where identical equipment has been installed and has been in operation for a period of at least one (1) year.

I. Only the ENGINEER will utilize the color "red" in marking Shop Drawing submittals.

1.05 WORKING DRAWINGS

A. When used in the Contract Documents, the term "working drawings" shall be considered to mean the CONTRACTOR's plan for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities, ground water control systems, forming and falsework; for underpinning; and for such other work as may be required for construction but does not become an integral part of the Project.

B. Copies of working drawings as noted in paragraph 1.05 A. above, shall be submitted to the ENGINEER where required by the Contract Documents or requested by the ENGINEER, and shall be submitted at least thirty (30) calendar days (unless otherwise specified by the ENGINEER) in advance of their being required for work.

C. Working drawings shall be signed by a registered Professional ENGINEER, currently licensed to practice in the State of North Carolina and shall convey, or be accompanied by, calculation or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use. Prior to commencing such work, working drawings must have been reviewed without specific exceptions by the ENGINEER, which review will be for general conformance and will not relieve the CONTRACTOR in any way from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error are assumed by the CONTRACTOR; the OWNER and ENGINEER shall have no responsibility therefor.

1.06 SAMPLES

A. The CONTRACTOR shall furnish, for review by the ENGINEER, samples required by the Contract Documents or requested by the ENGINEER. Samples shall be delivered to the ENGINEER as specified or directed. The CONTRACTOR shall prepay all shipping charges on samples. Materials or equipment for which samples are required shall not be used in work until accepted by the ENGINEER.

B. Samples shall be of sufficient size and quantity to clearly illustrate:
1. Functional characteristics of the product, with integrally related parts and attachment devices.

2. Full range of color, texture and pattern.

3. A minimum of two samples of each item shall be submitted.

C. Each sample shall have a label indicating:

1. Name of project.

2. Name of CONTRACTOR and Subcontractor.

3. Material or equipment represented.

4. Place of origin.

5. Name of producer and brand (if any).

6. Location in project.

(Samples of finished materials shall have additional marking that will identify them under the finished schedules).

D. The CONTRACTOR shall prepare a transmittal letter in triplicate for each shipment of samples containing the information required in paragraph 1.06 C. above. He shall enclose a copy of this letter with the shipment and send a copy of this letter to the ENGINEER. Review of a sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify any Contract requirements.

E. Accepted samples not destroyed in testing shall be sent to the ENGINEER or stored at the site of the work. Accepted samples of the hardware in good condition will be marked for identification and may be used in the work. Materials and equipment incorporated in work shall match the accepted samples. Samples which failed testing or were not accepted will be returned to the CONTRACTOR at his expense, if so requested at time of submission.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Submit to the ENGINEER a Schedule of Values allocated to the various lump sum portions of the work at the Pre-Construction Conference and in accordance with the successful bidder's bid schedule/cost estimating worksheet.

B. Upon request of the ENGINEER, support the values with data which will substantiate their correctness.

C. The Schedule of Values unless objected to by the ENGINEER, shall be used only as the basis for the CONTRACTOR's Applications for Payment.

1.02 RELATED REQUIREMENTS

A. General Conditions and Requirements of the Contract.

1.03 FORM AND CONTENT OF SCHEDULE OF VALUES

A. Type schedule on an 8-1/2” x 11” or 8-1/2” by 14” white paper; CONTRACTOR's standard forms and computer printout will be considered for approval by the Engineer upon CONTRACTOR's request. Identify schedule with:

1. Title of project and location
2. Owner and purchase order number
3. Engineer and project number
4. Name and address of Contractor
5. Contract designation
6. Date of submission

B. Schedule shall list the installed value of the component parts of the work in sufficient detail to serve as a basis for computing unit values for progress payments during construction.

C. Identify each line item with the number and title of the respective major section of the specifications.
D. For each line item which has installed value of more than $50,000, breakdown costs to list major products or operations under each item.

E. For the various portions of the Work:
   1. Each item shall include a directly proportional amount of the CONTRACTOR's overhead and profit.
   2. Total installed cost, with overhead and profit.

F. Round off figures to nearest dollar.

G. Make sum of total costs of all items listed in schedule equal to total Contract Sum.

1.04 PREPARING SCHEDULE OF UNIT MATERIAL VALUES

A. Submit a separate schedule of unit prices for materials to be stored on which progress payment will be made.

B. Make form of submittal shall parallel that of the Schedule of Values, with each item identified the same as the line item in the Schedule of Values.

C. Include in unit prices only:
   1. Cost of the material
   2. Delivery and unloading at site
   3. Sales taxes

D. Make sure that unit prices multiplied by quantities given, equal material cost of that item in Schedule of Values.

1.05 REVIEW AND RESUBMITTAL

A. After review by OWNER, revise and resubmit Schedule of Values and Schedule of Material Values as required.

B. Resubmit revised Schedules in same manner

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION
SECTION 01410

TESTING AND TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 TESTS

A. The OWNER will provide for payment for all required tests, except those proving satisfactory operation of equipment i.e., pressure leakage tests, disinfection, and initial borrow pit confirmation testing.

B. Generally, tests will be compaction and density tests; off-site borrow soils upon site delivery for classifications, permeabilities, and proctors; stone quality tests; liner quality control; and liner integrity tests. On pipe, the manufacturer's or supplier's certificate that the material meets the requirements of the specification will be accepted subject to verification by the OWNER'S ENGINEER. Any and all tests which have to be repeated because of the failure of the tested material to meet specifications shall be paid for by the CONTRACTOR and the costs of any such tests shall be deducted from payments due the CONTRACTOR.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
SECTION 01510

TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. Field Offices
B. Contractor Storage Area
C. Power Services
D. Water Services
E. Sanitary Facilities
F. Maintenance of Traffic
G. Barricades and Lights
H. Fences
I. Damage to Existing Property
J. Security
K. Access Roads
L. Drainage
M. Erosion and Siltation Control Measures
N. Parking
O. Emergencies
P. Petroleum Spill/Leak Containment
Q. Waste Construction Materials

1.02 FIELD OFFICES

A. The CONTRACTOR shall, prior to the first application for payment, erect temporary field offices only within the Limits of Construction shown on the Drawings or as otherwise approved by the OWNER.

B. During the performance of this Contract, CONTRACTOR shall maintain a suitable office at the site of the work which shall be the headquarters of his representative authorized to receive drawings, instruction, or other communication or articles. Any communication given to the said representative or delivered at CONTRACTOR's office at the site of the work in his absence shall be deemed to have been delivered to CONTRACTOR.
C. Copies of the Drawings, Specifications, and other Contract Documents shall be kept at CONTRACTOR's office at the site of the work and available for use by the OWNER, ENGINEER, or CONTRACTOR at all times.

D. In addition, CONTRACTOR shall furnish and maintain temporary field offices for the ENGINEER at designated locations at the site. The field office shall be a portable frame building or office trailer, as approved, and shall provide not less than 400 square feet of interior floor space with an enclosed office room and one room with 150 square feet. The office shall be watertight and weatherproof, shall have screened windows and solid door with a lock and six keys. The office shall be provided with electrical, and internet service, for the duration of the Contract, shall have the necessary equipment adequate to maintain a temperature of 72 degrees F (+3 C) under all conditions, and shall be provided with janitor and maintenance service. The CONTRACTOR shall provide sanitary facilities, hot and cold water, toilet paper, towels, soap and a water cooler with bottled drinking water (with adequate supplies maintained during the construction period). The office shall have linoleum or tile on the floor and shall be furnished with:

- 2 - 30-inch by 60-inch desk with drawers and chair
- 3 - 36-inch by 72-inch tables
- 1 - 42-inch by 72-inch drafting table with stool
- 1 - 4-drawer legal size cabinets with lock and 2 sets of keys. Cabinets shall be fire resistant, meeting with the requirements for "Filing Devices, Insulated (36E9) Class D Label" of UL Specifications
- 8 - office chairs
- 1 – Executive style rolling office chair (of appropriate height to work at the desk)
- 1 - 7-foot 3-inch by 3-foot steel utility shelving assembled, as provided
- 1 - metal plan rack (12 plans each) with bookshelf
- 1 - 4-foot by 6-foot bulletin board, mounted.
- 1 - clothes rack
- 1 - first aid kit
- 2 - fire extinguishers, non-toxic, dry chemical, meeting UL for Class A, B, & C fires
- 3 - Steel wastepaper baskets
- 1 – Internet Service
- 1 – Internet Modem (cable or satellite depending on location)
- 2 – 6’ Ethernet Cables
- 1 - Bottled water dispenser with refrigerator
- 1 – All in one Printer/Photocopy machine with shrink and enlarge capabilities

1.03 CONTRACTOR STORAGE AREA

A. A storage area will be provided on the project site for use by the CONTRACTOR for storage of his materials, tools, equipment, office and other items necessary for construction. The exact limits of the storage area will be designated in the field.
by the OWNER/ENGINEER. The CONTRACTOR shall be fully responsible for the security of this area, including fencing, watchmen, and other means of security. Under no circumstances will the OWNER be responsible for the security of any property belonging to the CONTRACTOR, his subcontractors, or any of his work forces.

B. The CONTRACTOR shall consult with the OWNER as to the best location for setting up construction plant buildings and related facilities so as to expedite the Work.

1.04 POWER SERVICES

A. CONTRACTOR shall provide all temporary power for heating, cooling, and lighting until the work is accepted. It is CONTRACTOR's responsibility to make any connections necessary to perform work or furnish services related to this Contract. A separate temporary meter shall be installed by the local utility to measure electricity usage by CONTRACTOR. CONTRACTOR shall make all necessary arrangements with the local utility for these services. CONTRACTOR shall pay for all electricity usage by the ENGINEER and CONTRACTOR.

1.05 WATER SERVICES

A. Water in sufficient amounts for proper completion of the Work shall be furnished by CONTRACTOR without charge to OWNER. CONTRACTOR shall furnish necessary equipment pipe hose, nozzles and tools and shall perform all necessary labor. If an existing water hydrant is used, the use of a water meter on hydrant will be required. Arrangements of such use with the OWNER will be necessary.

1.06 INTERNET SERVICES

A. CONTRACTOR shall make all necessary arrangements with the internet service provider for internet service in his offices at the site and a separate service line in the field office of the ENGINEER and shall pay all fees and charges for the hookup and service. The internet service will be 10Mbps or greater.

1.07 SANITARY FACILITIES

A. CONTRACTOR shall furnish temporary sanitary facilities at the sites, as provided herein, for the needs of all construction workers and others performing work or furnishing services in connection with this Contract.

B. Sanitary facilities shall be of reasonable capacity, properly maintained throughout the construction period, and obscured from public view to the greatest practical extent. If toilets of the chemically treated type are used, at least one toilet will be furnished for each 10 personnel. CONTRACTOR shall enforce the use of such
sanitary facilities by all personnel at the site. The use of existing toilet facilities at the landfill by CONTRACTOR's personnel is strictly forbidden.

1.08 MAINTENANCE OF TRAFFIC

A. CONTRACTOR shall conduct his work to interfere as little as possible with public travel, whether vehicular or pedestrian. Whenever it is necessary to cross, obstruct, or close roads, driveways and walks, CONTRACTOR shall obtain prior permission from the OWNER to obstruct traffic at the designated point.

B. In making open cut street crossing, CONTRACTOR shall not block more than one-half of the street at a time.

1.09 BARRICADES AND LIGHTS

A. All roads which are closed to traffic shall be protected by effective barricades on which shall be placed acceptable warning signs.

B. All open trenches and other excavations shall have suitable barricades and signs to provide adequate protection to the public. Obstructions, such as material piles and equipment shall be provided with similar warning signs.

C. All barricades, signs, and other protective devices shall be installed and maintained in conformity with applicable statutory requirements.

1.10 FENCES

A. All existing fences affected by the work shall be maintained by CONTRACTOR until completion of the work. Fences which interfere with construction operations shall not be relocated or dismantled until written permission is obtained from the OWNER of the fence and the period the fence may be left relocated or dismantled has been agreed upon.

B. On completion of the work, CONTRACTOR shall restore all fences to their original or to a better condition and to their original location.

1.11 DAMAGE TO EXISTING PROPERTY

A. CONTRACTOR will be held responsible for any damage to existing structures including the landfill gas collection system, work, materials or equipment because of his operations and shall repair or replace any damaged structures, work, materials or equipment to the satisfaction of, and at no additional cost to the OWNER.

B. CONTRACTOR shall protect all existing structures and property from damage and shall provide bracing, shoring, or other work necessary for such protection.
C. CONTRACTOR shall be responsible for all damage to streets, roads, curbs, sidewalks, highways, shoulders, ditches, embankments, culverts, bridges or other public or private property, which may be caused by transporting equipment, materials, or personnel to or from the work. CONTRACTOR shall make satisfactory and acceptable arrangements with the agency having jurisdiction over the damaged property concerning its repair or replacement.

1.12 SECURITY

A. CONTRACTOR shall be responsible for protection of the site, and all work, materials, equipment and existing facilities thereon, against vandals and other unauthorized persons.

B. No claim shall be made against OWNER by reason of any act of an employee or trespasser, and CONTRACTOR shall make good all damage to OWNER's property resulting from his failure to provide security measures as specified.

C. Security measures shall be at least equal to those usually provided by OWNER to protect his existing facilities during normal operation, but shall also include such addition security fencing, barricades, lighting and other measures as required to protect the site.

1.13 ACCESS ROADS

A. CONTRACTOR shall construct, grade, stabilize and maintain temporary access roads to various parts of the site as required to complete the project.

1.14 DRAINAGE

A. The CONTRACTOR shall keep all natural drainage and water courses unobstructed or provide equal courses effectively placed, and prevent accumulations of surface water.

1.15 EROSION AND SILTATION CONTROL MEASURES

A. Adequate control of erosion and siltation of both a temporary and permanent nature on areas disturbed by this work shall be provided under this Contract, subject to the acceptance of the ENGINEER. There will be a joint on-site inspection prior to commencing work, with CONTRACTOR, State and County Officials and the ENGINEER to determine specific siltation control requirements.

B. Erosion control shall comply with all applicable State and County Regulations.
1.16 PARKING

A. CONTRACTOR shall provide and maintain suitable parking areas for the use of all construction workers and other performing work by furnishing services in connection with the project, as required to avoid any need for parking personnel vehicles where they may interfere with public traffic, OWNER's operations, or construction activities.

1.17 EMERGENCIES

A. The CONTRACTOR shall display and update phone numbers of the local police, fire department, hospital, and emergency squad at all times and at all phones on site during the project.

1.18 PETROLEUM SPILL/LEAK CONTAINMENT

A. CONTRACTOR shall provide a spill/leak containment vessel for all petroleum storage tanks. The containment vessels shall have a capacity exceeding 125 percent, or more if required under current regulation, of the volume of the petroleum storage tank for which they are intended.

B. For earthen bermed containment vessel, the berm and floor of the containment area shall be lined with a plastic sheet type lining material that is watertight and capable of withstanding contact with the petroleum products stored in the area for the duration of the project, or until spill accumulation is removed. The petroleum storage tank, when placed in this area, shall not damage or puncture the plastic lining.

C. For concrete containment vessels, the concrete shall be air-entrained with a minimum of 4,000 psi compressive strength when delivered. Reinforced steel shall be Grade 40 with No. 4 bars on 12-inch centers each way.

Anchor bolts must be furnished to tie-down the petroleum storage tank to prevent the flotation of an empty tank due to rain water.

D. The containment vessel must contain an acceptable means of removing rain water or recovering spilled or leaked petroleum from the vessel. If a siphon arrangement is used, it shall be mounted on the wall of the vessel or other accessible means and must automatically break when the vessel empties. Then, the siphon must be manually primed the next time the contents are discharged.

1.19 WASTE CONSTRUCTION MATERIALS

A. The CONTRACTOR shall dispose of all waste construction material at a permitted waste facility. All associated cost for disposal shall be the CONTRACTORs.
B. Waste construction material, which is accepted at the OWNER's facility, may be disposed of in the OWNER's facility.

C. Waste construction materials shall be less than 4-feet in length.

D. Waste construction materials disposed at the OWNER's waste facility shall not be subject to tipping fees.

E. The CONTRACTOR shall provide sufficient containers to collect and hold waste construction materials. Waste materials shall be collected on a daily basis.

F. The CONTRACTOR shall dispose of waste construction material when containers are full. Transportation of the waste containers will be supplied by the CONTRACTOR.

G. The waste containers shall be transported, by the CONTRACTOR, to the scalehouse to be weighed prior to disposal. The waste containers shall be transported, by the CONTRACTOR, to disposal areas designated by the OWNER.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

A. General provisions of Contract, including General and Supplementary Conditions.

B. Division 1 through Division 16 Specification Sections.

1.02 SECTION INCLUDES

A. Administrative and procedural requirements governing the CONTRACTOR’s selection of products for use in the Project.

B. Administrative and procedural requirements for handling requests for substitutions.

C. Requirements for product list submittal.

1.03 SUBSTITUTION REQUESTS

A. Submit a separate request for each proposed substitution; original signature sets in accordance with Shop Drawings: Section 01340, each on form bound into Project Manual. Document each request with complete data substantiating compliance of proposed substitution with requirements of Contract Documents.

1. Designate Specification Section and Article number.

2. Identify manufacturer by name and address, trade name, model number or catalog number.


4. Give itemized comparison of qualities of proposed substitution with specified product, changes required in other elements of the WORK due to substitution and effect on Progress Schedule.

5. Give name and address of similar projects on which product was used and date of installation.

6. Provide cost data comparing proposed substitution with specified product and state the amount of net change to Contract Price.
B. During Bidding period, times for submittal of substitution requests are stated in the Instructions to Bidders.

C. After Bidding period, up to thirty (30) days after date of Notice to Proceed, ENGINEER will consider written requests from CONTRACTOR for proposed substitutions of products. Subsequent requests will be considered only in case of product unavailability or other condition beyond control of the CONTRACTOR.

D. Do not order or install substitute products without written acceptance from the ENGINEER. Do not imply or indicate substitutions on Shop Drawings or product data submittals without a separate formal request.

E. ENGINEER will determine acceptability of substitution. The burden of proof of acceptability of a proposed substitution is upon the CONTRACTOR; information submitted must convince the reviewers that characteristics of the proposed substitution are equal to or better than those of the specified product. Only one request for substitution for each product will be considered. If not accepted, CONTRACTOR shall provide specified product.

F. Request for substitution constitutes a representation that the CONTRACTOR:

1. Has investigated the proposed product and determined that it is equal to or superior in all respects to the specified product.

2. Will provide same or greater warranties for proposed product as for the specified product.

3. Will coordinate installation of substitution accepted into the WORK and make other changes and adjustments as may be required to make the WORK complete in all respects.

4. Waives all claims for additional costs due to substitution which may later become apparent.

5. Agrees to reimburse the OWNER for the additional service charges of the ENGINEER and their Consultants for evaluation and review of the proposed substitution.

1.04 PRODUCT LIST

A. Prepare the product listing schedule with information on each item tabulated under the following column headings:

1. Related Specification Section number.

2. Generic name used in Contract Documents.
3. Proprietary name, model number and similar designations.

4. Manufacturer’s name and address.

5. Supplier's name and address.

6. Installer's name and address.

7. Projected delivery date, or time span of delivery period.

B. Within fifteen (15) days after date of Notice to Proceed, submit five (5) copies of product list schedule. Provide a written explanation for omissions of data, and for known variations from Contract requirements.

C. The ENGINEER will respond in writing to the CONTRACTOR, within 30 days of receipt of the completed product list schedule. No response within this time period constitutes no objection to listed manufacturers or products, but does not constitute a waiver of the requirement that products comply with Contract Documents.

1.05 QUALITY ASSURANCE

A. To the fullest extent possible, provide products of the same kind, from a single source.

B. When the CONTRACTOR is given the option of selecting between two (2) or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

C. Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on the exterior.

1. Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.

2. Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface which is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:

   a. Name of product and manufacturer.

   b. Model and serial number.
c. Capacity.
d. Speed.
e. Ratings.

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle products in accordance with the manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft.

1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.

2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.

B. Deliver products to the site in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.

C. Inspect products upon delivery to ensure compliance with the Contract Documents, and to ensure that products are undamaged and properly protected.

D. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.

E. Store heavy materials away from the project structure in a manner that will not endanger the supporting construction.

F. Store products subject to damage by the elements above ground, under cover in a weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 - PRODUCTS

2.01 PRODUCT SELECTION

A. Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.
1. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.

2. Where available, provide standard products, which meet the specified requirements, of types that have been produced and used successfully in similar situations on other projects.

B. Product selection is governed by the Contract Documents and governing regulations, not by previous project experience. Procedures governing product selection include the following:

1. Where only a single source product or manufacturer is named, provide the product indicated or submit a request for substitution for any product or manufacturer not named.

2. Where two (2) or more sources of products or manufacturers are named, provide one (1) of the products indicated or submit a request for substitution for any product or manufacturer not named.

3. Where Specifications describe a product or assembly, listing exact characteristics required, without use of a brand or trade name, provide any product or assembly that provides the characteristics and otherwise complies with Contract requirements.

4. Where Specifications require compliance with performance requirements, provide any products that comply with the specified requirements.

5. Where the Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes or regulations specified.

6. Where Specifications require matching an established Sample, the ENGINEER'S decision will be final on whether a proposed product matches satisfactorily.

7. Where specified product requirements are indicated to be selected from manufacturer's standard colors, patterns, textures, or similar condition, select a product and manufacturer that complies with other specified requirements. The ENGINEER will select the color, pattern and texture from the product line selected.

8. The description of specific qualities takes precedence over specified reference standards. The description of specific qualities and specified reference standards together take precedence over the named products of designated manufacturers.
C. Source Manufacturers:

1. Primary source products and manufacturers named in a Specification section are listed as standards of quality to which other products will be compared.

2. Additional source manufacturers named in a specification are those manufacturers considered by the ENGINEER as generally capable of manufacturing products which may conform to the specified requirements. However, their being listed does not guarantee or imply that any or all of their products will be considered as equal to the specified requirements.

PART 3 - EXECUTION

3.01 MANUFACTURER'S INSTALLATION INSTRUCTIONS

A. When Contract Documents require installation of WORK to comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to all parties involved in the installation, including copies to the ENGINEER.

B. Handle, install, connect, condition, clean, and adjust products in accordance with such instructions and in conformance with specified requirements. Should job conditions or specified requirements conflict with manufacturer's instructions, notify ENGINEER for additional instructions.

C. Do not omit preparatory steps or installation procedures unless specifically modified or exempted by Contract Documents.

D. Do not proceed with WORK without clear instructions.
SUBSTITUTION REQUEST

PROJECT: ______________________ DATE: ______________________

TO: SCS ENGINEERS, PC
    4041 Park Oaks Blvd.
    Suite 100
    Tampa FL 33610

FROM: __CONTRACTOR __BIDDER __SUPPLIER __MANUFACTURER

HEREBY REQUESTS ACCEPTANCE OF THE FOLLOWING PRODUCT OR SYSTEMS AS A
SUBSTITUTION IN ACCORD WITH PROVISIONS OF DIVISION ONE OF THE
SPECIFICATIONS:

1. SPECIFIED PRODUCT OR SYSTEM:
   Generic Description: ____________ Specification Section No. _____ Art. ___ Para._

2. SUPPORTING DATA:
   ____Product data for proposed substitution is attached (description of product, reference standards,
   performance and test data).
   ____Sample attached. ____Sample will be sent if requested.

3. PRODUCT OR SYSTEM QUALITY COMPARISON:

<table>
<thead>
<tr>
<th>Specified Product</th>
<th>Substitution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name, brand:</td>
<td></td>
</tr>
<tr>
<td>Catalog No.:</td>
<td></td>
</tr>
<tr>
<td>Manufacturer:</td>
<td></td>
</tr>
<tr>
<td>Vendor:</td>
<td></td>
</tr>
<tr>
<td>Significant variations:</td>
<td></td>
</tr>
<tr>
<td>Maintenance Service Available Locally:</td>
<td>Yes</td>
</tr>
<tr>
<td>Spare Parts Source:</td>
<td></td>
</tr>
</tbody>
</table>

4. EFFECT OF SUBSTITUTION:
   Affects other parts of work: ____No____Yes
   Explain: ________________________________
   Substitution changes Contract Time: Add/Deduct ___days.
   Saving or credit to OWNER if accepted: $___________.
   Extra cost to OWNER if accepted: $___________.

5. PREVIOUS INSTALLATIONS:
   Attach list of local similar projects on which proposed substitution was used and dates of
   installations.
6. STATEMENT OF CONFORMANCE OF PROPOSED SUBSTITUTION TO CONTRACT REQUIREMENT: I/we have investigated the proposed substitution and:
   a. believe that it is equal or superior in all respects to specified product, except as stated above;
   b. will provide the same warranty as specified for specified product; and
   c. have included complete cost data and implications of the substitution; and
   d. will pay redesign and special inspection costs caused by the use of this product; and
   e. will pay additional costs to other contractors caused by the substitution; and
   f. will coordinate the incorporation of the proposed substitution in the WORK; and
   g. will modify other parts of the WORK as may be needed, to make all parts of the WORK complete and functioning; and
   h. waive future claims for added cost to Contract caused by the substitution; and
   i. agree to pay to the OWNER or ENGINEER the hourly rate of One Hundred Fifteen Dollars ($115.00) per hour for cost of ENGINEER to evaluate and review the proposed substitution.

Name and Title: __________________________________________ Date__________________

Signature: __________________________________________

ENGINEER'S REVIEW AND ACTION:

__Substitution not accepted:
__Resubmit with additional information:
__Substitution is accepted.
__Substitution is accepted, with the following comments:

By: ____________________________ Date: ____________________

OWNER'S Acceptance:

__Substitution is accepted.
__Substitution is accepted, with the following comments:

By: ____________________________ Date: ____________________

END OF SECTION
SECTION 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: Comply with requirements stated in Conditions of the Contract and in specifications for administrative procedures in closing out the WORK.

B. Related Work Described Elsewhere:
   1. Conditions of the Contract. Fiscal provisions, legal submittals and additional administrative requirements.
   2. Project Record Documents: Section 01720
   3. The respective sections of specifications: Closeout Submittals Required of Trades.

1.02 SUBSTANTIAL COMPLETION (BENEFICIAL OCCUPANCY)

A. When CONTRACTOR considers the WORK as substantially complete, he shall submit to ENGINEER:
   1. A written notice that the WORK, or designated portion thereof, is substantially complete.
   2. A list of items to be completed or corrected.

B. Within a reasonable time after receipt of such notice, ENGINEER shall make an inspection to determine the status of completion.

C. Should ENGINEER determine that the WORK is not substantially complete:
   1. The ENGINEER will promptly notify CONTRACTOR in writing, giving the reasons therefore.
   2. CONTRACTOR shall remedy the deficiencies in the WORK and send a second written notice of substantial completion to ENGINEER.
   3. ENGINEER will re-inspect the WORK.

D. When ENGINEER finds that the WORK is substantially complete, he will:
1. Prepare and deliver to OWNER a tentative Certificate of Substantial Completion on form provided herein, with a tentative list of items to be completed or corrected before final payment.

2. After consideration of any objections made by OWNER as provided in Conditions of the Contract, and when ENGINEER considers WORK substantially complete, he will execute and deliver to OWNER and CONTRACTOR a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected.

1.03 FINAL INSPECTION

A. When CONTRACTOR considers the WORK is complete, he shall submit written certification that:

1. Contract Documents have been reviewed.

2. WORK has been inspected for compliance with Contract Documents.

3. WORK has been completed in accordance with Contract Documents.

4. WORK is completed and ready for final inspection.

B. The ENGINEER will make an inspection to verify the status of completion with reasonable promptness after receipt of such certification.

C. Should ENGINEER consider that the WORK is incomplete or defective:

1. ENGINEER will promptly notify the CONTRACTOR in writing, listing the incomplete or defective WORK.

2. CONTRACTOR shall take immediate steps to remedy the stated deficiencies, and send a second written certification to ENGINEER that the WORK is complete.

3. The ENGINEER will reinspect the WORK.

D. When the ENGINEER finds that the WORK is acceptable under the Contract Documents, he shall request the Contractor to make closeout submittals.

1.04 REINSPECTION FEES

A. Should the ENGINEER perform re-inspections due to failure of the WORK to comply with the claims of status of completion made by Contractor:

1. OWNER will compensate the Engineer for such additional services.
2. OWNER will deduct the amount of such compensation from the final payment to the Contractor.

1.05 CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER

A. Evidence of compliance with requirements of governing authorities.
B. Project Record Documents: To requirements of Section 01720.
C. Evidence of Payment and Release of Liens: To requirements of General and Special Conditions.
D. Certificate of Insurance for Products and Completed Operations.

1.06 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit a final statement of accounting to the ENGINEER.
B. Statement shall reflect all adjustments to the Contract Sum:
   1. The original Contract Sum.
   2. Additions and deductions resulting from:
      a. Previous change orders or written amendment.
      b. Allowances
      c. Unit prices
      d. Deductions for uncorrected WORK
      e. Penalties and bonuses
      f. Deductions for liquidated damages
      g. Deductions for re-inspection payments
      h. Other adjustments
   3. Total Contract Sum, as adjusted.
   4. Previous payments.
   5. Sum remaining due.
C. ENGINEER will prepare a final Change Order, reflecting approved adjustments to the Contract Sum which were not previously made by Change Orders.

1.07 FINAL APPLICATION FOR PAYMENT

A. CONTRACTOR shall submit the final Application for Payment in accordance with procedures and requirements stated in the Conditions of the Contract.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. CONTRACTOR to maintain at the site for the OWNER one record copy of:

1. Drawings
2. Specifications
3. Addenda
4. Change Orders and other modifications of the contract.
5. Engineer's Field Orders or written instructions.
6. Approved Shop Drawings, Working Drawings and Samples.
7. Field Test records.
8. Construction photographs.

B. Related Requirements Described Elsewhere:

1. Field Engineering And Survey: Section 01050
2. Shop Drawings, Working Drawings, And Samples: Section 01340
3. Suggested Construction Sequencing: Section 01900

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store documents and samples in CONTRACTOR’s field office apart from documents used for construction.

1. Provide files and racks for storage of documents.
2. Provide locked cabinet or secure storage space for storage of samples.

B. File documents and samples in accordance with CSI format with section numbers as provided herein.
C. Maintain documents in a clean, dry, legible, condition and in good order. Do not use record documents for construction purposes.

D. Make documents and samples available at all times for inspection by the ENGINEER.

E. As a prerequisite for monthly progress payments, the CONTRACTOR is to exhibit the currently updated "Record Documents" for review by the ENGINEER and OWNER.

1.03 MARKING DEVICES

A. Provide felt tip marking pens for recording information in the color code designated by the ENGINEER.

1.04 RECORDING

A. Label each document "PROJECT RECORD" in neat large printed letters.

B. Record information concurrently with construction progress.

1. Do not conceal any WORK until required information is recorded.

C. Drawings: Legibly mark to record actual construction:

1. Depths of various elements of foundation in relation to finish first floor datum.

2. All underground piping with elevations and dimensions. Change to piping location. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Actual installed pipe material, class, etc.

3. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.

4. Field changes of dimension and detail.

5. Changes made by Field Order or by Change Order.

6. Details not on original contract drawings.

7. Structure and piping relocations.

D. Specifications and Addenda: Legibly mark each section to record:
1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.

2. Changes made by Field Order or by Change Order.

E. Shop Drawings (after final review and approval): Provide five (5) sets of record drawings for each process equipment, piping, electrical system and instrumentation system.

1.05 SUBMITTAL

A. At Contract closeout, deliver Record Documents to the ENGINEER for the OWNER.

B. Accompany submittal with transmittal letter in duplicate, containing:

1. Date

2. Project title and number

3. CONTRACTOR's name and address

4. Title and number of each Record Document

5. Signature of CONTRACTOR or his authorized representative.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
SECTION 01730
OPERATING AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:
   1. Compile product data and related information appropriate for OWNER’S maintenance and operation of products furnished under Contract.
   2. Prepare operating and maintenance data as specified in this Section and as referenced in other pertinent sections of Specifications.
   3. Instruct OWNER’S personnel in maintenance of products and in operation of equipment and systems.

B. Related Documents Described Elsewhere:
   1. Shop Drawings, Work Drawings, and Samples: Section 01340
   2. Contract Closeout: Section 01700
   3. Project Record Documents: Section 01720
   4. Warranties and Bonds: Section 01740

1.02 QUALITY ASSURANCE

A. Preparation of data shall be done by personnel:
   1. Trained and experienced in maintenance and operation of described products.
   2. Familiar with requirements of this Section.
   3. Skilled as a technical writer to the extent required to communicate essential data.
   4. Skilled as draftsman competent to prepare required drawings.

1.03 FORM OF SUBMITTALS

A. Prepare data in form of an instructional manual for use by OWNER’S personnel.

B. Format:
1. Size: 8 1/2-inches x 11 inches.

2. Paper: 20 pound minimum, white, for typed pages.

3. Text: Manufacturer's printed data, or neatly typewritten.

4. Drawings:
   a. Provide reinforced punched binder tab, bind in with text.
   b. Reduce larger drawings and fold to size of text pages but not larger than 11 inches x 17 inches.

5. Provide fly-leaf for each separate product, or each piece of operating equipment.
   a. Provide typed description of products and major component parts of equipment.
   b. Provide indexed tabs.

6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:
   a. Title of Project.
   b. Identity of separate structure as applicable.
   c. Identity of general subject matter covered in the manual.

C. Binders:
   1. Commercial quality three O-ring binders with durable and cleanable plastic covers.
   3. When multiple binders are used, correlate the data into related consistent groupings.

1.04 CONTENT OF MANUAL

A. Neatly typewritten table of contents for each volume, arranged in systematic order.

1. CONTRACTOR, name of responsible principal, address and telephone number.
2. A list of each product required to be included, indexed to content of the volume.

3. List, with each product, name, address and telephone number of:
   a. Subcontractor or installer, manufacturer and supplier name, address and telephone number.
   b. A list of each product required to be included, indexed to content of the volume.
   c. Identify area of responsibility of each.
   d. Local source of supply for parts and replacement name, address and telephone number.

4. Identify each product by product name and other identifying symbols as set forth in Contract Documents.

B. Product Data:

1. Include only those sheets which are pertinent to the specific product.

2. Annotate each sheet to:
   a. Clearly identify specific product or part installed.
   b. Clearly identify data applicable to installation.
   c. Delete references to inapplicable information.

3. Operation and maintenance information as herein specified.

4. Record shop drawings as submitted and approved with all corrections made for each product.

C. Drawings:

1. Supplement product data with drawings as necessary to clearly illustrate:
   a. Relations of component parts of equipment and systems.
   b. Control and flow diagrams.

2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.

3. Do not use Project Record Documents as maintenance drawings.
D. Written text, as required to supplement product data for the particular installation:
   1. Organize in consistent format under separate headings for different procedures.
   2. Provide logical sequence of instructions of each procedure.

E. Copy of each warranty, bond and service contract issued.
   1. Provide information sheet for OWNER’s personnel, give:
      a. Proper procedures in event of failure.
      b. Instances which might affect validity of warranties or bonds.

1.05 MANUAL FOR MATERIALS AND FINISHES

A. Submit six copies of complete manual in final form.

B. Content: for applied materials and finishes:
   1. Manufacturer's data, giving full information on products.
      a. Catalog number, size, and composition.
      b. Color and texture designations.
      c. Information required for reordering special manufactured products.
   2. Instructions for care and maintenance.
      a. Manufacturer's recommendation for types of cleaning agents and methods.
      b. Cautions against cleaning agents and methods which are detrimental to product.
      c. Recommend schedule for cleaning and maintenance.

C. Content, for moisture protection and weather-exposed products:
   1. Manufacturer's data, giving full information on products.
      a. Applicable standards.
      b. Chemical composition.
      c. Details of installation.
2. Instructions for inspection, maintenance and repair.

D. Additional requirements for maintenance data: Respective sections of Specifications.

1.06 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit six copies of complete manual in final form.

B. Content, for each unit of equipment and system, as appropriate:

1. Description of unit and component parts.
   a. Function, normal operating characteristics, and limiting conditions.
   b. Performance curves, engineering data and tests.
   c. Complete nomenclature and commercial number of replaceable parts.
   d. Summary of information listed on equipment and motor data plates.

2. Operating procedures:
   a. Start-up, break-in, routine and normal operating instructions.
   b. Regulation, control, stopping, shut-down and emergency instructions.
   c. Summer and winter operating instructions.
   d. Special operating instructions.

3. Maintenance procedures:
   a. Routine operations.
   b. Guide to "trouble-shooting".
   c. Disassembly, repair and reassembly.
   d. Alignment, adjusting and checking.

4. Servicing and lubrication required.

5. Manufacturer's printed operating and maintenance instructions.

6. Description of sequence of operation by control manufacturer.
7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
   a. Predicted life of parts subject to wear.
   b. Items recommended to be stocked as spare parts.
8. As-installed control diagrams by controls manufacturer.
10. Charts of valve tag numbers, with location and function of each valve.
11. List of original manufacturer's spare parts, manufacturer's current prices and recommended quantities to be maintained in storage.
12. Other data as required under pertinent sections of specifications.
13. Approved record shop drawings with all corrections made, and a copy of the warranty statement, check-out memo, and demonstration test procedures and certification.

C. Content, for each electric and electronic system, as appropriate:
1. Description of system and component parts.
   a. Function, normal operating characteristics, and limiting conditions.
   b. Performance curves, engineering data and tests.
   c. Complete nomenclature and commercial number of replaceable parts.
2. Circuit directories of panel boards.
   a. Electrical service
   b. Controls
3. As installed color coded wiring diagrams.
4. Operating procedures:
   a. Routine and normal operating instructions.
   b. Sequences required.
   c. Special operating instructions.
5. Maintenance procedures:
   a. Routine operations.
   c. Disassembly, repair and reassembly.
   d. Adjustment and checking.

6. Manufacturer's printed operating and maintenance instructions.

7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

8. Other data as required under pertinent sections of specifications.

D. Prepare and include additional data when the need for such data becomes apparent during instruction of OWNER’S personnel.

E. Additional requirements for operating and maintenance data: Respective sections of Specifications.

1.07 SUBMITTAL SCHEDULE

A. Submit two copies of preliminary draft of proposed formats and outlines of contents of Operation and Maintenance Manuals within 90 days after Notice to Proceed. Electronic version is acceptable.

B. Submit two copies of completed data in preliminary form no later than 20 days following ENGINEER’S review of the last shop drawing of a product and/or other submittal specified under Section 01340, but no later than delivery of equipment. One copy will be returned with comments to be incorporated into the final copies and the other copy will be retained on-site for use in any early training.

C. Submit six (6) copies of approved manual in final form directly to the offices of the ENGINEER, within 10 days after the reviewed copy or last item of the reviewed copy is returned.

D. Provide six (6) copies of addenda to the operation and maintenance manuals as applicable and certificates as specified within 30 days after final inspection.

1.08 INSTRUCTION OF OWNER'S PERSONNEL

A. Prior to demonstration test, fully instruct OWNER’S designated operating and maintenance personnel in operation, adjustment and maintenance of products, equipment and systems.
B. Operating and maintenance manual shall constitute the basis of instruction. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

C. Instructors shall be fully qualified personnel as outlined within the individual equipment specifications. If no specific training specifications are listed with the equipment, the CONTRACTOR shall provide the instruction with qualified CONTRACTOR personnel.

D. The instructors shall provide for and prepare lesson scopes and handouts for up to five individuals designated by the OWNER that outline the items to be covered. Separate sessions for operation and maintenance instruction shall be provided consecutively. Handouts shall be submitted to the OWNER with at least one week's notice prior to the training sessions.

E. All instruction sessions shall be video taped with portable video cameras and tapes supplied by the CONTRACTOR. Video taping shall be made by the CONTRACTOR under the direction of the OWNER. The instruction session videos will be supplied on either a DVD or USB 3.0 flash drive at the OWNER’s preference.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION (Not used)

END OF SECTION
SECTION 01740

WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Scope of Requirements:
   1. Compile specified warranties and bonds as specified in these Specifications.
   2. Co-execute submittals when so specified.
   3. Review submittals to verify compliance with Contract Documents.
   4. Submit to ENGINEER for review and transmittal to OWNER.

B. Related WORK Described Elsewhere:
   1. Instructions to Bidders: Bid Bonds
   2. Conditions of the Contract: Performance Bond and Payment Bond
   3. Conditions of the Contract: Instructions to CONTRACTORS
   4. Contract Closeout: Section 01700

1.02 SUBMITTAL REQUIREMENTS

A. Assembly warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors.

B. Number of original signed copies required: Two each.

C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.
   1. Product of WORK item.
   2. Firm, with name of principal, address and telephone number.
   4. Date of beginning of warranty, bond or service and maintenance contract.
5. Duration of warranty, bond or service maintenance contract.

6. Provide information for OWNER's personnel:
   a. Proper procedure in case of failure.
   b. Instances which might affect the validity or warranty or bond.

7. CONTRACTOR, name of responsible principal, address and telephone number.

1.03 FORM OF SUBMITTALS

A. Prepare in duplicate packets.

B. Format:
   1. Size 8-1/2 inches x 11 inches, punch sheets for standard three-post binder.
      a. Fold larger sheets to fit into binders.
   2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS".

   List:
   a. Title of Project.
   b. Name of CONTRACTOR.

C. Binders: Commercial quality, three-post binder, with durable and cleanable plastic covers and maximum post width of two inches.

1.04 WARRANTY SUBMITTALS REQUIREMENTS

A. For all major pieces of equipment, submit a warranty from the equipment manufacturer. Manufacturer's warranty period shall be concurrent with CONTRACTOR's for one (1) year, unless otherwise specified, commencing at the time of final acceptance by OWNER. Certain materials will require a longer term warranty. These limits will be designated in the specification for those materials.

B. CONTRACTOR shall be responsible for obtaining certificates for equipment warranty for all major equipment which has at least a 1 hp motor or which lists for more than $1,000. ENGINEER reserves the right to request warranties for equipment not classified as major. CONTRACTOR shall still warrant equipment not considered to be "major" in the CONTRACTOR's one-year warranty period even though certificates of warranty may not be required.
C. In the event that the equipment manufacturer or supplier is unwilling to provide a one-year warranty commencing at the time of OWNER acceptance, the CONTRACTOR shall obtain from the manufacturer a two (2) year warranty commencing at the time of equipment delivery to the job site. This two-year warranty from the manufacturer shall not relieve CONTRACTOR of the one-year warranty starting at the time of OWNER acceptance of the equipment.

D. OWNER shall incur no labor or equipment cost during the guarantee period.

E. Guarantee shall cover all necessary labor, equipment and replacement parts resulting from faulty or inadequate design, improper assembly or erection, defective workmanship and materials, leakage, breakage or other failure of all equipment and components furnished by manufacturer.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
SECTION 01900

CONSTRUCTION SEQUENCING

PART 1 - GENERAL

1.01 DESCRIPTION

A. CONTRACTOR is required to furnish all labor, equipment, appliances and materials, and perform all operations required to initiate and complete this suggested construction sequence schedule.

B. All construction WORK for this project shall be sequenced in detail and the OWNER shall accept the proposed schedule prior to construction.

C. The WORK under this contract shall not interfere with on-going operations. OWNER will WORK with CONTRACTOR to maintain a continuous construction schedule on this contract. This being noted, the following is a general sequence of construction that is suggested to achieve the aforementioned:

FOR THE CELLS 2-6 PARTIAL CLOSURE PHASE 3

1. CONTRACTOR to verify existing conditions.

2. CONTRACTOR to verify control points and construction baseline locations.

3. CONTRACTOR to set grade stakes for construction.

4. CONTRACTOR shall install the gas system improvements.

5. CONTRACTOR to install stormwater management system.

6. CONTRACTOR to expose the existing bottom liner system to which the cap liner will be welded. Where needed, adjustment in the grade for top of intermediate cover will be conducted. Soil removed will be stockpiled for placement over the bottom liner following the welding process.

7. CONTRACTOR to remove mulch.

8. CONTRACTOR to shallow till site and repair eroded areas.

9. CONTRACTOR to provide additional soil for minimum depth of intermediate cover and cover as per the intermediate grading plan.

10. CONTRACTOR to establish intermediate cover and survey.
11. CONTRACTOR to install cap liner system.

12. CONTRACTOR to install geocomposite.

13. CONTRACTOR to install gas system piping.

14. CONTRACTOR to provide and install 18-inch soil cap.

15. CONTRACTOR to install toe drains at terrace, toe of slope, and at mid-slope locations shown on the drawings.

16. CONTRACTOR to provide and install the topsoil.

17. CONTRACTOR shall confirm depth of soil cap system with depth checks.

18. CONTRACTOR will install the GFFR system.

19. CONTRACTOR to seed and mulch, or sod disturbed areas as designated on the drawings and in these specifications.

20. CONTRACTOR to provide survey of top of soil fill.

D. At the completion of the sodding and survey, the project should be completed.

E. This suggested sequence of construction is general in nature and does not illustrate the overall requirement, magnitude, scope, or responsibilities of the CONTRACTOR in the completion of the WORK under the Contract Agreement.

F. The CONTRACTOR shall submit a sequence of construction along with the construction schedule.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
SECTION 01910

CONTRACTOR COMPLIANCE REQUIREMENTS

PART 1 - GENERAL

1.01 INTRODUCTION

A. The safety and health of all contractors, customers, and employees of the New Hanover County Department of Environmental Management is of primary importance. As a result, the prevention of occupationally induced injuries and illnesses will be given precedence over operating productivity whenever necessary.

Our goal is to maintain a safety and health program conforming to all applicable OSHA standards and to lead in safety program management within our industry. To be successful will require CONTRACTOR cooperation in all safety and health matters.

As the CONTRACTOR you will be required, as part of your contract, to take an active role in the Department of Environmental Management safety and health program. The following CONTRACTOR safety and health requirements, when adhered to, will ensure safety for contractors, customers, and COUNTY employees. Additionally, potential damage to equipment and property will be avoided. It is impossible to document all possible situations or to provide precise guidance for every contingency a contractor may encounter in the course of their WORK. However, adherence to the rules as written and the desire to apply safe WORK practices will result in the highest level of safety.

1.02 GENERAL REQUIREMENTS

A. All CONTRACTOR employees shall abide by the Department of Environmental Management safety and health rules and regulations at all times. The DEM Safety Manual is available for copy or review in each of the Department’s offices.

B. The CONTRACTOR and all contracted employees are required to follow the procedures for signing in and out. Procedures may differ depending on the section of the department the CONTRACTOR is working in; they will be explained fully before the WORK begins.

C. The CONTRACTOR shall have a competent individual in charge at the job site to supervise the job, conduct an adequate accident prevention program, and ensure compliance to OSHA and DEM rules.
D. All accidents or injuries shall be reported immediately to the DEM Project Manager or Safety Manager.

E. CONTRACTOR employees are not allowed to enter areas other than the WORK site, unless it is required for the performance of their job.

F. The CONTRACTOR shall inform the ENGINEER and OWNER of any known hazardous conditions that exist, due to the contract WORK being done, in areas where any employees may be exposed to the known hazards.

G. The CONTRACTOR shall provide Safety Data Sheets for all containers of hazardous substances brought onto DEM property.

H. The CONTRACTOR shall sign the “Contractor Hold Harmless” waiver form in order to use any Department equipment.

I. Periodic job site inspections will be conducted by the DEM Project Manager or Safety Manager to ensure that the job is proceeding safely in accordance with safety rules.

J. Violation of these rules is grounds for immediate termination of contract WORK.

1.03 STANDARDS OF CONDUCT

A. The Department of Environmental Management has established standards to ensure the smooth, safe, and efficient operations of the Department. Violation of these standards is considered serious and may lead to termination of the contract. The following are prohibited:

1. Willful damage to any Departmental property, customer property, or the property of Department employees.

2. Possession, use, or distribution of alcohol, narcotics, or illegal drugs on Department property.

3. Possession of firearms, ammunition, concealed weapons, or explosives (unless properly authorized).

4. Abusive or threatening language, harassment, disrespectful behavior, workplace violence, or interfering with the WORK of Department employees.

5. Theft or attempted theft from the Department or Department employees.

6. Refusal to perform contracted WORK or refusal to obey instructions.
7. Sleeping on the job.
8. Negligence or conduct which could result in injury or damage to property.

1.04 CONTRACTOR SAFETY TRAINING

A. Please place a check by each of the following categories in which one or more of your employees has been trained. It is understood that not all CONTRACTORs will have employees who are trained in all of the areas listed.

___ Personal Protective Equipment
___ First Aid and CPR
___ Lockout/Tagout
___ Confined Space Entry
___ Respiratory Protection
___ Hazardous Communication
___ Safety Data Sheets
___ Fire Prevention and Protection
___ Fall Protection
___ Scaffolding
___ Heavy Equipment Training/Certification (includes bulldozer, loader, forklift, excavator, grader, roller, back-hoe, bobcat)
___ Welding, Cutting, and Brazing
___ Electrical Safety
___ Trenching/Excavation
___ Other ________________________________
___ Other ________________________________
* If the contracting company has ten (10) or more employees, they will be required to present OSHA 300 Logs, at a minimum for the past three calendar years, along with their bid.

The Department of Environmental Management reserves the right to ask for any training records from the categories that were checked above. The COUNTY reserves the right to reject the bid of any firm that cannot document proper safety training as it relates to conducting the WORK included in the contract.

1.05 CONTRACTOR AGREEMENT TO COMPLY

I, ______________________________, a representative of ___________________________ do hereby acknowledge that my company has received a copy of the guidelines governing contract WORK being performed on New Hanover County Department of Environmental Management property. It is agreed that as part of the contract my company and its employees will comply with these guidelines and all the written programs which apply to the WORK being performed.

Signed ___________________________  Date _____________________
(CONTRACTOR)

Signed ___________________________  Date _____________________
(CONTRACTOR)

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
DIVISION 2

SITE WORK
SECTION 02210

SITE EARTHWORK AND GRADING

PART 1 - GENERAL

1.01 DESCRIPTION

A. The WORK of this section consists of furnishing all necessary labor, equipment, material and transportation necessary to bring the pre-liner base grade, leachate seep trenches, final landfill cap grade, berms, drainage ditches, erosion control devices and swales to the lines and grades as shown on the drawings and in the Specifications.

B. The CONTRACTOR must determine for himself the volume of material required for the performance of items included in the drawings and specifications.

C. CONTRACTOR shall be responsible for controlling stormwater runoff from the adjacent landfill slope through the use of berms, dikes, and swales to direct stormwater away from construction areas and to areas where CONTRACTOR shall remove stormwater from the excavation through the use of temporary pumps or other means and methods.

D. The CONTRACTOR shall control fugitive dust in accordance with local and state requirements.

E. Prior to site clearing operations, the CONTRACTOR shall implement appropriate temporary erosion and sedimentation controls.

F. Any damage to the existing landfill liner systems shall be repaired as directed by the ENGINEER at the CONTRACTOR’s expense.

G. Open burning shall not be allowed.

1.02 DEFINITIONS

The following definitions apply only to the terms and conditions contained within this specification.

A. Suitable Soil: Suitable materials for fills shall be free from vegetation, organic material, marl, excessive silt, or muck. The CONTRACTOR will provide the appropriate soil from an off-site borrow source(s) in accordance with the Specification Section 2220.

Material suitable for use as synthetic liner system cover material shall be soil free of roots, stones, rocks and other debris. The CONTRACTOR shall have
sufficient manpower to inspect continuously each load that is placed to verify this requirement.

B. Unsuitable Soil: Unsuitable materials are highly organic soil (peat, clay, or muck) classified as A-8 in accordance with AASHTO Designation M-145.

C. Backfill: The suitable soil that is placed back into the excavation and compacted after the unsuitable soils are excavated and removed. The backfill shall be free of clays and compacted to meet the specified requirements contained within these Specifications.

D. Maximum Density: Maximum weight in pounds per cubic foot of a specific material.

E. Optimum Moisture: Percentage of water in a specific material at maximum density.

F. Clearing: Removal of vegetative materials found on the surface of the ground such as trees, brush, etc.

G. Grubbing: Removal of materials at, or protruding from, the surface of the ground such as grass, stumps, roots, rocks, etc.

H. Stripping: Removal and disposal of all organic material, sod, topsoil, grass and grass roots, mulch and other objectionable material remaining after clearing and grubbing from the areas designated to be stripped.

I. Tilling: Plowing and harrowing of all organic sod, topsoil, grass and grass roots, remaining after clearing and grubbing from the areas designated to be tilled. Tilling depth shall be limited to 3-inches to avoid contact with existing waste.

J. Demolition: Deconstruction and removal of existing stormwater system culverts, pipes, and access road.

1.03 RELATED WORK DESCRIBED ELSEWHERE

A. Section 02220 - Excavating, Backfilling, and Compaction

PART 2 - PRODUCTS

A. Not used.

PART 3 - EXECUTION

3.01 PREPARATION

A. Mulch Removal: Mulch will be either taken to the active landfill working face or the existing mulch stockpile south of the scale house and landfill office.
B. Stripping: The project area will be stripped of all unsuitable material (i.e., removal and satisfactory disposal of materials found on and protruding from the surface of the ground such as grass, brush, waste materials, rock, debris, roots) to a depth of 4 inches below the existing intermediate cover surface. The material removed shall be replaced with soil meeting Intermediate Cover as defined in spec section 02220 2.01.B. Stripped material without waste or excessive mulch may be reused with approval from the ENGINEER, or stockpiled in a location coordinated with the COUNTY. Stripped material with waste will be hauled to the active landfill working face.

3.02 PERFORMANCE

A. Excavation: Refer to Section 02220 - Excavating, Backfilling, and Compaction

B. Fills:

1. Fills shall be formed of suitable material placed in layers of not more than 8 inches in depth (around structures) and 12 inches in depth (backfill, embankments, and drainage conveyance) measured loose and rolled and/or vibrated with suitable equipment until compacted. Thickness of layers may be increased provided the equipment and methods used are proven by field density testing to be capable of compacting thicker layers to specified densities. Layer thickness shall be decreased if equipment and methods used are proven to be incapable of compacting layers to specified densities.

2. Rock that will not pass through a 3-inch diameter ring shall not be placed within the top 12 inches of the surface of the completed fill. Rock that will not pass through a 1-inch diameter ring shall not be placed within the top 4 inches of the completed fill. Broken concrete or asphaltic pavement shall not be used in fills.

3. Fill shall be compacted according to Section 02220 - Excavating, Backfilling and Compaction.

4. Final elevations shall be within 0.1 foot of the required elevation and surfaces shall be sloped to drain as shown on the Drawings. However, this variation does not exempt the contractor from meeting all minimum slopes and depths as indicated on the drawings. If a dimension is noted as minimum then it must be constructed to at least that dimension. The CONTRACTOR must review dimensions with ENGINEER prior to completion of each grading phase.

5. Fill material placed within the limits of liner shall be Suitable Soil as defined in the Definitions section above.

C. Laboratory and field density tests which, in the opinion of the ENGINEER, are necessary to establish compliance with the compaction requirements of these
specifications, will be conducted at the OWNER's expense. Tests will be made at depths and locations selected by the ENGINEER or Testing Laboratory's Representative. **For the purpose of certification of construction the ENGINEER will utilize destructive depth checks that will be conducted by CONTRACTOR and confirmed by the soils engineer, or the ENGINEER’s CQA personnel.**

D. Equipment placing fill material over the synthetic liner system shall do so according to Section 02220 - Excavating, Backfilling, and Compaction.

E. Fill placed on embankments must be placed with a small bulldozer/loader no larger than a Caterpillar D-4.

F. The Construction Drawings show the location of several existing liquids collection pipes, landfill gas wells, cleanouts, leachate risers, etc. that are to be protected in place. Any damage caused by the CONTRACTOR to any existing infrastructure shall be repaired at no cost to the OWNER.

**END OF SECTION**
SECTION 02215

SAFETY PROCEDURE

PART 1 - GENERAL

1.01 SAFETY PROCEDURES IN AND AROUND THE LANDFILL

It is the CONTRACTOR’s responsibility to provide for all safety functions during the term of their WORK on the project site.

A. All WORK conducted in and around landfills shall be done in accordance with State and local requirements and OSHA Safety and Health Standards 29 CFR and shall conform to the Landfill Gas Division of the Solid Waste Association of North American (SWANA) A Compilation of Landfill Gas Field Practices and Procedures dated August, 2011.

Additionally, for construction in the vicinity of a known landfill area, the following steps should be taken to prevent injury:

1. A combustible gas indicator must be utilized at all times during trenching and drilling, or when construction occurs within 10 feet of an open excavation.

2. When trenching or drilling deeper than 2 feet into the fill, or in the presence of detectable concentrations of methane, the soils are to be wetted and the operating equipment shall be provided with spark-proof exhausts.

3. Foam fire extinguishers will be provided on all equipment working in the landfill.

4. Personnel within or near an open trench or drill hole will:
   a. be fully clothed
   b. wear shoes with non-metallic soles
   c. wear a hard hat and safety goggles or glasses

5. Exhaust blowers should be on hand to be used in cases where trenches may show a build-up of methane or lack of oxygen.

6. Smoking should not be permitted in any area within 500 feet of the excavation.
7. An attempt should be made to keep personnel away from a downwind proximity of any open trench, unless the trench is constantly monitored and declared safe.

8. The operator of trenching equipment should wear an organic vapor and acid gas respirator while operating the equipment in or astride any trench.

9. Before personnel are permitted to enter an open trench, the trench should be carefully monitored for methane and oxygen sufficiency. The personnel should also be provided with a continuous methane and oxygen monitor in their WORK area as long as they are in the excavation.

B. For construction near (within 1,000 feet) of a known landfill area, the following safety precautions should be taken:

1. The areas under construction must be checked with a combustible gas indicator before excavation to determine if methane gas is in the area.

2. Any excavations must be monitored for methane and oxygen deficiency if personnel are to be sent in. This must be carried out continuously, unless the presence of methane in the area can definitely be ruled out.

3. Should methane gas be found in the area, those precautions applicable to digging in the landfill shall also apply to this situation.

C. Safety procedures to adhere to when working in landfill generated gas atmospheres:

1. Personnel monitoring equipment: tri-techtors required for detecting:
   a. flammable gas
   b. low O2
   c. toxic gas

2. At least one monitor for each work party.

3. All appliances used in landfill generated gas atmospheres, must be explosion proof, i.e., Class I, Division -I, Group C, or, as per the 1987 NEC.

4. Ventilation must be a minimum of 2,500 CFM and should be increased as excavation of area becomes larger.

5. Entrance into utility line access manhole covers should be done with extreme caution. Sparks can occur from metal manhole covers and rings.
6. Always sample the air in a manhole or confined space with a detector, before entering. Many confined spaces encountered on the landfill will be a “permit-required confined space” as defined by OSHA.

7. If flammable vapors or low oxygen atmosphere conditions prevail, ventilate before entering.

8. Never allow smoking, open lights in or near excavations or confined spaces.

D. CONTRACTOR NOTE: New Hanover County has a standing Health and Safety Plan that must be adhered to for construction activities at the facility. See Section 01910 for additional information.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
SECTION 02220

EXCAVATING, BACKFILLING, AND COMPACTION

PART 1 - GENERAL

1.01 DESCRIPTION

A. The work included under this Section consists of excavating, trenching, sheeting/shoring, grading, leachate seep trenching, trench backfilling activities, compacting, transporting, segregating materials, stockpiling, disposing of materials, installing bedding and backfill materials, field testing, quality control/quality assurance, installing pipe and appurtenances as required for the construction of the work as shown on the drawings and specified herein.

B. The CONTRACTOR must determine for himself the volume of material required for the performance of all lump sum items included in the Contract plans and specifications.

C. Work under this Section includes trenching and grading activities potentially both in and outside of municipal solid waste (MSW).

D. Excavation, backfilling, sampling, and testing shall be performed by the CONTRACTOR only when the ENGINEER or CQA REPRESENTATIVE is present. A minimum of 24 hours prior notice shall be provided to the ENGINEER or CQA REPRESENTATIVE.

E. Upon identification, the CONTRACTOR shall notify the ENGINEER in writing if the site conditions encountered during construction differ from that indicated on the Contract Drawings. Notification by the CONTRACTOR shall include an explicit description of the differences.

F. Any damage to the existing landfill liner systems or existing LFG vents, wells or piping shall be repaired as directed by the ENGINEER at the CONTRACTOR’S expense.

1.02 DEFINITIONS

A. Existing Intermediate Cover - The Existing Intermediate Cover refers to Existing Intermediate Cover Soil over the waste that was previously placed by the OWNER; however, following stripping of the vegetation and mulch, in some areas the thickness is less/more than is required and filling/excavating and grading is needed to achieve the Intermediate Cover lines and grades as identified on the Contract Drawings.

B. Intermediate Cover Soil Layer/Grading Layer - The Intermediate Cover Soil Layer/Grading Layer refers to the Existing Intermediate Cover Soil over the waste
that was previously placed by the OWNER that is graded to achieve a minimum specified thickness over waste.

1. The objective of the Intermediate Cover Soil Layer/Grading Layer is to obtain a minimum specified thickness over the waste of 12 inches (measured perpendicular to the slope) within the closure area top/sideslope footprint.

2. The CONTRACTOR will be required to achieve the Intermediate Cover lines and grades and required minimum thickness of the Intermediate Cover Soil Layer/Grading Layer identified on the Contract Drawings.

C. Topsoil - A fertile, natural or amended soil, typical of locality, free from large stones, roots, sticks, clay, weeds, and sod, and suitable for use as a growing medium for vegetation.

D. Suitable Soil - Soil that meets the requirements specified in Part 2 and as defined in Section 02210 Earthwork and Grading.

E. Unsuitable Soil - Soil that does not meet the requirements specified in Part 2 and as defined in Section 02210 Earthwork and Grading.

F. CQC CONSULTANT - Independent geotechnical consultant retained by the CONTRACTOR to perform the Construction Quality Control (CQC). The CQC CONSULTANT shall oversee all geotechnical activities and the Quality Control testing services as presented in these Specifications.

1.03 APPLICABLE PUBLICATIONS

A. All publications and standard specifications referred to herein are the latest or current issue of that publication or specification as of the specification date.

1.04 PROJECT CONDITIONS

A. Existing project conditions are shown on the Contract Drawings or otherwise described herein.

B. 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, utilities, etc.

C. Structures shall be supported and protected from damage by the CONTRACTOR. If structures are broken or damaged, CONTRACTOR shall restore structures, utilities, etc. to their original condition at no additional cost to the OWNER. Repair of damaged features or structures shall be approved by the ENGINEER and OWNER.
1.05 QUALITY ASSURANCE/QUALITY CONTROL

A. Construction Quality Assurance (CQA) will include field and laboratory testing as required by the specifications which will be conducted by a qualified soil-testing laboratory representing and paid for by the OWNER. Re-testing of areas failing to meet the specification requirements will be conducted at the cost of the CONTRACTOR.

B. Construction Quality Control (CQC) will be performed by an independent geotechnical consultant retained by the CONTRACTOR for testing of off-site soil borrow areas to demonstrate that the soil proposed to be imported to the site meets the minimum criteria. The CONTRACTOR shall give a minimum of 48 hours notice to the OWNER’S CQA testing laboratory prior to the testing services being needed for compaction and depth check testing. The CONTRACTOR shall schedule his work so as to permit a reasonable time for testing before placing succeeding lifts and shall keep the laboratory and the OWNER’S CQA REPRESENTATIVE informed of his progress. Any and all tests which have to be repeated because of the failure of the tested material to meet specification shall be paid for by the CONTRACTOR and the cost of any tests shall be deducted from payments due the CONTRACTOR.

1. Qualifications for the geotechnical CQC Consultant shall be submitted to the ENGINEER at least 15 calendar days prior to conducting any geotechnical laboratory or field testing related to the project.

2. A final report shall be signed and sealed by a professional Engineer licensed in the State of North Carolina and submitted to the ENGINEER at the conclusion of the project which certifies the geotechnical activities performed on this project are in accordance with these Specifications. The report shall include at a minimum:

   a. Field Density Test Report (with field activity log and test location map).

   b. Summary of test results from both qualifying the products and during placement.

1.06 SUBMITTALS

A. Submit to the ENGINEER for review the proposed methods of construction, including dewatering excavation, bedding compaction, and backfilling of the various portions of the work. Review shall be for method only. The CONTRACTOR shall remain responsible for the adequacy and safety of the methods.

B. For all borrow sources, the CONTRACTOR shall notify the ENGINEER in writing of the off-site material source for each soil type specified within Part 2 of
this Section at least 15 calendar days prior to the date of anticipated use of such material. Notification shall include:

1. Supplier’s name
2. Borrow location
3. Documentation confirming adequate quantities are available for this project
4. A representative sample of the proposed material, consisting of one 5-gallon, sealed container from each borrow location
5. Test results for a minimum of 2 samples as required within Part 2 of this Section. The CONTRACTOR shall submit to the ENGINEER the parameters for the testing equipment. Parameters include, but not limited to, ASTM test method used, sieve sizes, liquids used for permeability testing, and parameters outlined in the appropriate ASTM test method.

C. Qualifications of the geotechnical CQC consultant shall be submitted to the ENGINEER at least 15 calendar days prior to conducting any geotechnical laboratory or field testing related to the project.


E. Pipe Surveys
   1. Proposed stationing and pipeline identification procedures.
   2. CONTRACTOR daily logs detailing length of trench excavated and backfilled, with reference to pipe stationing and details sufficient to properly describe the WORK completed to date.

F. Topographic Surveys

   Top of Intermediate Cover - The OWNER has conducted depth checks in the area of construction. Based on that depth check a grading plan has been developed to provide a minimum of one foot of soil cover will be in place following the CONTRACTOR’s placement of soil to the elevations shown in the Intermediate Cover grading plan.

   Upon approval of the completed Intermediate Cover level the contractor shall complete any leachate seep management required to provide an acceptable base for the liner system. Leachate Seep Management includes trenches as required by the construction documents and as directed by the ENGINEER or OWNER. Upon the Intermediate Cover layer the 40 mil textured LLDPE geomembrane will be installed and a Topographic Survey (Record Drawing) will be conducted. The survey will provide for
locations of the edge of the liner around the perimeter of the installation. All surveys shall be provided with an electronic copy compatible with AutoCAD 2016 or newer.

1. Final Cover - The CONTRACTOR shall submit to the ENGINEER a Topographic Survey (Record Drawing) of the completed Final Cover for review and acceptance that the lines and grades of the Final Cover shown on the Contract Drawings have been achieved.

2. Refer to Section 01050 Field Engineering and Survey.

G. Certificate of Subbase Acceptance

1. Upon completion of the Intermediate Cover construction and acceptance of the Topographic Survey (Record Drawing) of the completed Intermediate Cover, refer to Section 1.05.F.1 of this Section, a “Certificate of Subbase Acceptance” shall be co-signed by the INSTALLER along with the CQA REPRESENTATIVE prior to the installation of the 40 mil textured LLDPE geomembrane certifying the Intermediate Cover was constructed in accordance with the approved Contract Documents and Specifications.

2. Refer to Section 02777 Linear Low Density Polyethylene (LLDPE) Geomembrane Liner Part 1.05.H.

1.07 PROTECTION

A. Sheetling and Bracing:

1. Furnish, put in place, and maintain such sheeting and bracing as may be required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction, and to protect adjacent structures, power poles, etc. from undermining, and to protect workers from hazardous conditions or other damage. Such support shall consist of braced steel sheet piling, braced wood lagging and soldier beams or other approved methods. If the OWNER is of the opinion that at any point sufficient or proper supports have not been provided, he may order additional supports put in at the expense of the CONTRACTOR, and compliance with such order shall not relieve or release the CONTRACTOR from his responsibility for the sufficiency of such supports. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed. Where soil cannot be properly compacted to fill a void, lean concrete shall be used as backfill at no additional expense to the OWNER.

2. The CONTRACTOR shall construct the sheeting outside the neat lines of the foundation unless indicated otherwise to the extent he deems it
desirable for his method of operation. Sheeting shall be plumb and securely braced and tied in position. Sheeting and bracing shall be adequate to withstand all pressure to which the structure or trench will be subjected. Any movement or bulging which may occur shall be corrected by the CONTRACTOR at his own expense so as to provide the necessary clearances and dimensions.

3. Where sheeting and bracing is required to support the sides of excavations for structures, the CONTRACTOR shall engage a Professional Geotechnical ENGINEER, registered in the State of North Carolina, to design the sheeting and bracing. The sheeting and bracing installed shall be in conformity with the design, and certification of this shall be provided by the Professional ENGINEER.

4. The installation of sheeting, particularly by driving or vibrating, may cause distress to existing structures. The CONTRACTOR shall evaluate the potential for such distress and, if necessary, take all precautions to prevent distress of existing structures because of sheeting installation.

5. The CONTRACTOR shall leave in place to be embedded in the backfill all sheeting and bracing not shown on the Drawings but which the OWNER may direct him in writing to leave in place at any time during the progress of the work for the purpose of preventing injury to structures, utilities, or property, whether public or private. The OWNER may direct that timber used for sheeting and bracing be cut off at any specified elevation.

6. All sheeting and bracing not left in place shall be carefully removed in such manner as not to endanger the construction or other structures, utilities, or property. All voids left or caused by withdrawal of sheeting shall be immediately refilled with common fill soil by ramming with tools especially adapted to that purpose, or otherwise as may be directed by the OWNER.

7. The right of the OWNER to order sheeting and bracing left in place shall not be construed as creating any obligation on his part to issue such orders, and his failure to exercise his right to do so shall not relieve the CONTRACTOR from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise, growing out of a failure on the part of the CONTRACTOR to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.

8. No wood sheeting is to be withdrawn if driven below mid-diameter of any pipe, and under no circumstances shall any wood sheeting be cut off at a level lower than 1 foot above the top of any pipe.
B. Pumping and Drainage:

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 undisturbed subgrade foundation condition until the fills, 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. The CONTRACTOR shall engage a Geotechnical ENGINEER registered in the State of North Carolina, to design the dewatering systems for all structures. The CONTRACTOR shall submit to the ENGINEER for review a plan for dewatering systems prior to commencing work. The dewatering system installed shall be in conformity with the overall construction plan, and certification of this shall be provided by the Professional ENGINEER. The Professional ENGINEER shall be required to monitor the performance of the dewatering systems during the progress of the work and require such modifications as may be needed to assure that the systems are performing satisfactorily.

2. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation and to preserve the integrity of adjacent structures. Well or sump installations shall be constructed with proper sand filters to prevent drawing of finer grained soil from the surrounding ground.

3. Water entering the excavation from surface runoff shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and pumped from the excavation to maintain a bottom free from standing water.

4. All liquids encountered that have been in contact with waste shall be treated as leachate and disposed of accordingly.

5. The CONTRACTOR shall take all additional precautions to prevent uplift of any structure during construction.

6. The conveying of water in open ditches or trenches will not be allowed. Permission to use any storm sewers, or drains, for water disposal purposes shall be obtained from the authority having jurisdiction. Any requirements and costs for such use shall be the responsibility of the CONTRACTOR. However, the CONTRACTOR shall not cause flooding by overloading or blocking up the flow in the drainage facilities, and he shall leave the facilities unrestricted and as clean as originally found. Any damage to facilities shall be repaired or restored as directed by the OWNER or the authority having jurisdiction, at no cost to the OWNER.
7. Flotation shall be prevented by the CONTRACTOR by maintaining a positive and continuous operation of the dewatering system. The CONTRACTOR shall be fully responsible and liable for all damages which may result from failure of this system.

8. Removal of dewatering equipment shall be accomplished after the system is no longer required; the material and equipment constituting the system shall be removed by the CONTRACTOR.

9. The CONTRACTOR shall take all necessary precautions to preclude the accidental discharge of fuel, oil, etc. in order to prevent adverse effects on groundwater quality.

### 1.08 SITE ACCESS

A. Work shall be performed so as to not block or hinder site access, except as authorized by the OWNER.

### PART 2 - PRODUCTS

#### 2.01 Material

A. PIPE BEDDING AND SOIL BACKFILL

1. For excavations outside the limits of waste, CONTRACTOR shall reuse excavated soils from trenching for backfilling around installed pipe, unless directed otherwise by ENGINEER. Reused soils shall conform to Part 2.01 C and D of this Section.

2. Beyond the reusable quantities of soil described above, the CONTRACTOR shall provide appropriate pipe bedding and soil backfill material from an off-site source.

3. These soils shall generally be free of sticks, roots, organic matter, and stones larger than 1-inch in any dimension.

4. Pipe bedding material shall be appropriate for spreading with hand tools and compaction with vibratory compactor to provide a level and stable surface for pipe placement. Pipe bedding and backfill soils shall be approved by the ENGINEER.

B. INTERMEDIATE COVER/GRADING LAYER

1. Intermediate Cover was previously placed by the OWNER; however, in most areas the thickness is less/more than is required and filling/excavating and grading is needed to achieve the Intermediate Cover lines and grades as identified on the Contract Drawings within the landfill project area top and sideslopes prior to receiving the Final Cover System.
2. The CONTRACTOR shall place fill, compact, grade the Intermediate Cover and shall be graded with the tolerance of 0.1 feet of the indicated cross section thicknesses and slopes. Use of graders or other power equipment will be permitted for final grading and dressing of slopes, provided the result is uniform and equivalent to hand work. The required minimum thickness of Intermediate Cover is 12 inches over the waste within landfill top and sideslopes. The CONTRACTOR will provide the Intermediate cover material in place for the price per the bid.

C. GENERAL FILL

1. General Fill soils shall be well-drained soil material with no MSW, reasonably free of sticks (exceeding 1/4-inch diameter), roots, organic matter, and stones larger than ½-inch in any dimension for General Fill.

2. General Fill soils shall be well-graded sand (SW), silty-clayey sand (SC-SM), SP as classified by the Unified Soil Classification System (USCS), or other soil as approved by the ENGINEER.

3. The CONTRACTOR’S QC Geotechnical Laboratory shall provide results of the following laboratory testing for at least 2 representative samples of General Fill borrow soils to the ENGINEER at least 14 calendar days prior to beginning backfilling operations:

   a. Natural Moisture Content (ASTM D2216)
   b. Standard Proctor Compaction (ASTM D698)
   c. Atterberg Limits (ASTM D4318)
   d. Sieve Analysis (ASTM D422)
   e. Soil Classification (ASTM D2487)
   f. Permeabilities

4. No general fill soil is available on-site. All soil will be required to be brought in from off-site.

D. PROTECTIVE COVER SOIL

1. The 6-inch topsoil material shall be free of sticks and roots larger than one inch in any dimension, MSW, organic matter and stones. The material shall have a maximum organic content of 15 percent.

2. The 18-inch Protective/drainage cover material shall be a medium to coarse grain sand. No on-site material is available for the protective cover soil, so all must be brought in from off-site.

3. The CONTRACTOR’S QC Geotechnical Laboratory shall provide results of the following laboratory testing for at least 2 representative samples of Protective Cover borrow soils to the ENGINEER at least 14 calendar days prior to beginning backfilling operations:
prior to beginning backfilling operations and for every 5,000 cubic yards thereafter:

a. Natural Moisture Content (ASTM D2216)
b. Permeability (ASTM D2434)
c. Standard Proctor Compaction (ASTM D698)
d. Atterberg Limits (ASTM D4318)
e. Sieve Analysis (ASTM D422)
f. Soil Classification (ASTM D2487)

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4. The above gradation may be modified by the ENGINEER if the soil gradation varies from the gradation curve above but still meets the permeability and geotextile requirements.

E. TOPSOIL

1. Topsoil shall be fertile, natural or amended soil, typical of the locality, free from MSW, large stones, roots, sticks, clay, peat, weeds and sod, and obtained from naturally well drained areas.

2. Topsoil shall not be excessively acid or alkaline nor contain toxic material harmful to plant growth. The source of the topsoil shall be approved by the ENGINEER prior to placement by the CONTRACTOR. Topsoil shall be certified as uncontaminated, and the CONTRACTOR shall accept responsibility as such.

3. Upon request by the ENGINEER, the CONTRACTOR submit representative samples for use in sodding and seeding operations and results of analysis by a private laboratory to determine nutrient content.

4. Topsoil is not available onsite. Topsoil must be imported to the site.
F. ROUNDED RIVER ROCK

1. The rock placed in the anchor trenches and around the toe drain pipes shall be quartz or granite-based noncalcareous rounded river rock, washed and free of deleterious material.

2. The gradation shall comply with the requirements for No. 5 or 57 aggregate as specified in the North Carolina Department of Transportation (NDOT), Standard Specifications for Road and Bridge Construction (latest edition), or other materials as approved by the ENGINEER.

<table>
<thead>
<tr>
<th>No. 5 Aggregate</th>
<th>Amount Finer (% by weight)</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1½</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>1</td>
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<td>20-55</td>
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<tr>
<td></td>
<td>1/2</td>
<td>0-10</td>
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<table>
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<th>No. 57 Aggregate</th>
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<th>Size</th>
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<td></td>
<td>No. 8</td>
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</table>
PART 3 - EXECUTION

3.01 TESTING REQUIREMENTS DURING PLACEMENT

A. During placement, materials shall be tested in accordance with Table 02220-1.

**TABLE 02220-1 SOIL QUALIFICATION TESTING**

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>TEST</th>
<th>ASTM NO.</th>
<th>FREQUENCY</th>
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<tbody>
<tr>
<td>General Fill</td>
<td>Natural Moisture Content</td>
<td>ASTM D2216</td>
<td>Upon visual change or change in source</td>
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<tr>
<td></td>
<td>Standard Proctor</td>
<td>ASTM D698</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soil Classification</td>
<td>ASTM D2487</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sieve Analysis</td>
<td>ASTM D422</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Atterberg Limits</td>
<td>ASTM D4318</td>
<td></td>
</tr>
<tr>
<td>Protective Cover Soil</td>
<td>Natural Moisture Content</td>
<td>ASTM D2216</td>
<td>1/5,000 CY</td>
</tr>
<tr>
<td></td>
<td>Standard Proctor</td>
<td>ASTM D698</td>
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<td>Atterberg Limits</td>
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<td></td>
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<tr>
<td>Rock</td>
<td>Sieve Analysis</td>
<td>ASTM D422</td>
<td>1/5,000 CY</td>
</tr>
<tr>
<td>Topsoil</td>
<td>Soil Classification</td>
<td>ASTM D2487</td>
<td>1/5,000 CY</td>
</tr>
</tbody>
</table>

3.02 EROSION AND SEDIMENT CONTROL

A. The CONTRACTOR shall provide erosion and sedimentation control methods in accordance with requirements of authorities having jurisdiction, as specified in the Contract Documents and in Section 02276 Temporary Erosion and Sedimentation Control.

3.03 DEWATERING

A. Water that enters excavations into waste shall be considered leachate and shall not be discharged to the ground or other means that are typical for stormwater. Water that enters trench excavations containing waste shall be pumped into sealed tanks,
and discharged as directed by the ENGINEER and/or OWNER. The CONTRACTOR must notify the OWNER prior to dewatering and allow the OWNER to witness the dewatering and discharge to the leachate sump.

B. The CONTRACTOR shall at all times during construction provide and maintain proper equipment and facilities to remove water entering excavations. CONTRACTOR shall keep such excavations dry so as to obtain a satisfactory foundation condition for all WORK.

C. 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 suitable materials as approved by the ENGINEER at the CONTRACTOR’s expense. The bottom of excavations shall be firm and without standing water before placing structures or pipes. Provide and maintain pumps, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

D. For excavations not in waste, 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.

E. Disposal of Water Removed by Dewatering

1. Water conveyed away from excavations which has not contacted waste materials shall be discharged to areas approved by the ENGINEER.

2. Dispose of water by procedures approved by the ENGINEER in such a manner as to cause no inconvenience to the OWNER, the ENGINEER, or others involved in work about the site.

3. If a pipe trench becomes watered-in after placement of pipe, but before backfilling, CONTRACTOR shall dewater the trench, demonstrate that the pipe bedding and pipe slope remain satisfactory, and upon approval by the ENGINEER, backfill the pipe with clean dry soil in accordance with Part 2.01 of this Section.

3.04 PREPARATION

A. Tilling: The existing intermediate cover shall be tilled to a 3 inch depth in preparation for the liner system. The existing material shall remain in place and will not be stockpiled for later use. Unsuitable material removed shall be hauled to the landfill working face for use by the OWNER as daily cover at no additional cost to the OWNER. Topsoil and vegetation shall not be stockpiled by CONTRACTOR for reuse.
B. Screening: The existing material shall be visually inspected and all roots, rocks, or debris that could damage the liner shall be moved to the working face as directed by the OWNER by the CONTRACTOR.

3.05 GENERAL EXCAVATION

A. The CONTRACTOR is responsible for layout of all excavations and establishment of grades as shown on the Contract Drawings. CONTRACTOR shall replace existing survey markers to original location if disturbed or destroyed at no additional cost to OWNER. Layout WORK shall be performed by a licensed land surveyor registered in the State of North Carolina.

B. The CONTRACTOR shall provide drainage at all times during construction by shaping excavated areas and maintaining ditches and berms. CONTRACTOR will protect graded areas against action of elements and re-establish grades where settlement, washouts, or erosion damage occurs. Damaged areas shall be repaired at no additional cost to the OWNER.

C. When excavation has reached prescribed depths, the ENGINEER shall be notified that an inspection of the excavation may be performed.

D. If the bottom of any excavation is removed below the limits shown on the Contract Drawings or as directed by the ENGINEER, it shall be backfilled with ENGINEER approved materials at no additional cost to the OWNER.

E. The CONTRACTOR shall not leave any excavations, boreholes, or trenches open at the completion of WORK each day unless proper protection is provided. All open holes shall be backfilled flush with existing grade or covered, at the ENGINEER’S direction, with acceptable materials prior to leaving the site.

F. Exposed waste, or soil containing waste materials, shall not be allowed to remain exposed overnight. At the end of each work day, the CONTRACTOR shall cover exposed waste in a temporary or permanent manner by the means of an earthen cover or suitable tarp. Site clearing shall be coordinated with other WORK to minimize exposed waste. At no time shall water exposed to waste be allowed to enter the stormwater management system. Water exposed to waste shall be considered leachate and handled accordingly.

G. All excavations shall conform to the Safety Procedures submitted under Section 02215 of these specifications.

3.06 GRADING

A. Grading in preparation for geomembrane placement shall be performed to the lines, grades, and elevations shown on the Contract Drawings or as directed by the ENGINEER. Smooth finish surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated or between such points and existing grades.
B. The ENGINEER reserves the right to make adjustments or revisions in lines or grades as the WORK progresses while still achieving the intent of the grading plan.

C. By survey methods, verify that all grades, slopes and elevations conform to specified requirements. Record elevations of each component in accordance with Section 01050 - Field Engineering and Survey. If there is a discrepancy, immediately notify the ENGINEER. Do not proceed with installation in an area of discrepancy until the ENGINEER gives approval.

3.07 DISPOSAL OF WASTE MATERIALS

A. Excavated material from the existing Intermediate Cover that does not contain waste or other objectionable material, as determined by the ENGINEER, shall be reused and incorporated into the project as the Intermediate Cover Soil Layer/Grading Layer. Excavated material from the existing Intermediate Cover which contains waste shall be disposed of at the active landfill working face during regular business hours per the cost in the bid. Soil removed to expose the existing liner systems shall be reused, if the material is acceptable, to provide cover over the same areas once the liner systems have been properly installed. Excess soil from this operation can be stockpiled near the construction trailers as directed by the OWNER for use in finishing the intermediate cover grading.

B. Excavated waste shall be graded into the Cells 2-6 closure areas to the extent possible in order to obtain the lines and grades as required. Excess waste not incorporated into the project shall be disposed of at the active landfill working face during regular business hours per the cost in the bid. Exposed waste shall be covered at the end of each working day. The OWNER or CQA REPRESENTATIVE will interpret the classification of materials encountered as to what is waste and what is soil.

C. The CONTRACTOR shall be responsible for loading and transporting waste and waste materials not incorporated into the project to the active landfill working face or other area as directed by the OWNER for disposal. The OWNER will not charge the CONTRACTOR a tipping fee. At no time shall excavated waste or waste material be stockpiled adjacent to the excavations after normal working hours.

3.08 STOCKPILE OF MATERIALS

A. Excavated material shall be transported to stockpile areas designated by the OWNER for surplus or unsuitable materials. No materials shall be removed from the site or disposed of by the CONTRACTOR except as directed by the ENGINEER. Excavated materials may be segregated during excavation and the ENGINEER or CQA REPRESENTATIVE shall direct locations for segregated materials. The ENGINEER or CQA REPRESENTATIVE shall identify materials that require segregated stockpiling.
B. The CONTRACTOR shall be responsible for vehicle traffic safety and shall coordinate with the ENGINEER to determine site-specific safety concerns.

C. CONTRACTOR shall coordinate disposal activities with the OWNER to not interfere with on-going landfill operations activities. Materials shall be placed at the designated disposal site, within the limits and to the fill heights as directed by the OWNER.

D. The CONTRACTOR shall sweep or wash paved roadways that become covered with soil. The CONTRACTOR shall provide all equipment, water, and personnel necessary to clear the paved roads. This activity shall be performed at a minimum of once per week or as the CQA REPRESENTATIVE directs.

3.09 PLACEMENT OF INTERMEDIATE COVER/GRADING LAYER

A. Intermediate Cover was previously placed by the OWNER; however, in some areas the thickness is less than is required and filling and grading is needed to achieve the minimum 12 inches of depth and grades as identified on the Contract Drawings within the landfill project area top and sideslopes prior to receiving the Final Cover System.

B. For areas with less than the required minimum thickness of the Intermediate Cover Soil Layer/Grading Layer (12 inches measured perpendicular to the slope) the Contractor shall obtain General Fill from an off-site borrow pit as specified herein. Material shall be placed and compacted in maximum 12 inch lifts. A minimum of 12 inches of placed and compacted material is required.

C. Remove materials that cannot be made to compact readily and replace with General Fill as described in Part 2.01.C of this Section or suitable materials as approved by the ENGINEER. Soil materials excessively wet or dry are considered unsuitable soils.

D. Intermediate Cover soils which yield or exhibit pumping or leachate seeps due to excessive moisture, shall be brought to the attention of the CQA REPRESENTATIVE and the CONTRACTOR shall perform the following:

1. Excavate and remove the unsuitable material or underlying waste for a minimum of 12 inches. Soil materials that are excessively wet shall be considered unsuitable. Backfill with General Fill as described in Part 2.01.C of this Section or suitable materials as approved by the ENGINEER.

2. Should the CQA REPRESENTATIVE, OWNER or ENGINEER determine that a leachate seep is present the CONTRACTOR will excavate a 4’ wide 12’ deep Leachate Seep Trench and backfill with a Course Grained Sand. The Coarse Grained Sand shall meet the
requirements of Protective Cover as defined Part 2.01.D. See Part 3.12 for details.

E. The vertical extent of the unsuitable soil excavated and replaced is to be field verified by the CONTRACTOR.

F. The surface of the Intermediate Cover grade of the landfill area to receive the Final Cover System shall be approved by the ENGINEER. The CQA REPRESENTATIVE or the ENGINEER shall be present to observe Intermediate Cover grade preparation.

G. The surface of the Intermediate Cover shall be free of sticks, roots, organic matter, and stones.

H. Placement of Final Cover System materials on the completed Intermediate Cover shall not begin until the Certification of Subbase Acceptance has been completed. Refer to Part 1.05.G.1 of this Section.

3.10 PLACEMENT OF PROTECTIVE COVER SOIL AND TOPSOIL

A. The CONTRACTOR shall place a minimum of 18 inches of Protective Cover Soil material (measured perpendicular to the slope) meeting the requirements specified in Part 2.01.D of this Section. The cover material shall be placed starting from the bottom of the slope and moving up grade.

B. The CONTRACTOR shall place a minimum of 6 inches of Topsoil material (measured perpendicular to the slope) meeting the requirements specified in Part 2.01.E of this Section.

C. Low ground pressure equipment shall be used to place and spread the Protective Cover Soil and Topsoil materials. The CONTRACTOR shall use extreme care when working above the geosynthetic liner system. A minimum of 18 inches of soil shall be between the low ground pressure equipment and the geocomposite and geomembrane at all times. Any damage to the geocomposite or geomembrane shall be repaired by the CONTRACTOR at no additional cost to OWNER.

D. Place Protective Cover Soil and Topsoil in a manner to not cause wrinkles and undue stresses to the underlying geocomposite and geomembrane.

E. Maintain proper drainage during grading operations until final acceptance. Repair any fill or grading materials which may be lost or displaced as a result of natural causes such as storms, squalls, etc., with acceptable material. Repair shall be performed at no additional cost to the OWNER. The additional survey or documentation necessary to conduct the repairs shall be at no additional cost to the OWNER.
F. The compaction effort achieved from placing, spreading and grading the Final Cover Soil (Protective Cover Soil and Topsoil) over the geocomposite and geomembrane conducted in accordance with the requirements of this Section shall be compacted to 95% of the standard proctor in accordance with the ASTM D2434.

G. The CONTRACTOR shall maintain the liner system and all other surfaces free of ruts, depressions and damage resulting from the hauling and handling of any material, equipment, tools, etc.

H. Refer to Section 02930-Sodding and Section 02932 Seeding and Mulching.

3.11 PLACEMENT OF ROCK

A. Place fill materials, with geotextile wrap to the lines and grades shown on the Contract Drawings.

3.12 LEACHATE SEEP TRENCH

A. The CONTRACTOR shall stake the ends of the Leachate Seep Trench and get the approval of the ENGINEER or OWNER prior to starting the excavation.

B. CONTRACTOR shall notify the ENGINEER prior to beginning construction of the leachate seep trench. The ENGINEER or CQA REPRESENTATIVE shall confirm depth and width of all seep trenches prior to the start of backfilling.

C. Backfill material shall meet the requirements of Protective Cover, see Part 2.01.D.

D. The Leachate Seep Trench will be 4’ wide and 12’ deep and shall extend for a length as required to properly manage the leachate seep.

3.13 PLACEMENT OF PIPE BACKFILL

A. CONTRACTOR shall notify the ENGINEER prior to beginning pipe backfilling. The ENGINEER shall inspect all pipe, fittings and connections prior to approving backfilling. If CONTRACTOR backfills pipe without inspection of the pipe while pipe is installed in the open trench, CONTRACTOR shall uncover all uninspected buried pipe so that it may be properly inspected. This shall be done at no additional cost to the OWNER or ENGINEER.

B. Bedding material shall be placed in the trench ensuring material is placed under the haunch of the pipe. The bedding shall be poured into place, not pushed, and shall be raked by hand and then compacted, using a mechanical compaction device such as walk-behind vibratory compactor, in a loose lift not to exceed 6 inches above the top of the pipe.
C. Backfilling procedures shall be modified as necessary as approved by the ENGINEER in order to not displace (either horizontally or vertically) piping installed in the trench during backfill or bedding placement.

D. Place soil backfill in maximum 6 inch lifts above pipe bedding to the existing grade. CONTRACTOR shall compact soil backfill in 6 inch lifts with a mechanical compaction device such as a walk-behind vibratory compactor. Compaction shall be to a density where subsequent passes with the mechanical compaction device will not reduce the surface elevation of the bedding material by more than three-quarters of an inch.

E. Foundations for structures including concrete stormwater drainage discharge structures, grout filled fabric formed revetment, etc. shall include a minimum of 12 inches of bedding gravel to extend a minimum of 12 inches beyond the footprint of the structure.

3.14 SODDING/REVEGETATION

A. Sodding shall be required on the whole project area. Anywhere the CONTRACTOR’S operations have disturbed existing grassed areas, regardless of the approximate limits that may be indicated on the Contract Drawings the contractor will sod at no cost to the OWNER. Refer to Section 02930-Sodding.

B. Topsoil and sod shall be required in all other areas and at the CONTRACTOR’S construction staging/laydown area or where the CONTRACTOR’S operations has disturbed existing grassed areas, regardless of the approximate limits that may be indicated on the Contract Drawings. At the request of or written approval of the OWNER, Topsoil, Seeding and Mulching may be substituted in some areas. Refer to Section 02920-Topsoil and Section 02932-Seeding and Mulching.

C. CONTRACTOR shall maintain the seeded and sodded areas in accordance with Section 02930-Sodding and Section 02932 Seeding and Mulching.

3.15 PROTECTION OF WORK

A. The CONTRACTOR shall protect all finished earthwork at the end of the working day and over the weekend from damages from moisture loss, hot weather, inclement weather and stormwater erosion. The CONTRACTOR shall repair all damages on the prepared Intermediate Cover and the Final Cover System layers at his own expense.

3.16 TOLERANCES

The CONTRACTOR shall bring final grading to within the tolerances specified in Section 01050 Field Engineering and Survey.

END OF SECTION
SECTION 02221
WASTE HANDLING, STORAGE, AND DISPOSAL

PART 1 - GENERAL

1.01 NOTIFICATION

A. The CONTRACTOR shall notify the COUNTY 24-hours in advance of planned excavation of landfill waste.

B. No excavated materials shall be removed from the site or disposed of by the CONTRACTOR except as specified below and approved by the COUNTY.

C. The words refuse and waste are used interchangeably.

PART 2 – PRODUCTS

2.01 REQUIREMENT

A. The CONTRACTOR will be required to uncover the waste that is to be removed and survey the area prior to excavation. After the waste has been excavated the CONTRACTOR will survey the area again prior to the placement of any covering material. Waste must be covered at the end of each working day. The CONTRACTOR will submit those surveys and the associated volume calculations to support their application for payment. See Section 01050 Field Engineering and Survey for survey requirements.

B. The volume for payment will be the cubic yard difference between the pre-excavation survey and the post-excavation survey as calculated by AutoCAD.

C. The post-excavation survey will be compared with the top of intermediate cover design surface and over excavation will not be reimbursed.

D. In the event that waste is excavated and cannot be immediately taken to the working face, the waste may be stored adjacent to the excavation until it can be taken to the working face before the end of the same working day, unless rain is forecast in the day, in which case the waste must be immediately taken to the working face to avoid production of leachate due to rainfall on the waste. Waste shall remain within close proximity to the location from which it was removed and within the edge of the landfill bottom liner system where it turns down to slope into the cell. All waste must be removed from all locations at the end of each working day.

E. The CONTRACTOR is responsible for cleanup and handling for any leachate due to rainfall on the waste uncovered by their activities that leaves the lined area of the landfill.
F. The CONTRACTOR shall include all costs for the survey and all other costs associated for loading, hauling, and dumping the waste at the working face in the Waste Removal and Relocation bid item.

G. The CONTRACTOR is responsible for the proper disposal and all other costs associated for loading, hauling, and dumping the waste at the working face for any over excavation of the waste and shall do so at no additional cost to OWNER.

PART 3 - EXECUTION (NOT USED)

END OF SECTION
SECTION 02272

GROUT FILLED FABRIC REVETMENTS (GFFR)

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: The WORK consists of providing drainage protection for the project through the use of a grout filled fabric revetment (GFFR). The GFFR shall consist of a fabric envelope in a mat configuration filled with a pumpable sand/cement grout in such a way as to form a stable mat of suitable weight and configuration. Surfaces to be protected shall be prepared and graded to such an extent that they are normally stable in the absence of erosive forces.

1.02 QUALITY ASSURANCE

A. Standards: American Society of Testing and Materials:
   1. C-31 Making and Curing Concrete Test Specimens in the Field.
   2. C-39 Tests for Compressive Strength of Cylindrical Concrete Specimens.

B. Furnish records of past successful experience in performing this type of WORK. The CONTRACTOR shall hold the OWNER harmless from liability of any kind arising from the use of any patented or unpatented invention in the performance of this WORK.


1.03 SUBMITTALS

A. Shop drawings and manufacturer's literature: CONTRACTOR shall submit the following to the ENGINEER for approval prior to installation:
   1. Installation procedures including proposed method and sequence of operations, areas of placement, and details including typical cross sections, seaming and anchoring methods.
   2. List of prior installation history.
5. Design mix and design mix test cylinder reports.

### 1.04 DELIVERY, HANDLING AND STORAGE

A. Fabric forms shall be delivered to the job site and stacked in a manner that assures ease of unloading. When fabric forms are delivered to the site, they should be kept dry and remain wrapped so that they are protected from the elements during storage and handling. If stored outdoors, they should be elevated and protected with a waterproof cover that is opaque to ultraviolet light. Care should be taken not to damage the fabric forms during unloading, storage, and handling.

### PART 2 - PRODUCTS

A. Grout: Pumpable mixture of Portland cement, fine aggregate and water with a minimum 28 day compressive strength of 2,000 psi when testing in accordance with ASTM C-31 and ASTM C-39. Pozzolan and/or grout fluidizer may be used as an admixture per the recommendations of the fabric manufacturer.

B. Fabric: 8-inch filter point mat

1. Fabric description:
   a. Material: Polyester, nylon and/or polypropylene.
   b. Warp: Top and bottom, 15 ends per inch (min.).
   c. Fill: Top and bottom, 14 picks per inch (min.).
   d. Approximate Weight: 8 ounces per square yard.

2. Fabric test data requirements:
   a. Tensile strength, warp and fill: Minimum 160 pounds per inch, ASTM D-4632.
   b. Porosity: Minimum 100 cubic feet per minute, ASTM D-737.

3. Fabric design:
   a. Grout-filled mattresses are comprised of a double layer of strong synthetic fabric, typically woven nylon or polyester, sewn into a series of pillow-shaped compartments that are connected internally by ducts.
   b. Individual mill width panels shall be sewn together edge to edge. Each layer shall be sewn separately. Tensile strength of the seams shall be a minimum of 100 pounds per inch.
PART 3 - EXECUTION

3.01 INSPECTION

A. Fabric shall not be placed until earth berms are constructed and the berm surface conforms to fabric manufacturer's recommendations.

3.02 INSTALLATION

A. Areas on which GFFR is to be placed shall be constructed to the lines, grades, contours, and dimensions shown on the Contract Drawings.

B. All obstructions such as roots, projecting stones, etc. shall be removed. Where such areas are below the allowable grades, they shall be brought to grade by placing compacted layers of General Fill. All fill and in place materials shall be compacted per Section 02220. Where required by the Contract Documents, soft and otherwise unsuitable subgrade soils shall be identified, excavated, and replaced with suitable clean sandy soil.

C. Excavation and preparation of aprons as well as anchor, terminal, or toe trenches shall be done in accordance with the lines, grades, contours, and dimensions shown on the Contract Drawings. Immediately prior to placing the fabric forms, the ENGINEER will inspect the prepared area and no forms shall be placed until the area has been approved.

D. Grout stops shall be installed parallel to the mill width at predetermined intervals to regulate the flow of fluid mortar.

E. Fabric is to be continuous. Provide field sewn joints as necessary in accordance with fabric manufacturer's recommendations. Lap joints shall be overlapped minimum of two feet, simple butt joints are not acceptable.

F. If panels are rectangular and of uniform dimensions, they may be joined by means of factory-installed zippers.

G. Place grout between fabric layers in accordance with manufacturer's recommendations. Grout shall be introduced into fabric from the top of berm. Final thickness of the grout filled fabric shall average approximately 4 inches. Weight shall be approximately 50 lbs/sq foot.

H. Backfill and compact anchor trench.
3.03 FIELD QUALITY CONTROL

A. Grout mix design: Grout mix shall be designed in accordance with fabric manufacturer's standards. Four test cylinders of design mix shall be made and tested at 28 days in conformance with ASTM C-31 and ASTM C-39. Minimum allowable 28-day compressive strength shall be 2,000 psi for all four cylinders.

B. Grout in fabric testing: Six inch diameter sleeves of the same fabric as used in the field installation shall be provided by the fabric manufacturer. The design grout mix shall be injected into these sleeves and held at a pressure of not less than 10 psig nor more than 15 psig for a period of ten (10) minutes. At the same time, three (3) test cylinders of grout shall be made. After curing, the fabric sleeved specimens shall be cut into 12-inch long cylinders. Three (3) test cylinders of each type shall be tested cylinders and testing shall conform to ASTM C-31 and ASTM C-39. The results of this testing shall be:

1. Plain test cylinders shall have a minimum 28-day compressive strength of 2,000 psi for each cylinder.

2. Test cylinders made from fabric sleeved samples shall have a minimum 28-day compressive strength of 2,500 psi for each cylinder.

3. The average 28-day compressive strength of the three fabric sleeved cylinders shall be a minimum of 20 percent higher than the average 28-day compressive strength of the plain test cylinders.

3.04 CLEANING

A. Following grout injection, prior to the grout taking its initial set, all excess grout and spillage shall be cleaned up by hand to present a neat final appearance. The use of water in this cleaning is absolutely prohibited.

END OF SECTION
SECTION 02276

TEMPORARY EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

A. The WORK specified in this Section shall include installing and maintaining erosion and sedimentation controls as necessary or as indicated in this section for proper execution of WORK. All erosion controls shall be installed and approved by the ENGINEER prior to beginning WORK. All existing and foreseeable conditions that affect the WORK both inside and outside the limits of construction shall be CONTRACTOR’s responsibility.

B. Temporary erosion controls include, but are not limited to:

1. Grassing, mulching, netting, seeding and watering on-site surfaces and soil and borrow area surfaces, providing interceptor ditches at those locations which will ensure erosion during construction will be either eliminated or maintained within acceptable limits as established by the regulatory agencies having jurisdiction.

C. Temporary sedimentation controls include, but are not limited to:

1. Silt dams, traps, barriers, and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the regulatory agencies having jurisdiction.

D. CONTRACTOR is responsible for providing effective temporary erosion and sediment control measures during execution of WORK or until final controls become effective or until the WORK is accepted by the ENGINEER. CONTRACTOR may, with ENGINEER’s approval, perform WORK outside the limits of construction to establish, maintain, or enhance erosion control systems.

E. The project may require relocation or removal of limited amounts of solid waste for grading the sideslopes and top slope of the partial closure area. Note that exposure to landfill leachate and landfill gases are a possibility during excavation of solid waste. Any solid waste that is relocated must be placed within the active landfill filling area within the limits of the bottom liner system so that any water that contacts solid waste will be collected as leachate and not routed through the stormwater management system. Leachate shall be collected through the leachate collection systems or shall be removed to the existing leachate impoundments.
F. At no time will stormwater runoff within the limits of construction be allowed to discharge to the stormwater system or offsite without proper water quality treatment. CONTRACTOR shall plan construction activities to assure that the discharge of leachate or contaminated stormwater outside the liner and leachate collection system does not occur.

G. CONTRACTOR shall be solely responsible for all costs (including investigation, sampling, testing, analysis engineering, and remedial construction) related to the discharge of leachate or contaminated stormwater outside the liner and leachate collection system resulting from ineffective control of leachate or stormwater discharge by CONTRACTOR.

H. CONTRACTOR shall install additional erosion and sedimentation control measures deemed necessary by the ENGINEER as a result of variations in the CONTRACTOR’s operations, or shall repair existing system as directed by the ENGINEER. Additional controls or repairs shall be installed at no additional cost to the OWNER.

I. All erosion and siltation control devices shall be checked regularly by the CONTRACTOR, especially after each rainfall event and will be cleaned out and/or repaired as required by the ENGINEER.

J. Submittal

1. Submit to the ENGINEER for review prior to the start of construction, the erosion control procedures to be utilized for this project prior to construction. This shall be submitted in the form of a shop drawing titled “Erosion Control Plan”, and shall address all items in this section.

1.02 REFERENCE DOCUMENTS


PART 2 - PRODUCTS

2.01 EROSION CONTROL

A. Netting - fabricated material acceptable to the OWNER and the ENGINEER.

2.02 SEDIMENTATION CONTROL

A. Bales - clean, seed-free cereal hay type.

B. Netting - fabricated material acceptable to the OWNER and the ENGINEER.

C. Filter stone - crushed stone conforming to North Carolina Department of Transportation (NCDOT) specifications.
D. Concrete block - hollow, non-load-bearing type.

E. Concrete exterior grade, Class B.

PART 3 - EXECUTION

3.01 EROSION CONTROL

A. Minimum procedures for grassing are:

1. Scarify slopes to a depth of not less than six inches and remove large clods, rock, stumps, and roots larger than 1/2-inch in diameter and debris.

2. Sow seed within 24 hours after the ground is scarified with either mechanical seed drills or rotary hand seeders.

3. Apply mulch loosely and to a thickness of between 3/4-inch and 1-1/2 inches.

4. Apply netting over mulched areas on sloped surfaces.

5. Roll and water seeded areas in a manner which will encourage sprouting of seeds and growing of grass. Reseed areas which exhibit unsatisfactory growth. Backfill and seed eroded areas.

3.02 SEDIMENTATION CONTROL

A. Install and maintain silt dams, traps, barriers, and appurtenances as necessary to prevent the movement of soils and any contaminated water from leaving the Project. Hay bales which deteriorate and filter stone which is dislodged shall be replaced at the CONTRACTOR’s expense.

B. Silt fencing will be established along the toe of the slope within the partial closure area. Drainage structures will be protected to prevent sediment intrusion.

3.03 PERFORMANCE

A. Should any of the temporary erosion and sediment control measures employed by the CONTRACTOR fail to produce results which comply with the requirements of the local regulatory authorities, the CONTRACTOR shall immediately take whatever steps are necessary to correct the deficiency at his own expense.

B. During construction, any stripped or bare areas are to be covered immediately by mulch products or by sod or seed and mulch with temporary or permanent vegetation.

C. All swales, ditches, channels, retention ponds and detention areas are to be sodded or seeded as required as soon as possible.

END OF SECTION
SECTION 02371

RIPRAP

PART 1 GENERAL

1.01 SUMMARY

A. The WORK specified in this section consists of supplying and installing riprap material as shown on the plans and in the specifications.

1.02 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Riprap:
   2. Basis of Payment: Includes supply and placing riprap.

1.03 QUALITY ASSURANCE

A. Furnish each aggregate material from single source throughout the WORK.
B. Perform WORK in accordance with North Carolina Department of Transportation Standard Specifications.

PART 2 PRODUCTS

2.01 MATERIALS

A. Furnish materials in accordance with North Carolina Department of Transportation Standard Specifications for Class B Riprap.
B. Riprap: Limestone or clean broken concrete; solid and nonfriable with rough and angular surfaces. Use broken stone or broken concrete meeting the following gradation and thickness requirements:

   TABLE 02371-1. PROPERTIES OF RIPRAP

<table>
<thead>
<tr>
<th>Weight Maximum (pounds)</th>
<th>Weight 50% (pounds)</th>
<th>Weight Minimum (pounds)</th>
<th>Minimum Thickness (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>30</td>
<td>15¹</td>
<td>2</td>
</tr>
</tbody>
</table>

Note 1 15-pound minimum is typical to size/weight relationship for a 5-inch stone.

C. Geotextile Fabric: Non-biodegradable, woven.
PART 3 EXECUTION

3.01 EXAMINATION
   A. Verification of existing conditions before starting WORK.

3.02 PLACEMENT
   A. Place geotextile fabric over substrate, lap edges and ends.
   B. Place riprap in channels, at pipe ends, and as indicated on Drawings.
   C. Installed Thickness: As indicated on Drawings.

END OF SECTION
SECTION 02550

GEOTEXTILE

PART 1 - GENERAL

1.01 SUMMARY

A. The WORK specified in this section includes the manufacture, testing, and installation of non-woven geotextile for the Leachate Collection and Removal System and woven geotextile for the gravel access road as shown on the drawings and as specified herein. This Section does not include requirements for geotextile bonded to geocomposite which is contained in Section 02562 and 02563.

1.02 SUBMITTALS

A. Submit MANUFACTURER’s prequalification, test reports and data, specifications, installation instructions, roll dimensions, and geotextile approval form.

B. Submit copies of evaluation reports provided by the manufacturer demonstrating that properties for the materials comply with specification requirements.

C. ENGINEER’s approval shall be obtained prior to the use of any materials in the project.

PART 2 PRODUCTS

2.01 WOVEN GEOTEXTILE

A. A woven geotextile fabric shall be furnished and installed on the compacted existing soil prior to placement of 6-inch gravel at the new gravel access road.

B. Material shall be an 8-oz woven geotextile as manufactured by Tencate Mirafi HP 570, or ENGINEER approved substitution conforming to the following minimum properties:

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>SPECIFICATION</th>
<th>TEST METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparent Opening Size</td>
<td>0.6 mm</td>
<td>ASTM D4751</td>
</tr>
<tr>
<td>Flow Rate</td>
<td>30 gal/min/ft²</td>
<td>ASTM D4491</td>
</tr>
<tr>
<td>Permeability</td>
<td>0.05 cm/sec</td>
<td>ASTM D4491</td>
</tr>
<tr>
<td>Permittivity</td>
<td>0.40 sec⁻¹</td>
<td>ASTM D4491</td>
</tr>
<tr>
<td>Tensile Strength (at ultimate)</td>
<td>4800 lbs/ft(MD) 4800 lbs/ft(CD)</td>
<td>ASTM D4595</td>
</tr>
<tr>
<td>Tensile Strength (at 2% strain)</td>
<td>960 lbs/ft(MD) 1320 lbs/ft(CD)</td>
<td>ASTM D4595</td>
</tr>
<tr>
<td>Tensile Strength (at 5% strain)</td>
<td>2400 lbs/ft(MD) 2700 lbs/ft(CD)</td>
<td>ASTM D4595</td>
</tr>
<tr>
<td>Tensile Strength (at 10% strain)</td>
<td>4800 lbs/ft(MD) 4800 lbs/ft(CD)</td>
<td>ASTM D4595</td>
</tr>
</tbody>
</table>
2.02 NON WOVEN GEOTEXTILE

A. A non woven geotextile fabric shall be furnished for the leachate collection and removal system and for the toe drains.

B. Material shall be 8-oz non woven geotextile as manufactured by Carthage Mills FX-80HSE or ENGINEER approved substitution conforming to the following minimum properties:

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>SPECIFICATION</th>
<th>TEST METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grab Tensile Strength</td>
<td>220 lbs</td>
<td>ASTM D 4632</td>
</tr>
<tr>
<td>Grab Tensile Elongation</td>
<td>50%</td>
<td>ASTM D 4632</td>
</tr>
<tr>
<td>Trapezoidal Tear</td>
<td>90 lbs</td>
<td>ASTM D 4533</td>
</tr>
<tr>
<td>CBR Puncture</td>
<td>575 lbs</td>
<td>ASTM D 6241</td>
</tr>
<tr>
<td>UV Resistance</td>
<td>70% @ 500 hrs</td>
<td>ASTM D 4355</td>
</tr>
<tr>
<td>Permittivity</td>
<td>1.26 sec⁻¹</td>
<td>ASTM D 4491</td>
</tr>
<tr>
<td>Water Flow Rate</td>
<td>100 g/min/ft²</td>
<td>ASTM D 4491</td>
</tr>
<tr>
<td>Permeability</td>
<td>0.25 cm/sec</td>
<td>ASTM D 4491</td>
</tr>
<tr>
<td>Apparent Opening Size (AOS)</td>
<td>80 US Std. Sieve</td>
<td>ASTM D 4751</td>
</tr>
<tr>
<td>Mass Per Unit Area (Minimum)</td>
<td>8.0 oz/yd²</td>
<td>ASTM D 5261</td>
</tr>
<tr>
<td>Thickness (Typical)</td>
<td>90 mils</td>
<td>ASTM D 5199</td>
</tr>
</tbody>
</table>

PART 3 EXECUTION

3.01 SHIPPING AND HANDLING

A. The MANUFACTURER typically assumes responsibility for initial loading and shipping of geotextiles. Unloading, on-site handling, and storage shall be the responsibility of the CONTRACTOR.

B. A visual inspection of each roll should be made as it is unloaded to identify if any packaging has been damaged. Rolls with damaged packaging should be repaired prior to being placed in storage.

C. The CONTRACTOR shall contact the MANUFACTURER prior to shipment to ascertain the appropriateness of the proposed unloading methods and equipment to be utilized.

D. The CONTRACTOR assumes all liability with regards to shipping, transport and unloading of the geotextiles required to complete the WORK. The OWNER shall not be responsible for damaged, lost or mis-stocked shipments, or mishandled or damaged materials.

E. CONTRACTOR shall submit to ENGINEER the manufacturer’s quality control test results for the geotextile produced specifically for the project and certification.
that the material meets the requirements of this Specification at least 15 days prior to the installation of the material.

### 3.02 PROTECTION AND STORAGE

**A.** Each roll of material shall have a MANUFACTURER’S identification label. Each roll shall be labeled to provide product identification adequate for inventory and quality control purposes. The label shall provide as a minimum the MANUFACTURER’S name, product identification, lot number, roll number, and roll dimensions. Rolls shall be labeled as per ASTM D4873 Standard Guide for Identification, Storage and Handling of Geosynthetic Rolls and Samples.

**B.** Materials shall be shipped and stored in rolls furnished at the manufacturing facility to prevent exposure of the geotextile to ultraviolet light, precipitation, moisture, mud, dirt, dust, puncture or other damaging conditions.

**C.** Rolls of geotextile should not be stacked upon one another to the extent that deformation of the core occurs. Outdoor storage shall not exceed 6 months.

**D.** Storage of the geotextile rolls shall be the responsibility of the CONTRACTOR. A dedicated storage area shall be selected at the site that is away from high traffic areas and is level, dry and well-drained.

**E.** Rolls should be stored in a manner that prevents sliding or rolling from the stacks. This may be accomplished by the use of chock blocks or by use of the dunnage shipped between rolls. Rolls should be stacked at a height no greater than the lifting apparatus can be safely handled (typically no higher than four rolls).

**F.** All stored geotextile must be covered with a plastic sheet or tarpaulin until their installation. Covering shall protect the geotextile from ultraviolet light exposure, precipitation, mud, dirt, puncture, cutting or any other damaging or deleterious conditions.

**G.** Geotextiles shall not be exposed to sunlight for more than 15 days unless otherwise specified and guaranteed by the geotextile MANUFACTURER.

### 3.03 INSTALLATION

**A.** Geotextiles shall be installed in accordance with the MANUFACTURER’S recommendations. No equipment shall be allowed to operate on the geotextile and any tears or damage to the geotextile shall be repaired prior to placement. The surface of the geotextile shall be kept relatively clean and free of debris during installation.

**B.** Geotextile shall not be placed in a trench that is excessively wet or has standing water.

**C.** Geotextile shall be placed in anchor trenches as shown in the Contract Drawings.
D. Geotextile sheets shall be joined in accordance with the MANUFACTURER’s recommendations.

E. The CONTRACTOR shall place all cover materials in such a manner to prevent damage to the materials, slippage of the underlying layers and excessive tensile stresses in the materials.

3.04 REPAIRS

A. Geotextile damaged during placement shall be replaced or repaired at the CONTRACTOR’s expense in accordance with MANUFACTURER’s recommendation. Repairs shall be performed in the presence of the CQA CONSULTANT. The CONTRACTOR shall be responsible for the documentation of repairs describing location and type of repair. Repair documentation shall be submitted to the ENGINEER.

3.05 GEOTEXTILE EXPOSURE FOLLOWING PLACEMENT

A. Exposure of geotextiles to the elements between the time the geotextile is placed to the time backfilling operations are complete shall be limited to a maximum of 15 days to minimize ultraviolet damage unless the MANUFACTURER specifies a shorter timeline otherwise recommended. Any geotextile exposed to sunlight for more than 15 days shall be removed and replaced with new material at the CONTRACTOR’s expense.

END OF SECTION
PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. The WORK specified in this Section includes the manufacture, fabrication, testing, and installation of geocomposite (i.e., composite geonet). The Contract Drawings call for a geocomposite, which is a three-layer material, comprised of an inner core of high density polyethylene (HDPE) geonet between an upper and lower layer of non-woven geotextile. The geotextile is thermally fused to both sides of the geonet.

B. All testing specified in this section is quality control (QC) testing and is the CONTRACTOR's responsibility and all costs shall be included in the Bid Price. The OWNER is responsible for the Quality Assurance (QA) testing described in the approved CQA Plan.

1.02 MANUFACTURER’S QUALIFICATIONS

A. Single Source: All products or components of the product, used for construction shall be obtained from a single manufacturer. Fusion of the geonet and geotextile, for each product, shall be completed by a single manufacturer.

1.03 CONSTRUCTION QUALITY CONTROL/QUALITY ASSURANCE

A. Construction Quality Control (CQC) shall be performed by the geocomposite INSTALLER. The INSTALLER’s responsibilities shall include, but not be limited to:

1. Supervise all geocomposite installation activities.

2. Perform and document quality control testing as specified herein.

3. Certify geocomposite materials and installation as meeting requirements of the Contract Documents.

B. Construction Quality Assurance (CQA) will be performed by a designated CQA CONSULTANT and QA TESTING LABORATORY retained by the OWNER.

C. The CQA CONSULTANT or OWNER’s REPRESENTATIVE shall obtain samples and perform conformance testing of the geocomposite as indicated in section 3.02.C of this Section.
D. The CQA CONSULTANT, or his CQA REPRESENTATIVE, shall observe and inspect the geocomposite installation activities.

E. The CQA CONSULTANT shall submit a final report, signed and sealed by a professional engineer licensed in the State of North Carolina, certifying the test results.

F. Based upon review of the CQC and CQA final reports, the CQA CONSULTANT will provide certification to the regulatory agencies that the geocomposite was installed in accordance with the Contract Documents.

G. The CONTRACTOR shall schedule work to provide sufficient time as required to complete CQC and CQA field testing and documentation prior to placing any overlying layers above the geocomposite and shall keep the CQA CONSULTANT’s QA TESTING LABORATORY informed of the construction progress to provide sufficient time for laboratory testing.

1.04 SUBMITTALS

A. Data showing manufacturer has a minimum of 5,000,000 ft² of experience.

B. Product Information: Submit the following information for each product 14 calendar days prior to installation, to the ENGINEER for approval:

1. Prequalification: Submit independent laboratory test results demonstrating compliance with the material properties listed in Table 02562-1, Table 02562-2, and Table 02562-3. 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. Transmissivity: Submit MANUFACTURER’s test data that indicates transmissivity values shown in Table 02562-3 can be met at 100 hours of testing, along with the 100 hour conformance test as indicated in section 3.02 of this Section.

3. Roll Layout Drawings: Submit at a minimum, 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, temporary anchorage, anchor trenches, and other terminations.

4. Protection from Wind and Weather: Submit methodology to protect each product from wind, dirt, and direct sunlight. At a minimum, the methodology shall reflect that materials shall be shipped and stored in rolls furnished at the manufacturing facility to prevent exposure of the
geotextile to ultraviolet light, precipitation, moisture, mud, dirt, dust, puncture, or other damaging conditions.

5. Rolls of products shall not be stacked upon one another to the extent that deformation of the core occurs. If stored outdoors, they shall be elevated from the ground and protected with a waterproof cover. Outdoor storage should not be allowed to exceed six months. For storage for more than six months, a temporary enclosure shall be constructed so that the geocomposite rolls are stored inside an enclosed facility.

6. Material Data: Submit complete MANUFACTURER's Specifications, descriptive drawings, and literature for each product, including the product identification and suppliers of the polymer resin and recommended method 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.

7. Manufacturing Quality Control (MQC): Submit a 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.

8. Installation Instructions: Submit samples of the product with a complete set of specifications, and MANUFACTURER's complete written instructions for storage, handling, installation and joining.

9. Qualifications: Submit MANUFACTURER's qualifications for each product.

10. Geonet Resin: Submit the name of the HDPE resin supplier, the production plant, the brand name, and name of resin used to manufacture the product.

C. Manufacturing Quality Control (MQC): The CONTRACTOR shall submit quality control test reports within 48 hours of completion of the test. Submit the following manufacturing quality control information to the CQA CONSULTANT prior to material shipment:

1. Production Dates: Submit statement of production dates for each product.
2. Test Reports: See Part 3 of this Section for tests and test frequencies.
PART 2 -PRODUCTS

2.01 GEONET

A. The CDN shall consist of a void maintaining geonet with a non-woven geotextile heat bonded to one or both sides to provide water flow meeting the requirements listed in Table 02562-1.

B. The geonet shall consist of new, first-quality products designed and manufactured specifically for the intended purpose designated in this specification, as satisfactorily demonstrated by prior use. The geonet shall contain stabilizers to prevent ultraviolet light degradation. The HDPE shall be unmodified HDPE containing no plasticizer, fillers, chemical additives, reclaimed polymers, or extenders. Approximately 2 percent carbon black shall be added to the resin for ultraviolet resistance. The only other allowable compound elements shall be antioxidants and heat stabilizers, of which up to 1.5 percent total, as required for manufacturing, may be added.

2.02 GEOTEXTILE

A. The geotextile shall meet the requirements listed in Table 02562-2.

2.03 GEOCOMPOSITE

A. The geocomposite shall be those manufactured by SOLMAX, or an ENGINEER approved equal.

B. The final product material shall meet the requirements listed in Table 02562-3.

C. Manufacturer: The geocomposite shall be fabricated by heat bonding the geotextile to one or both sides of the geonet. No burn-through of geotextiles shall be permitted. No glue or adhesive shall be permitted. The bond between the geotextile and the geonet shall meet the requirements listed in Table 02562-3.

D. Labels: Geocomposite 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.

E. Roll Dimensions: The product 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.
PART 3 - EXECUTION

3.01 MANUFACTURING QUALITY CONTROL TESTING

A. All of the specified tests are the CONTRACTOR's responsibility. Testing during manufacturing shall be accomplished by the MANUFACTURER's laboratory.

B. HDPE resin shall be tested at a frequency of one test per resin batch for compliance with Table 02562-1. One batch is defined as one rail car load of resin. The finished rolls shall be identified by a roll number corresponding to the resin batch used. The following minimum test frequencies shall be observed:

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Minimum Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polymer Density</td>
<td>ASTM D 1505</td>
<td>1 per batch</td>
</tr>
<tr>
<td>Polymer Melt Index</td>
<td>ASTM D 1238</td>
<td>1 per batch</td>
</tr>
</tbody>
</table>

C. The geonet shall be tested during manufacturing for compliance with Table 02562-1. The following minimum test frequencies shall be observed:

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Minimum Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polymer Density</td>
<td>ASTM D 1505</td>
<td>1/100,000 sf</td>
</tr>
<tr>
<td>Thickness</td>
<td>ASTM D 5199</td>
<td>1/100,000 sf</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>ASTM D 7179</td>
<td>1/100,000 sf</td>
</tr>
<tr>
<td>Carbon Black</td>
<td>ASTM D 4218</td>
<td>1/100,000 sf</td>
</tr>
</tbody>
</table>

D. Geotextile shall be tested during manufacturing for compliance with Table 02562-2. The following minimum test frequencies shall be observed:

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Minimum Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permittivity</td>
<td>ASTM D 4491</td>
<td>1/100,000 sf</td>
</tr>
<tr>
<td>Mass per Unit Area</td>
<td>ASTM D 5261</td>
<td>1/100,000 sf</td>
</tr>
<tr>
<td>AOS</td>
<td>ASTM D 4751</td>
<td>1/100,000 sf</td>
</tr>
<tr>
<td>Grab Tensile</td>
<td>ASTM D 4632</td>
<td>1/100,000 sf</td>
</tr>
<tr>
<td>Grab Elongation</td>
<td>ASTM D 4632</td>
<td>1/100,000 sf</td>
</tr>
<tr>
<td>Trapezoidal Tear Strength</td>
<td>ASTM D 4533</td>
<td>1/100,000 sf</td>
</tr>
<tr>
<td>CBR Puncture</td>
<td>ASTM D 6241</td>
<td>1/100,000 sf</td>
</tr>
</tbody>
</table>

E. Upon fusion of the geotextile and geonet, the product shall be tested during manufacturing for compliance with Table 02562-3. The following minimum test frequencies shall be observed:

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Minimum Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmissivity</td>
<td>ASTM D 4716</td>
<td>1/200,000 sf</td>
</tr>
<tr>
<td>Ply Adhesion (minimum)</td>
<td>ASTM D 7005</td>
<td>1/100,000 sf</td>
</tr>
</tbody>
</table>
F. The CONTRACTOR shall inspect every roll for bonding integrity between the geonet and the geotextile. All poorly bonded and/or delaminated material shall be rejected. Visible lack of bonding of any areas exceeding one square foot or multiple locations on the same roll that are considered excessive by the ENGINEER will be cause for rejection of the roll of material.

3.02 CQA CONFORMANCE TESTING

A. In-Plant Conformance Sample Testing Services – The OWNER’s REPRESENTATIVE or CQA CONSULTANT have qualified personnel to collect conformance samples directly at the following facilities:

- GSE Lining Company
- AGRU America
- Poly-Flex, Inc.

1. Conformance sample(s) of the geocomposite will be collected by the OWNER’s REPRESENTATIVE or CQA CONSULTANT prior to shipment to the site.

2. Conformance sample(s) of the geocomposite will be tested by the CQA CONSULTANT prior to shipment to the site.

3. The CONTRACTOR shall coordinate with the MANUFACTURER, CQA CONSULTANT, and OWNER to schedule the date of delivery of the geocomposite to the site.

4. The Contractor shall inform, in writing, the CQA CONSULTANT and ENGINEER 14 day prior to the actual date of shipment from the MANUFACTURER. Geocomposite shall not be shipped prior to testing without OWNER’s approval.

5. Geocomposite products shipped to the site without prior sampling and approved conformance test results shall be sampled and tested upon delivery to the project site by the CQA CONSULTANT. All costs associated with collecting and shipping samples from the project site will be the CONTRACTOR’s responsibility. The CONTRACTOR shall allow a minimum of 7 days for sampling and testing approval of geocomposite materials upon delivery to the project site prior to installation.

6. Once sampled at the MANUFACTURER’s plant geocomposite products shall not be added or removed from the shipment. Upon addition or removal of products the following conditions shall prevail:

   a. Geocomposite products added shall be sampled for conformance testing at the CONTRACTOR’s expense.
b. Individual geocomposite products removed from the shipment, which have been previously sampled or tested – Additional samples that have identical lot or batch numbers shall be sampled for conformance testing at the CONTRACTOR’s expense.

B. Conformance Sample Test Frequency. The geocomposite shall be randomly sampled by the OWNER’s REPRESENTATIVE or CQA CONSULTANT at a rate of one sample per lot, or one sample per 100,000 square feet of material unless otherwise specified, from consecutively numbered rolls, whichever is smaller. A lot is defined as a group of consecutively numbered rolls manufactured from the same resin batch or production line. The initial conformance testing shall be at the OWNER’s expense.

C. The initial conformance tests shall include the following:

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>TEST METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEONET</td>
<td></td>
</tr>
<tr>
<td>Thickness</td>
<td>ASTM D 5199</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>ASTM D 7179</td>
</tr>
<tr>
<td>Carbon Black</td>
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<td>Polymer Density</td>
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<td>GEOTEXTILE</td>
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</tr>
<tr>
<td>AOS</td>
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<tr>
<td>Grab Elongation</td>
<td>ASTM D 4632</td>
</tr>
<tr>
<td>Trapezoidal Tear Strength</td>
<td>ASTM D 4533</td>
</tr>
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<td>GEOCOMPOSITE</td>
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<tr>
<td>Ply Adhesion</td>
<td>ASTM D 7005</td>
</tr>
<tr>
<td>Transmissivity</td>
<td>ASTM D 4716</td>
</tr>
<tr>
<td>Interface Friction Angle</td>
<td>ASTM D 5321</td>
</tr>
</tbody>
</table>

Note: Required test results shall be in conformance with Table 02562-1, Table 02562-2, and Table 02562-3.

D. Samples shall be taken across the entire width of the rolls and shall not include the first three feet if stored outside or damaged. The test results of the geocomposite samples shall meet or exceed the Contract Documents and Specifications.

E. Samples that do not satisfy the Contract Documents and Specifications shall be cause to reject applicable rolls. If a geocomposite sample fails to meet Contract Documents and Specifications, subsequent tests shall be performed at random on additional geocomposite samples produced from the same resin batch to
determine whether all rolls produced from the same batch shall be considered as unsatisfactory and therefore rejected. Rejected rolls will not be installed and shall be removed from the project at no additional cost to the OWNER.

3.03 FIELD QUALITY CONTROL

A. Field Joining: The CONTRACTOR shall inspect all roll end joints and roll side joints. The results of these inspections shall be documented in the daily reports. Field joints shall comply with the requirements of Table 02562-4.

B. Quality Control Reporting Procedures: All information regarding the installation of the geocomposite will 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.

4. Statement of whether materials were installed in accordance with the Technical Specifications.

5. Additional information as required.

6. All product certifications, filed appropriately for future reference.

3.04 MANUFACTURER'S RECOMMENDATIONS

A. Each Product shall be installed in accordance with the plans, specifications, and the MANUFACTURER's recommendations. In case of a conflict between these documents, the more stringent requirements shall apply.

3.05 CLEANLINESS

A. The interface between the geocomposite and the 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. Products which are clogged with silts or other materials shall be discarded and shall not be installed.

3.06 ROLL JOINING METHODS

A. Table 02562-4 summarizes acceptable roll joining methods.
B. Lap Seams: The bottom layer of geotextile shall be lap seamed. Lap seaming is accomplished by overlapping adjacent geotextile a minimum of 6 inches.

C. Nylon Ties: The geonet shall be overlapped and fastened with nylon ties. Nylon ties shall be yellow or white in color to facilitate inspection.

D. Machine Sewn Seams: The top layer of geotextile shall be sewn. Sewing shall be accomplished with a lock-stitching sewing machine. The thread shall be polymeric thread which complies with manufacturer's recommendations. The seam shall be placed at a minimum of 4 inches from the geotextile edges. The finished seam shall be folded to one side.

3.07 ROLL JOINING REQUIREMENTS

A. The minimum requirements for joining rolls are specified in Table 02562-4.

B. Roll Ends: The end of each roll of geocomposite shall be overlapped a minimum of six inches. The geonet portion shall be shingled, with the uphill end overlapping the downhill end. The geonet portion shall be tied 2 feet on center at a minimum. The bottom layer of geotextile shall be overlapped a minimum of 6 inches. The upper layer of geotextile shall be machine sewn. Where the geocomposite is to terminate, the upper geotextile shall be folded over the ends with a minimum of 12 inches of geotextile placed under the geocomposite.

C. Adjacent Roll Sides: At roll sides, the material shall be overlapped a minimum of 4 inches. The bottom geotextile shall be overlapped. The geonet shall be overlapped and tied a minimum of 5 feet on center with nylon ties as described above. The upper layer of geotextile shall be machine sewn as described above.

3.08 INSTALLATION

A. The product shall be installed in accordance with the manufacturer's recommendations or as specified herein, whichever is more stringent.

B. Orientation:

1. Geocomposite 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 laterally (i.e., across the slope).

C. The CONTRACTOR shall provide sufficient ballast and temporary anchorage to protect the product. The CONTRACTOR is responsible for protecting the product from damage due to weather at all times.
D. Physical Damage:

1. Personnel walking on the product shall not engage in activities or wear footwear that could damage the material. Smoking shall not be permitted on or near the geosynthetics.

2. Care shall be taken to assure that any underlying layers are not damaged during placement. The use of low ground pressure machines, such as ATV’s to facilitate deployment over the geosynthetic layers is allowed. Low ground pressure machines are machines with a ground pressure less than 6 psi. Additionally as a practical matter, the driver should not perform sharp turns, spinouts or abrupt stops or other actions that could damage the geocomposite. Any damage resulting from the use of such vehicles are the responsibility of the contractor.

E. Bridging: The product shall be installed to avoid bridging.

F. Corners: In corners, where overlaps between rolls are staggered, an extra roll shall be installed from the top to the bottom of the slope.

G. Weather Protection: Each product shall be protected from direct sunlight or precipitation prior to installation. After installation this product shall not be exposed to direct sunlight and shall be covered within 30 days of installation. Product which is exposed to direct sunlight for 30 days or more shall be replaced at the CONTRACTOR's expense.

H. The geocomposite shall be properly anchored within the anchor trench to resist sliding. Anchor trench compacting equipment shall not come into direct contact with the geocomposite.

I. If there are any obstructions (such as outlet pipes, gas wells or monitoring wells) while deploying the geocomposite, the geocomposite shall be cut to fit around the obstruction. Care should be taken as to make sure there is no gap between the obstruction and the geocomposite. The geocomposite should be cut in a way that the lower geotextile has an excess overhang. There must be enough of the upper geotextile to be able to tuck the upper geotextile back under the geocomposite to protect the exposed geonet core. This will prevent any soil particles from migrating into the geonet core flow channels.

J. It is the CONTRACTOR's responsibility to provide all labor and materials for protection of the product during the period of time prior to installation of overlying soils. The CONTRACTOR's protection method is subject to the approval of the ENGINEER.
3.09 REPAIRS

A. Limitations - In general, damaged, soiled, or delaminated products shall be discarded. Products which have major damage, which require extensive repairs or replacement, shall be discarded at the CONTRACTOR's expense.

B. Minor Damage - Minor damage is defined as a hole 2 inches or smaller in diameter in the product. Minor damage shall be repaired by snipping out protruding geonet and machine sewing or thermal bonding a geotextile patch over the hole. The patch shall be a minimum of 12 inches larger than the damaged area in all directions. If thermal bonding is conducted, care shall be taken to prevent excessive heat damage to the surrounding geosynthetics.

C. Major Damage - Major damage is defined as a hole larger than 2 inches in diameter through the product. Major damage shall be repaired by replacing the entire panel width.

3.10 PLACEMENT OF PROTECTIVE COVER

A. Placement of Protective Cover Soil over the geocomposite and geomembrane by the CONTRACTOR shall be conducted in accordance with the requirements in Section 02220 Excavation, Backfilling, and Compaction.

<table>
<thead>
<tr>
<th>TABLE 02562-1. GEONET PROPERTIES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Property</strong></td>
</tr>
<tr>
<td>----------------------------------</td>
</tr>
<tr>
<td>Thickness</td>
</tr>
<tr>
<td>Tensile Strength (machine direction)</td>
</tr>
<tr>
<td>Carbon Black</td>
</tr>
<tr>
<td>Polymer Density, Resin</td>
</tr>
<tr>
<td>Polymer Melt Index</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TABLE 02562-2. GEOTEXTILE PROPERTIES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Property</strong></td>
</tr>
<tr>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Mass per Unit Area</td>
</tr>
<tr>
<td>Grab Tensile</td>
</tr>
<tr>
<td>Grab Elongation</td>
</tr>
<tr>
<td>CBR Puncture</td>
</tr>
<tr>
<td>Trapezoidal Tear Strength</td>
</tr>
</tbody>
</table>
TABLE 02562-3. GEOCOMPOSITE PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Qualifier</th>
<th>Unit</th>
<th>Test Method</th>
<th>Specified Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmissivity (Note 1)</td>
<td>Minimum</td>
<td>m²/s</td>
<td>ASTM D 4716</td>
<td>2.5x10⁻³ (8 oz double sided)</td>
</tr>
<tr>
<td>Ply Adhesion</td>
<td>Average</td>
<td>lbs/inch</td>
<td>ASTM D 7005</td>
<td>0.5</td>
</tr>
<tr>
<td>Coefficient of Interface Friction w/ Geomembrane (Note 2) and w/ Protective Cover Soil (Note 3)</td>
<td>Minimum</td>
<td>degrees</td>
<td>ASTM D 5321</td>
<td>20.5°</td>
</tr>
</tbody>
</table>

Notes:

1. Per ASTM D 4716, one sample per 200,000 square feet, with a normal stress of 1,000 psf; water at 20°C (68°F); gradient of 0.02; profile of upper load plate, soil, composite, geomembrane, and lower load plate; and a test time period of 100 hours. Apply normal stress, under saturated conditions, for 1 hour minimum prior to start of test. Test data from the manufacturer using the identical testing configuration and parameter shall indicate that transmissivity values when tested in excess of 100 hours do not fall below the minimum value of Table 02562-3. Thickness of the core geonet must be monitored during application of the normal compressive load and flow testing. Report to provide hydraulic conductivity and transmissivity.

2. Interface Friction Angle (ASTM D 5321), one representative test with the proposed geocomposite and the geomembrane material. The testing criteria are as follows: The direct shear box shall be a minimum of 12 inches by 12 inches. Each normal load shall be preload at the specified normal load, for a minimum of 1 hours, prior to testing to dissipate pore pressures. Fully saturate soil prior to testing for each normal load. The specified testing Normal Stresses are 100, 200, and 800 psf. The strain rate is 1 mm/min (0.04 in/min). The minimum PEAK interface friction angle shall be 20.5 degrees. The interface friction angle shall be the result of a linear regression line drawn continuously through the three shear strength results obtained for the normal loads specified following the procedures outlined in ASTM D 5321. Provide the results of peak and residual values. Adhesion value may be considered in determining the effective interface friction angle.

3. Interface Friction Angle (ASTM D 5321), one representative test with the proposed geocomposite and the protective soil material. The testing criteria are as follows: The proposed protective soil material shall be prepared and molded to a minimum of 95% of the Standard Proctor (ASTM D 698). The direct shear box shall be a minimum of 12 inches by 12 inches. Each normal load shall be preload at the specified normal load, for a
minimum of 24 hours, prior to testing to dissipate pore pressures. Fully saturate soil prior to testing for each normal load. The specified testing Normal Stresses are 100, 200, and 800 psf. The strain rate is 1 mm/min (0.04 in/min). The minimum PEAK interface friction angle shall be 20.5 degrees. The interface friction angle shall be the result of a linear regression line drawn continuously through the three shear strength results obtained for the normal loads specified following the procedures outlined in ASTM D 5321. Provide the results of peak and residual values. Adhesion value may be considered in determining the effective interface friction angle

**TABLE 02562-4. GEOCOMPOSITE JOINING METHODS**

<table>
<thead>
<tr>
<th>Location</th>
<th>Layer</th>
<th>Joining Method</th>
<th>Min. Overlap</th>
<th>Tying Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roll End (See Note 1)</td>
<td>Upper geotextile</td>
<td>Machine sewing</td>
<td>4&quot;</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Geonet</td>
<td>Nylon ties</td>
<td>6&quot;</td>
<td>2' on center</td>
</tr>
<tr>
<td></td>
<td>Lower geotextile</td>
<td>overlap</td>
<td>6&quot;</td>
<td>N/A</td>
</tr>
<tr>
<td>Roll Side</td>
<td>Upper geotextile</td>
<td>Machine sewing</td>
<td>4&quot;</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Geonet</td>
<td>Nylon ties</td>
<td>4&quot;</td>
<td>5' on center</td>
</tr>
<tr>
<td></td>
<td>Lower geotextile</td>
<td>overlap</td>
<td>6&quot;</td>
<td>N/A</td>
</tr>
<tr>
<td>Repair of minor damage (See Note 2)</td>
<td>Upper geotextile</td>
<td>Machine sewing/thermal bonding</td>
<td>12&quot;</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Geonet</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Notes:
1. At termination of geocomposite fold over upper geotextile as defined in Part 3.07.B.
2. Minor damage is defined in Part 3.09.B.
SECTION 02720

STORM DRAINAGE SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Provide storm drainage systems consisting of culverts, and other drainage structures as shown on the Drawings and specified herein.

B. The WORK specified in this Section includes supplying, fabricating, transporting, storing, quality control/quality assurance laboratory services required for the installation of the High Density Polyethylene (HDPE) pipe, as shown on the Contract Drawings and as specified herein, in accordance with provisions of the Contract Documents.

1.02 SUBMITTALS

A. All product (i.e., pipe, fittings, and valves) data shall be submitted, to the ENGINEER for approval, at least 15 calendar days prior to installation.

B. The CONTRACTOR shall submit to the ENGINEER the names of the pipe, pipe fitting, and valve suppliers, certificates of compliance on materials to be furnished, and MANUFACTURER’s recommendations for storage, handling, installation, inspection, and repair of each type of pipe, pipe fitting, and valve to be furnished.

C. The CONTRACTOR shall submit to the ENGINEER a MANUFACTURER’s certification that the HDPE pipe was manufactured from resins in compliance with these Specifications. The certificate shall state the specific resin, its source and the specific information required by ASTM D1248.

D. The polyethylene pipe MANUFACTURER shall provide certification that stress regression testing has been performed on the specific product. This stress regression testing shall have been done in accordance with ASTM D2837.

E. The MANUFACTURER must warrant the pipe to be free from defects in material and workmanship in accordance with ASTM D3350 and F714.

F. Verification that CONTRACTOR’s pipe welding technician has been certified by the MANUFACTURER to conduct heat fusion connections.
PART 2 - PRODUCTS

2.01 STORM DRAINAGE SYSTEM

A. Polyethylene pipe resins shall be high performance, high molecular weight, High Density Polyethylene (HDPE) conforming to ASTM D1248 (Type III, Class C, Category 5, Grade P34), ASTM D2513, and ASTM D3350 (Cell Classification PE 345434C, with material designation of PE 3408). The pipe and fittings shall be manufactured with a minimum of 2 percent carbon black to withstand outdoor exposure without loss of properties. All HDPE pipe shall meet the requirements of ASTM F714.

B. Each pipe length shall be marked with the MANUFACTURER’s name or trademark, size, material code, and Standard Dimension Rating (SDR). Pipe SDR ratings shall be as indicated on the Contract Drawings.

C. All HDPE pipe and fittings shall be furnished by a single MANUFACTURER who is fully experienced, reputable, and qualified in the manufacture of the items to be furnished. The pipe shall contain no recycled compound except that generated in the MANUFACTURER’s own plant from resin of the same MANUFACTURER’s specification as the raw material. The pipe shall be homogenous throughout and free of visible cracks, holes, foreign inclusions, or other deleterious defects and shall be identical in color, density, melt index and other physical properties.

2.02 PERFORATIONS

A. As indicated on the Contract Drawings.

B. As installed, the pipe shall be aligned to placed so that the perforations at the bottom of the pipe along to the trench.

PART 3 - EXECUTION

3.01 TRANSPORTATION, HANDLING, AND STORAGE

A. Transportation: Care shall be taken not to cut, kink or otherwise damage the pipe material during transportation.

B. Handling:

1. Ropes, fabric or rubber-protected slings and straps shall be used when handling pipe materials.

2. Chains, cables, or hooks inserted into the pipe ends shall not be used. A sling with a spreader bar shall be used for lifting each length of pipe.
Pipe materials shall not be dropped or dragged on rocky or rough ground.

C. Storage:

1. Pipe materials shall be stored on level ground, preferably turf or sand, free of sharp objects which could damage them in accordance with MANUFACTURER’s recommendations.

2. Stacking of the pipe shall be limited to a height that will not cause excessive deformation of the bottom layers of pipes under anticipated temperature conditions.

3. Where necessary due to ground conditions, the pipe shall be stored on wooden pallets and supported to prevent deformation of the pipe.

D. Pipe material which is damaged by the CONTRACTOR shall be replaced at no additional cost to the OWNER.

3.02 EXCAVATION AND BACKFILL

A. All excavation in the preparation of pipe shall be performed in accordance with the requirements of Section 02220 - Excavation, Backfill, Fill and Grading.

3.03 INSTALLING HDPE PIPE AND FITTINGS

A. The installation of pipe shall be in accordance with the MANUFACTURER’s recommendations.

B. Upon satisfactory excavation of the pipe trench, pipe bedding shall be installed to provide continuous uniform support for the piping.

C. The interior of all pipes shall be thoroughly cleaned of all foreign material before being lowered in the trench and shall be kept clean during laying operations by means of caps, or other industry-approved methods.

D. Each pipe shall be carefully examined for damage (i.e., cuts, scratches, gouges) before being installed, and sections of pipe with damage exceeding MANUFACTURER recommendations shall be replaced at CONTRACTOR’S expense. Pipe shall be repaired according to MANUFACTURER’s recommendations.

E. Under no circumstances shall pipe be installed in trenches that are excessively wet or have standing water. No pipe shall be installed when trench or weather conditions are unsuitable for such WORK. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary.
F. Cutting shall be done with approved mechanical methods in a manner that will not damage the pipe. Pipe shall be firmly and uniformly supported during cutting and fusion activities. Care shall be taken that pipe is not disturbed until joints are cured. The maximum allowable depth of cuts, scratches or gouges on the exterior of the pipe is 10 percent of wall thickness. The interior pipe surface shall be free of cuts, gouges or scratches. Sections of pipe with cuts, scratches or gouges deeper than allowed shall be removed completely and ends of the pipeline rejoined.

G. Each pipe section shall be joined in strict conformance with the pipe MANUFACTURER’s recommendations using approved equipment. Joining and installation of pipe shall be accomplished by a trained and authorized technician.

H. The CONTRACTOR shall protect the pipe and workers from the build-up of static electricity, which can be generated in the pipe by friction from the handling of pipe in storage, shipping, and installation. The CONTRACTOR shall minimize the hazard of discharge by following recommendations by the pipe MANUFACTURER, such as applying a film of water to the WORK surface to drain away the static electricity.

I. When WORK is not being performed, the open ends of the pipe shall be closed by fabricated caps, or by other approved means. All caps shall be outside diameter fitting caps. No caps will be allowed that require insertion of the cap into the pipe. Any sediment or other contaminants allowed to enter pipe by failure to place cap over end shall be removed at CONTRACTOR’s expense.

J. The ENGINEER shall be notified prior to pipe being backfilled. The ENGINEER will inspect the following items at this time:

1. All joints.
2. Pipe integrity.
3. Pipe bedding for foreign material.
4. Proper slope.
5. Trench contour to ensure the pipe will have uniform and continuous support.

Any pipe which is disturbed or found to be defective after installation shall be removed and replaced by the CONTRACTOR.

K. The termination of the pipes shall be as shown on the Contract Drawings.
3.04 MECHANICAL CONNECTIONS

A. Mechanical connections of the HDPE pipe to auxiliary equipment through flanged connections such as manholes, shall consist of the following:

1. All stub ends and flange connections shall be thermally butt-fused to the ends of the pipe.

2. A metal back-up ring shall be ductile iron and be sized to ANSI B16.6 outside diameter and drillings.

3. Studs (Thread-rod), not bolts, shall be galvanized ASTM A354 to connect flanges. All studs shall be coated, just prior to installation, with an anti-seize compound such as manufactured by Kopr-Kote or ENGINEER approved substitution.

4. Other mechanical couplings such as 360 degree full circle clamps can be used only as approved by the ENGINEER.

3.05 INTERIM CLEANING

A. Care shall be exercised during fabrication to prevent the accumulation of dirt, pipe cuttings and filings, gravel, cleaning rags, etc. within piping sections. All piping shall be examined to assure removal of these and other foreign objects prior to assembly.

3.06 CERTIFICATION OF COMPLETION

A. Upon completion of the covering operation over the pipe, the CONTRACTOR shall certify in writing the following to the ENGINEER:

1. The piping system has been constructed in accordance with the approved project plans and specifications.

2. The piping system has not been damaged during construction or the backfilling operation.

END OF SECTION
PART 1 - GENERAL

1.01 DESCRIPTION
A. Work under this section includes all labor, material, tools and equipment required to lay toe drains as shown in the Drawings.

1.02 SUBMITTALS
A. The CONTRACTOR shall submit to the ENGINEER the names of the pipe, pipe fitting, and certificates of compliance on materials to be furnished, and manufacturer's recommendations for storage, handling, installation, inspection, and repair.

B. The CONTRACTOR shall submit to the ENGINEER for acceptance, complete, detailed shop drawings of all pipe and fittings.

PART 2 - PRODUCTS

2.01 MATERIALS
A. Piping: Piping shall be perforated HDPE pipe and sized as noted on the drawings.

B. Rounded River Rock: Rounded river rock shall consist of naturally occurring noncalcareous materials, such granite or other hard durable stone material. Dolomites, limestone and sandstone are not allowed:
   1. The rounded river rock shall consist of material having hard, strong, durable particles free of adherent coating. Rounded river rock shall have satisfactory soundness and satisfactory resistance to abrasion in accordance to AASHTO T104 and AASHTO T96: Satisfactory soundness will be considered to be a loss in weight of not greater than 15 percent when subjected to five alterations of the soundness test. Satisfactory resistance to abrasion will be considered to be a percentage of wear not greater than 55 percent.
   2. Gradation Size: Refer to Specification Section 02220 2.01.F-Rounded River Rock.

C. Geotextile: The geotextile shall be capable of withstanding direct exposure to sunlight for 30 days with no measurable deterioration. The non-woven geotextile products shall be a fabric of polypropylene monofilament yarns and inert to commonly encountered chemicals, hydrocarbons, mildew and rot resistant, and be
insect and rodent resistant. The geotextile products shall conform to Specification Section 02550-Geotextile.

PART 3 - EXECUTION

3.01 GENERAL

A. Certification: The CONTRACTOR is required to submit a letter of certification from the supplying quarry stating that the material supplied meets the requirements of this specification. The CONTRACTOR is also required to submit the supplier and source of the material.

B. Type Used: The type of rounded river rock used may be gravel or granite, but the rock must have rounded edges with no sharp projection and only one type of material can be used throughout the project. Refer to Specification Section 02220

3.02 PREPARATION

A. The CONTRACTOR shall install the toe drains in such a manner as to ensure the underlying layers are not damaged.

3.03 INSTALLATION

A. Laying Pipe: All pipes shall be carefully laid in conformity with the Drawings and in accordance with these specifications.

B. Connections to riprap stormwater swales will conform to the drawings and details.

END OF SECTION
SECTION 02777

LINEAR LOW DENSITY POLYETHYLENE (LLDPE) GEOMEMBRANE LINER

PART 1 - GENERAL

1.01 DESCRIPTION

A. The WORK described in this section consists of furnishing all labor, transportation, materials, supervision, administration, management, quality control and installation equipment necessary for the manufacturing, storage, delivery, watertight installation and testing of the 40 mil textured LLDPE geomembrane for the liner system as herein specified and as shown on the drawings.

B. All materials shall conform to the following requirements and shall be of new stock of the highest grade available, free from defects, and recently manufactured.

C. All installation shall be in conformance with the MANUFACTURER’s recommendations and with current industry standards.

1.02 CONSTRUCTION QUALITY CONTROL/QUALITY ASSURANCE

A. Construction Quality Control (CQC) shall be performed by the geomembrane INSTALLER. The INSTALLER’s responsibilities shall include, but are not limited to the following:

1. Supervise all geomembrane installation activities.

2. Perform and document CQC testing as specified herein.

3. Certify geomembrane materials and installation as meeting requirements of the Contract Documents.

B. Construction Quality Assurance (CQA) will be performed by a designated CQA CONSULTANT and QA TESTING LABORATORY retained by the OWNER.

C. The CQA CONSULTANT or OWNER’S REPRESENTATIVE shall obtain samples and perform conformance testing of the geomembrane as indicated in Section 2.02 of this Section.

D. The CQA CONSULTANT, or his CQA REPRESENTATIVE, shall observe and monitor the geomembrane installation activities and obtain and perform CQA testing at random frequencies and locations.

E. The CQA CONSULTANT shall submit a final report, signed and sealed by a professional engineer licensed in the State of Florida, certifying the test results.

F. Based upon review of the CQC and CQA final reports, the CQA CONSULTANT will provide certification to the regulatory agencies that the geomembrane was installed in accordance with the Contract Documents.
G. The CONTRACTOR shall schedule WORK to provide sufficient time as required to complete CQC and CQA field testing and documentation prior to placing any overlying layers above the geomembrane and shall keep the CQA CONSULTANT'S QA TESTING LABORATORY informed of the construction progress to provide sufficient time for laboratory testing.

1.03 DEFINITIONS

A. Lot - A quantity of resin (usually the capacity of one rail car) used in the manufacture of geomembranes. Finished roll will be identified by a roll number traceable to the resin lot used.

B. Construction Quality Assurance Consultant (CQA CONSULTANT) - Party, independent from the MANUFACTURER and INSTALLER that is responsible for observing and documenting activities related to quality assurance during the lining system construction.

C. ENGINEER - The person, firm or corporation named as such in the Agreement.

D. Geomembrane Manufacturer (MANUFACTURER) - The party responsible for manufacturing the geomembrane rolls.

E. Geomembrane Fabricator (FABRICATOR) - The party responsible for fabricating the geomembrane rolls (if required).

F. Geosynthetic Quality Assurance Laboratory (QA TESTING LABORATORY) - Party, independent from the OWNER, MANUFACTURER and INSTALLER, responsible for conducting laboratory tests on samples of geosynthetics obtained during manufacturing, usually under the direction of the OWNER and CQA CONSULTANT.

G. INSTALLER - Party responsible for field handling, storing, deploying, seaming and testing of the geomembrane seams.

H. Panel - Unit area of a geomembrane that will be seamed in the field that is larger than 100 ft².

I. Patch - Unit area of a geomembrane that will be seamed in the field that is less than 100 ft².

J. Intermediate Cover/Subbase - Soil layer surface which immediately underlies the geosynthetic material(s).

1.04 QUALIFICATIONS

A. For general information purposes only, Geomembrane MANUFACTURER’s are the following or an ENGINEER approved equal:

1. Agru/America, Inc.
2. GSE Lining Technology, Inc.

3. Poly-Flex, Inc.

B. Manufacturer Qualifications: MANUFACTURER shall be a company, corporation, or firm regularly engaged in the development and manufacture of geosynthetic liners with a history of successful production/installation for a minimum period of 3 years. The geomembrane rolls shall be manufactured by a single MANUFACTURER. A company other than MANUFACTURER may supply the geomembrane, however, the MANUFACTURER of the geomembrane shall be required to submit and meet the requirements stated in the Section. The MANUFACTURER shall submit written information on the following:

1. Information on plant size (square feet of geomembrane produced daily), number of shifts, and capacity of each shift.

2. Daily production quantity shall be sufficient to meet the demands of the schedule for this WORK.

3. Quality Control program manual of descriptive documentation for production. The manual shall define sampling procedures, test frequencies and methods. The MANUFACTURER shall, at a minimum, comply with the Quality Control Specifications for this WORK.

4. A statement from the MANUFACTURER stating the Manufacturing Quality Control measures specified for this WORK will be followed and the manufactured geomembrane products will meet or exceed the product Specifications for this WORK.

5. Verification that the MANUFACTURER has successfully supplied geomembrane for a minimum of 6 projects in the United States, during the last 5 years, of similar size and scope totaling to a minimum of 10 million square feet of installed geomembrane. Projects shall be considered similar only if the MANUFACTURER had total manufacturing responsibility for geomembrane production and the installed geomembrane has successfully fulfilled its primary function for a minimum of 2 years. The MANUFACTURER shall submit written information as follows:
   a. Name and location of project and date of installation.
   b. Contact name and phone number for each project.
   c. Geomembrane thickness and surface area of geomembrane installed.

C. Fabricator Qualifications: Qualified Fabricator shall be a company, corporation, or firm regularly engaged in the seaming and fabrication of geomembrane products, under factory-controlled conditions, for the installation of geomembrane under field conditions. The Fabricator usually seams together combinations of smaller rolls of geomembrane into larger factory panels for deployment in the
field. The geomembrane shall be fabricated by a single Fabricator. The Fabricator shall submit written information on the following:

1. Information on plant size (square feet of geomembrane fabricated daily), number of shifts, and capacity of each shift.

2. Daily production quantity shall be sufficient to meet the demands of the schedule for this WORK.

3. Quality Control procedures (manual) for fabrication. The manual shall define sampling procedures, test frequencies and methods. The Fabricator shall, at a minimum, comply with the quality control specification for this WORK.

4. A statement from the Fabricator stating the fabrication quality control measures specified for this WORK will be followed and the fabricated geomembrane products will meet or exceed the product specifications for this WORK.

5. The Fabricator shall have successfully fabricated geomembrane products for at least 6 projects, during the last 5 years, of similar size and function totaling a minimum of 10 million square feet of installed geomembrane. Projects shall be considered similar only if the Fabricator had total fabrication responsibility for geomembrane production and the installed geomembrane has successfully fulfilled its primary function for a minimum of 2 years. The Fabricator shall submit written information as follows:
   a. Name and location of project and date of installation.
   b. Contact name and phone number for each project.
   c. Geomembrane thickness and surface area geomembrane installed.

D. INSTALLER QUALIFICATIONS: A qualified INSTALLER shall be a company, corporation, or a single INSTALLER. The INSTALLER shall submit written information on the following:

1. INSTALLER shall have installed a minimum of 2,000,000 square feet of LLDPE geomembrane during the last 5 years or otherwise demonstrate they are qualified to perform the WORK.

2. INSTALLER shall have worked in a similar capacity on at least 6 projects similar in complexity to the project described in the Contract Documents.

3. The INSTALLER shall provide a minimum of one Field Installation Supervisor for WORK on the project.
   a. The Field Installation Supervisor qualifications to be assigned to this WORK shall have directly supervised the installation of a minimum of 2,000,000 square feet of geomembrane. No
geomembrane shall be installed without the presence of the Field Installation Supervisor.

4. The INSTALLER shall provide a minimum of one Master Seamer for work on the project.
   a. All personnel performing seaming operations shall be qualified by experience or by successfully passing seaming tests. At least one seamer shall have experience seaming a minimum of 1,000,000 linear feet of geomembrane seams using the same type of seaming apparatus to be used for this WORK. No seaming shall be carried out without the presence of the master seamer within the immediate vicinity.

5. Installation quality control testing personnel in the field shall have a minimum of 400,000 square feet of geomembrane quality control testing. Only the actual square footage that the personnel have directly performed quality control testing on shall be counted as fulfillment of the minimum square footage.

6. Quality Assurance/Quality Control Field Program - The INSTALLER shall, at a minimum, comply with the Specifications for this WORK. The QA/QC Field Program shall provide for recording all inspection and testing of all WORK items to ensure conformance to the applicable Contract Documents and Specifications with respect to materials, workmanship, construction, functional performance and identification. If differences exist between the INSTALLER'S Quality Control procedures and the Quality Control procedures specified by the ENGINEER or CQA CONSULTANT the procedures specified for the WORK shall govern installation. The QA/QC Field Program shall be subject to approval by the ENGINEER and include:
   a. Storage and Handling (equipment).
   b. Panel Identification.
   c. Panel Inspection.
   d. Panel Layout Drawings/Shop Drawings.
   e. Seam Identification.
   f. Seaming Process and Equipment.
   g. Seaming Inspection.
   h. Non-Destructive Tests (Seams, Repairs, Geomembrane Boots).
   i. Destructive Tests.
   j. Laboratory Tests.

l. Corrective Actions (i.e., addition of geomembrane, reduction of geomembrane, topography changes).

m. Procedures for Development of Record Drawings.

n. Weather Contingencies.

b. Record Keeping.

7. A statement from the INSTALLER stating the installation Quality Control measures specified for this WORK will be followed and the installed geomembrane products will meet or exceed the product Specifications for this WORK.

1.05 SUBMITTALS

A. The CONTRACTOR shall submit in writing to the ENGINEER, for approval, prior to delivery of the geomembrane to the site and prior to installation of the geomembrane material documentation on the following:

1. MANUFACTURER’s Qualification.

2. FABRICATOR’s Qualification (If a FABRICATOR is used).

3. INSTALLER’S Qualification.


5. Geomembrane Resin information and MANUFACTURER Quality Control Certificates.

6. Geomembrane MANUFACTURER material properties sheet, including at a minimum all properties specified in GRI GM17, including test methods used and Quality Control Certificates.

7. FABRICATOR’s Quality Control Certificates & Material Certification (if used).

8. Geomembrane Accessories.


10. Recommended loading, unloading, and handling equipment (include model number or load capacity).

11. A list indicating correlation between the MANUFACTURER Quality Control Certificates and individual geomembrane rolls.

12. The date of shipment of geomembrane from the MANUFACTURER. A minimum of 14 days shall be given to the ENGINEER so as to provide
sufficient time to perform conformance sampling and receive laboratory test results prior to shipment.

13. Direct Shear Test (Interface Shear Resistance): Direct Shear Test Results tests demonstrating compliance with Part 2.01.D.

14. Direct Shear Test Results (interface): Direct Shear Test Results tests demonstrating compliance with Part 2.02.E.

B. Installation Plan: The INSTALLER shall furnish the following information to the ENGINEER and OWNER prior to installation:

1. Installation layout drawing drawn to scale.
   a. Must show proposed geomembrane panel layout including field seams and details, panel location, orientation, identification, and installed square footage of geomembrane.
   b. Must be approved prior to installing the geomembrane.
      1) Approved drawings will be for concept only and actual panel placement will be determined by site conditions.

2. INSTALLER’S Geosynthetic Field Installation Quality Assurance Plan.

3. Description of welding equipment, techniques, and materials.

4. Complete set of forms used to record installation QA/QC data.

5. Resumes of key geomembrane installation personnel. (The Field Installation Supervisor, Master Seamer, and quality control personnel shall be clearly identified).


7. Warranty (Workmanship).

C. Resin - MANUFACTURER Quality Control Certificate, written on the MANUFACTURER’s company letterhead, shall be provided for the raw resin material used to produce each roll of geomembrane. The frequency of the testing of the resin batches shall be per MANUFACTURER’s Quality Control Plan but shall not be less than 1 test per resin lot. A resin lot is defined as 180,000 pounds or less of raw resin material. Resin shall meet the following minimum requirements:

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>TEST METHOD</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density (g/cm³)</td>
<td>ASTM D1505 or D792</td>
<td>0.915 to 0.926</td>
</tr>
<tr>
<td>Melt Flow Index (g/10 min.)</td>
<td>ASTM D1238</td>
<td>≤ 1.0</td>
</tr>
</tbody>
</table>

D. Any geomembrane manufactured from resin not meeting the WORK Specifications shall be rejected and shall not be delivered to the project.
E. Sheet - MANUFACTURER Quality Control Certificate, written on the MANUFACTURER’s company letterhead, shall be provided for each roll of geomembrane, including roll identification number, and the results (listed individually) of quality assurance/quality control testing performed by the MANUFACTURER. A lot is defined as a group of consecutively numbered rolls manufactured from the same resin batch or production line. At a minimum, the following tests shall be performed at a frequency of one test per 50,000 square feet of material per lot. Testing procedures and results shall conform to Table 02776-1 of this Section.

1. Statement certifying no recycled polymer and no more than 10% rework of the same type of material is added to the resin (product run may be recycled).

<table>
<thead>
<tr>
<th>TEST</th>
<th>PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>ASTM D5994</td>
</tr>
<tr>
<td>Asperity Height</td>
<td>ASTM D7466</td>
</tr>
<tr>
<td>Density</td>
<td>ASTM D1505 or D792</td>
</tr>
<tr>
<td>Tensile Property (each direction)</td>
<td>ASTM D6693 Type IV</td>
</tr>
<tr>
<td>Tear Resistance</td>
<td>ASTM D1004</td>
</tr>
<tr>
<td>Puncture Resistance</td>
<td>ASTM D4833</td>
</tr>
<tr>
<td>Carbon Black Content</td>
<td>ASTM D4218</td>
</tr>
<tr>
<td>Carbon Black Dispersion¹</td>
<td>ASTM D5596</td>
</tr>
</tbody>
</table>

Note 1 - Carbon black dispersion for 10 different views: all 10 in categories 1, 2.

F. The INSTALLER will submit the following to the ENGINEER upon completion of geomembrane installation:

1. Certificate stating the geomembrane has been installed in accordance with the Contract Documents.

2. Daily log including the daily record that summarizes panels deployed, seams completed, seam testing, seam repair, personnel on site, weather conditions, and equipment on site.

3. Panel Log: provides geomembrane roll number used and subgrade acceptance for each panel deployed.

4. Seam Testing Log: a complete record of all non-destructive and destructive testing performed as part of the INSTALLER’s QC program.

5. Seam/Repair Log: provides a complete record of all repairs and vacuum box testing of repairs made to defective seams and panels.


7. Record Drawings: The CONTRACTOR shall submit a panel layout drawing reflecting as-built conditions and related installation details (i.e.,
panel layout, penetrations, boots, connections, seam type) of the actual geomembrane lining system. The panel layout record drawings shall:

a. Be at the same scale as the Contract Drawings, and use applicable drafting standards including a border identifying the INSTALLER, OWNER, project name and drawing name.

b. Indicate the installed field panel and seam numbering, configuration and dimensions, geomembrane penetrations, and berms. The CQC CONSULTANT shall correlate the identification numbers for each roll of material to the installation field panel.

c. Include the installed area, in square feet, of installed geomembrane.

d. Include the locations of destructive samples and repairs with the correct corresponding sample number.

G. Prior to geomembrane installation, the CONTRACTOR shall supply the ENGINEER with signed and sealed survey drawings with data that clearly indicates the grades and elevation meet the Contract Documents and Specifications.

H. Upon completion of the subbase construction, prior to deploying the geomembrane, a “Certificate of Subbase Acceptance” shall be co-signed by the CONTRACTOR along with the INSTALLER prior to the installation of the 40 mil LLDPE geomembrane certifying the Subbase was constructed in accordance with the approved Contract Documents and Specifications.

I. If the INSTALLER proposes to conduct seaming operations outside of the approved conditions as specified herein (i.e., outside the weather parameters or night operations), written information and supporting data verifying seam quality can be maintained shall be submitted to the ENGINEER for review and approval. Alternate seaming operations will not be allowed without prior approval from the ENGINEER.

1.06 MATERIAL LABELING, DELIVERY, STORAGE AND HANDLING

A. Labeling - Each roll of geomembrane delivered to the site shall be labeled by the MANUFACTURER. The label will identify:

1. Manufacturer’s name

2. Product identification

3. Thickness

4. Length

5. Width
6. Roll number

B. Delivery - Rolls of liner will be prepared to ship by appropriate means to prevent damage to the material and to facilitate off-loading.

C. Storage - Storage requirements for the materials shall be specified by the MANUFACTURER and INSTALLER. At a minimum, the storage location for geomembrane material, provided by the OWNER to protect the geomembrane from punctures, abrasions and excessive dirt and moisture, shall have the following characteristics:

1. Rolls shall be fully supported on pallets or other devices to be prevented from contacting the ground.

2. Water shall be prevented from accumulating beneath the rolls.

3. Geomembrane rolls shall not be stacked upon one another to the extent that deformation of the core or flattening of the rolls occurs.

4. Outdoor storage should not be allowed to exceed six months.

5. Protected from theft and vandalism.

6. Adjacent to the area being lined.

D. Handling - Each roll of geomembrane delivered to the site shall be inspected by the CONTRACTOR, at a minimum, as follows:

1. The CONTRACTOR shall provide transportation, labor, and handling for delivery of the geomembrane to and from the project site. Special transportation or handling requirements required for the geomembrane shall be provided by the CONTRACTOR.

2. The equipment for transportation, handling, loading and unloading the geomembrane shall be of sufficient size and capacity to safely and efficiently handle geomembrane materials without damage or personnel injury occurring. The type, size and capacity shall be according to the MANUFACTURER and INSTALLER requirements.

3. The CONTRACTOR shall provide all equipment and labor necessary for the loading, unloading, handling, and installation of the geomembrane.

4. Upon delivery to the project site, the geomembrane material shall be inspected by the CONTRACTOR to confirm that proper labeling, transportation, handling, and storage procedures are followed. Damaged materials will be identified and repaired or rejected at the discretion of the ENGINEER. Materials to be repaired as specified herein. Repairs will be at no additional cost to the OWNER. Rejected materials will be identified and removed from the project site at no additional cost to the OWNER.
5. Each roll shall be delivered to the site bearing markings which provide the roll number, thickness of the material, length and width of the material, and the proper direction to unroll the material to facilitate layout and positioning in the field.

6. The materials shall be unloaded by the CONTRACTOR in areas designated by the OWNER. If the OWNER has not specified a storage area, the CONTRACTOR shall determine an area for storage of the materials to meet the WORK schedule requirements. In any case the materials shall not be stored or unloaded in areas that will impair the operations of the landfill facility or be deleterious to the materials.

7. Protection shall be provided, at a minimum, from puncture, cutting, ultraviolet radiation, precipitation, dirt or other damaging or deleterious conditions.

1.07 MATERIAL AND INSTALLATION WARRANTY

A. Material shall be warranted, on a pro-rata basis against MANUFACTURER’s defects for a period of 5 years from the date of final acceptance. The warranty shall state that materials will be repaired or replaced, by the MANUFACTURER, any defective materials or products that fail to meet the design requirements. Repair or replacement of such defective material and/or products shall be completed within 30 calendar days of notification by the Owner.

B. Installation shall be warranted against defects in workmanship for a period of 2 years from the date of final acceptance. The warranty shall state the installer will repair or replace any defective work that fails to meet the design requirements. Repair or replacement of such defective work shall be completed within 30 calendar days of notification by the OWNER.

C. Warranty conditions proposed by the MANUFACTURER / FABRICATOR / INSTALLER concerning limits of liability will be submitted by the CONTRACTOR and will be evaluated upon receipt and must be acceptable to the OWNER prior to installation of the geomembrane.

PART 2 - PRODUCTS

2.01 GEOMEMBRANE

A. Material shall be 40 mil textured LLDPE geomembrane textured on both sides as shown on the Contract Drawings and specified herein.

B. Geomembrane Rolls:

   1. Do not exceed a combined maximum total of 1 percent by weight of additives other than carbon black.

   2. Geomembrane shall be free of holes, blisters, undispersed raw materials, nicks and cuts on roll edges or any sign of contamination by foreign
matter. If pinholes are located, identified and indicated during manufacturing, these pinholes may be corrected during installation in accordance with the MANUFACTURER’s recommendations.

3. Geomembrane material is to be supplied in roll form. Each roll is to be identified with labels indicating the information provided in Section 1.06.A.

4. The 40 mil textured LLDPE geomembrane shall conform to the physical properties requirements, at a minimum, as shown in Table 02777-A or the most current GRI standard for this product. Values presented in Table 02777-A are based upon standard GRI GM17 established by the Geosynthetics Research Institute (GRI) for LLDPE.

5. The geomembrane shall be packaged and shipped by the MANUFACTURER in a manner to protect the integrity of the geomembrane from damage.

C. Extrudate Rod or Bead

1. Extrudate material shall be made from same type resin as the geomembrane.

2. Additives shall be thoroughly dispersed.

3. Materials shall be free of contamination by moisture or foreign matter.

D. Direct Shear Test (Interface Shear Resistance) - The CONTRACTOR will perform one Direct Shear Test in accordance with ASTM D5321 on representative samples of the geocomposite and 40 mil LLDPE geomembrane. The cost for shipping and testing the samples shall be included in the price of the materials. The following testing parameters will be followed for the Direct Shear Testing with the results submitted to the ENGINEER:

1. Testing to be conducted under fully saturated (water) conditions.

2. Three Normal Loads = 200, 400, and 800 psf.

3. Test Configuration: Geocomposite clamped to top box textured geomembrane clamped to bottom box

4. Strain Rate = 0.040 in/min.

5. Continue testing to ensure a full 3 inches of displacement.

6. Plot and report (Peak and Residual values) for the best fit line through each of the three test results.

7. A minimum PEAK value of 0 psf adhesion and 24.5° for the interface friction angle is required for this project (based upon the best fit line).
8. Adhesion may be considered by the ENGINEER to determine equivalent stability for this project.

E. Direct Shear Test (Interface Shear Resistance) - The CONTRACTOR will perform one Direct Shear Test in accordance with ASTM D5321 on representative samples of the intermediate cover soil and 40 mil LLDPE geomembrane. The cost for shipping and testing the samples shall be included in the price of the materials. The following testing parameters will be followed for the Direct Shear Testing with the results submitted to the ENGINEER:

1. Testing to be conducted under fully saturated (water) conditions.
2. Three Normal Loads = 200, 400, and 600 psf.
3. Test Configuration: intermediate cover soil in top box textured geomembrane clamped to bottom box
4. Strain Rate = 0.040 in/min.
5. Continue testing to ensure a full 3 inches of displacement.
6. Plot and report (Peak and Residual values) for the best fit line through each of the three test results.
7. A minimum PEAK value of 0 psf adhesion and 24.5º for the interface friction angle is required for this project (based upon the best fit line).
8. Adhesion may be considered by the ENGINEER to determine equivalent stability for this project.

2.02 CQA CONFORMANCE TESTING

A. In-Plant Conformance Sample Testing Services - The OWNER’s REPRESENTATIVE and CQA CONSULTANT have qualified personnel to collect conformance samples directly at the following facilities:

- GSE Lining Company
- AGRU America
- Poly-Flex, Inc.

1. Conformance sample(s) of the geomembrane will be collected by the OWNER’s REPRESENTATIVE or CQA CONSULTANT prior to shipment to the site.
2. Conformance sample(s) of the geomembrane will be tested by the CQA CONSULTANT prior to shipment to the site.
3. The CONTRACTOR shall coordinate with the MANUFACTURER, CQA CONSULTANT, and OWNER to schedule the date of delivery of the geomembrane to the site.
4. The CONTRACTOR shall inform, in writing, the CQA CONSULTANT and ENGINEER 14 days prior to the actual date of shipment from the MANUFACTURER. Geomembrane shall not be shipped prior to testing without OWNER’S approval.

5. Geomembrane products shipped to the site without prior sampling and approved conformance test results shall be sampled and tested upon delivery to the project site by the CQA CONSULTANT. All costs associated with collecting and shipping samples from the project site will be the CONTRACTOR’s responsibility. The CONTRACTOR shall allow a minimum of 7 days for sampling and testing approval of geomembrane materials upon delivery to the project site prior to installation.

6. Once sampled at the MANUFACTURER’s plant geomembrane products shall not be added or removed from the shipment. Upon addition or removal of products the following conditions shall prevail:
   a. Geomembrane products added shall be sampled for conformance testing at the CONTRACTOR’s expense.
   b. Individual geomembrane products removed from the shipment, which have been previously sampled or tested - Additional samples that have identical lot or batch numbers shall be sampled for conformance testing at the CONTRACTOR’s expense.

B. Conformance Sample Test Frequency (CQA) - The geomembrane shall be randomly sampled and tested by the OWNER’S REPRESENTATIVE or CQA CONSULTANT at a minimum of one sample per lot but at a rate of not less than one sample every 100,000 square feet of installed material from consecutively numbered rolls, whichever is smaller. A lot is defined as a group of consecutively numbered rolls manufactured from the same resin batch or production line. The initial conformance testing shall be at the OWNER’s expense.

C. The initial conformance tests shall include the following:

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>TEST METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>ASTM D5994</td>
</tr>
<tr>
<td>Carbon Black Content</td>
<td>ASTM D4218</td>
</tr>
<tr>
<td>Carbon Black Dispersion</td>
<td>ASTM D5596</td>
</tr>
<tr>
<td>Density</td>
<td>ASTM D1505 or D792</td>
</tr>
<tr>
<td>Tensile Properties (each direction)</td>
<td>ASTM D6693 Type IV</td>
</tr>
<tr>
<td>Asperity Height</td>
<td>ASTM D7466</td>
</tr>
<tr>
<td>Geomembrane/ Interface Friction Angle</td>
<td>ASTM D5321</td>
</tr>
<tr>
<td>Geomembrane/ Interface Friction Angle</td>
<td>ASTM D5321</td>
</tr>
</tbody>
</table>

Note: Required test results shall be in conformance with Table 02777-A.

D. Samples shall be taken across the entire width of the rolls and shall not include the first three feet if stored outside or damaged. The averaged test results of the
Geomembrane samples shall meet or exceed the Contract Documents and Specifications.

E. Samples that do not satisfy the Contract Documents and Specifications shall be cause to reject applicable rolls. If a geomembrane sample fails to meet Contract Documents and Specifications, subsequent tests shall be performed at random on additional geomembrane samples produced from the same resin batch to determine whether all rolls produced from the same batch shall be considered as unsatisfactory and therefore rejected. This additional testing, at no additional cost to the OWNER, may be performed to more closely identify the rolls which do not comply with the specifications. Rejected rolls will not be installed and shall be removed from the project site at no additional cost to the OWNER.

F. The CQA CONSULTANT will conduct one test on the actual extrudate welding rod used in the field for seaming and repairing the geomembrane panels to verify the material is compatible with the geomembrane. The tests shall consist of the following:

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>TEST METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>ASTM D1505 or D792</td>
</tr>
<tr>
<td>Carbon Black Content</td>
<td>ASTM D4218</td>
</tr>
</tbody>
</table>

PART 3 - EXECUTION

3.01 GEOMEMBRANE SUBBASE

A. Surface to be lined shall be smooth and tested in accordance with Section 02220 Excavating, Backfilling and Compaction for Subbase Material. The area shall be free of all rocks (greater than ½- inch in any dimension), sticks (greater than ½-inch in diameter), roots, grass, refuse, sharp objects, or debris of any kind. The surface shall provide a firm, unyielding foundation for the geomembrane with no sudden, sharp, or abrupt changes or breaks in grade. No standing water or excessive moisture shall be allowed.

B. All areas that have been subject to erosion shall be repaired as required in Section 02220 Excavating, Backfilling and Compaction. The repaired surface for geomembrane placement shall be even with no abrupt changes or breaks in grade. No standing water or excessive moisture shall be allowed.

3.02 EQUIPMENT

A. Welding equipment and accessories shall, at a minimum, meet the following requirements:

1. Gauges showing temperatures in apparatus (extrusion welder) or wedge (wedge welder) shall be present.

2. An adequate number of welding apparatus shall be available to avoid delaying WORK.
B. Power source must be capable of providing constant voltage under combined line load.

3.03 DEPLOYMENT

A. All activities by personnel and equipment in the vicinity of the geomembrane during and after geomembrane placement shall be monitored by the CONTRACTOR to insure that the geomembrane and geomembrane foundation are not damaged.

B. Assign each panel a simple and logical identifying code. The coding system shall be subject to approval and shall be determined at the job site.

C. Visually inspect the geomembrane during deployment for imperfections and mark faulty or suspect areas. Field panels shall not be placed if any of following conditions exists: inadequate geomembrane foundation, precipitation, presence of excessive moisture (i.e. fog, dew), ponded water, or presence of excessive winds.

D. On slopes shallower than 6:1, deploy panels in a “shingle” manner, wherein the upgradient panel overlays the down gradient panel.

E. Deployment of geomembrane panels shall be performed in a manner that will comply with the following guidelines:
   
   1. Unroll geomembrane using methods that will not damage geomembrane and will protect underlying surface from damage (spreader bar, protected equipment bucket).

   2. Place ballast (commonly sandbags) on geomembrane which will not damage geomembrane to prevent wind uplift. The CONTRACTOR shall have sufficient sand bags or other appropriate anchoring materials on site to secure the geomembrane. CONTRACTOR shall replace or repair all geomembrane damaged (as determined by the ENGINEER) by wind or insufficient anchoring at no additional cost to the OWNER.

   3. Personnel walking on geomembrane shall not engage in activities or wear shoes that could damage it. Smoking will not be permitted on the geomembrane.

   4. Do not allow heavy vehicular traffic directly on geomembrane. Rubber-tired ATV’s and trucks are acceptable if wheel contact is less than 6 psi.

   5. Protect geomembrane in areas of heavy traffic by placing protective cover over the geomembrane.

F. Sufficient material (slack) shall be provided to allow for thermal expansion and contraction of the material. The geomembrane shall be installed so as to conform to the contours and grade breaks. The geomembrane shall remain in contact with the underlying soils. Sand bags or excess material, placed during deployment, shall be used to prevent bridging due to temperature or installation procedures.
Allowances for additional material due to temperature and installation procedures shall be included in the bid and at no additional cost to the OWNER.

G. “Fishmouths” or wrinkles at the seam overlaps shall be cut along the ridge of the wrinkle in order to achieve a flat overlap. The cut fishmouths or wrinkles shall be seamed and any portion where the overlap is inadequate shall then be patched with an oval or round patch of the same geomembrane extending a minimum of 6 inches beyond the cut in all directions.

H. If the INSTALLER proposes to conduct seaming operations outside of the approved conditions as specified herein (i.e., outside the weather parameters or night operations), written information and supporting data verifying seam quality can be maintained shall be submitted to the ENGINEER for review and approval 72 hours in advance. Alternate seaming operations will not be allowed without prior approval from the ENGINEER. If during the course of the WORK, the ENGINEER, CQA CONSULTANT, or OWNER decides the WORK is inadequate, the CONTRACTOR shall adjust operations as required or WORK shall ceased. Contract Documents and Specifications for placing and seaming the geomembrane shall apply to all WORK conditions.

3.04 FIELD SEAMING

A. Seams shall meet the following requirements:

1. To the maximum extent possible, orient seams parallel to line of slope, i.e., down and not across slope.

2. Minimize number of field seams in corners, odd-shaped geometric locations and outside corners.

3. Slope seams (panels) shall extend a minimum of five-feet beyond the grade break into the flat area.

4. Use a sequential seam numbering system compatible with panel numbering system that is agreeable to the CQA CONSULTANT and INSTALLER.

5. Align seam overlaps consistent with the requirements of the welding equipment being used. The panels of geomembrane have a finished overlap of 4 inches for extrusion welding and 6 inches for fusion welding, but in any event sufficient overlap shall be provided to allow peel tests to be performed on the seam.

B. During welding operations provide at least one Master Seamer who shall provide direct supervision over other welders as necessary.

C. Extrusion Welding

1. Hot-air tack adjacent pieces together using procedures that do not damage the geomembrane.
2. Clean geomembrane surfaces by disc grinder or equivalent.


D. Hot Wedge Welding

1. Welding apparatus shall be a self-propelled device equipped with an electronic controller which displays applicable temperatures.

2. Clean seam area of dust, mud, moisture and debris immediately ahead of hot wedge welder.

3. Protect against moisture build-up between sheets.

E. Trial Welds

1. Perform trial welds on geomembrane samples to verify welding equipment is operating properly.

2. Make trial welds under the same surface and environmental conditions as the production welds, i.e., in contact with subgrade and similar ambient temperature.

3. Minimum of two trial welds per day, per welding apparatus, one made prior to the start of work and one completed at mid shift. (typically after lunch break). Additionally, perform trial welds at any time the welding equipment is shut down and restarted.

4. Cut four, one inch wide by 6 inch long test strips from the trial weld.

5. Quantitatively test specimens for peel adhesion and then for shear strength.

6. Trial weld specimens shall pass when the minimum results, as indicated in Table 02777-D, are achieved in both peel and shear tests.

   a. The break, when peel testing, occurs in the liner material itself, not through peel separation (FTB).

   b. The break is ductile.

7. Repeat the trial weld, in its entirety, when any of the trial weld samples fail in either peel or shear.

8. No welding equipment or welder shall be allowed to perform production welds until equipment and welders have successfully completed trial weld.

F. Seaming shall not proceed when ambient air temperature or adverse weather conditions jeopardize the integrity of the liner installation. Immediately prior to seaming procedures, the seam area shall be completely free of moisture, dirt, or
foreign material of any kind. INSTALLER shall demonstrate that acceptable seaming can be performed by completing acceptable trial welds.

G. Defects and Repairs

1. Examine all seams and non-seam areas of the geomembrane for defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter.

2. Repair and non-destructively test each suspect location in both seam and non-seam areas. Do not cover geomembrane at locations that have been repaired until test results with passing values are available.

H. Cold weather installations should follow the guidelines contained in GRI GM9.

3.05 FIELD QUALITY ASSURANCE

A. MANUFACTURER and INSTALLER shall participate in and conform to all terms and requirements of the OWNER’S CQA Plan. CONTRACTOR shall be responsible for assuring this participation.

B. Welding equipment shall be calibrated prior to each day’s welding in accordance with the Installation Plan. The INSTALLER shall record all calibration data for inclusion in the final report. Additional test welds shall be performed for each welding machine every 4 hours, if welder is turned off, prior to starting work, after lunch, or as directed by the CQA CONSULTANT.

3.06 NON-DESTRUCTIVE TESTING

A. Non-destructive testing shall be carried out as the seaming progresses. All seams shall be non-destructively tested in the presence of the CQA CONSULTANT. Insufficient seams shall be labeled, recorded, repaired and re-tested.

1. Vacuum Box Testing - Shall be performed in accordance with ASTM D5641, Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber.

   a. Shall be required for all extrusion welds, except for those welds inaccessible to the vacuum box, such as geomembrane boots. Air pressure gauges shall read 0 psi when testing apparatus is not turned on. Pressure gauges not reading 0 psi shall be replaced. Vacuum box apparatus shall be capable of sustaining a vacuum pressure 5 psi (gauge) for 10 seconds while placed on a seam. The following procedures shall be followed:

      1) Energize the vacuum pump and reduce the tank pressure to approximately 10 inches of mercury, i.e., 5 psi gauge. All gauges shall read 0 psi when the vacuum pump is not turned on. Gauges not reading 0 psi shall be replaced.

      2) Wet a strip of geomembrane approximately 4 inches by 24
inches with a soapy solution.

3) Place the box over the wetted soapy area.

4) Close the bleed valve and open the vacuum valve.

5) Ensure that a leak tight seal is created.

6) For a period of not less than 10 seconds, examine the geomembrane through the viewing window for the presence of soap bubbles, which would indicate defects in the geomembrane.

7) If no bubble appears 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 overlap, and repeat the process.

8) All areas where soap bubbles appear shall be marked and repaired by extrusion weld or patching.

2. Air Pressure Testing - Shall be performed in accordance with ASTM D5820, Standard Practice for Pressurized Air Channel Evaluation of Dual Seamed Geomembranes.

a. Testing apparatus shall be capable of generating a minimum pressure of 25 psi. Air pressure gauges shall read 0 psi when testing apparatus is not turned on. Pressure gauges not reading 0 psi shall be replaced. The air channel shall be pressurized from 25 to 30 psi and allowed to stabilize. Once stabilized, the channel pressure shall be sustained for a minimum of 5 minutes. If loss of pressure is more than 2 psi, or the pressure does not stabilize, the seam shall be rejected, the faulty area located and repaired and the seam re-tested. The following procedures shall be followed:

1) Seal both ends of the seam to be tested.

2) Insert needle or other approved pressure feed device into the tunnel created by the fusion weld.

3) Insert a protective cushion between the air pump and the geomembrane.

4) Energize the air pump to a pressure between 25 and 30 psi, close valve, allow channel pressure to stabilize, and sustain channel pressure for approximately 5 minutes.

5) If loss of pressure is more than 2 psi or does not stabilize, locate faulty area and repair.
6) After a seam has passed a pressure test, release pressure at the end of seam that is opposite the air pump and pressure gauge assembly to ensure that the seam is continuous and has been completely tested.

B. The CQA CONSULTANT shall include all results from the destructive and non-destructive seam tests into the final report.

3.07 DESTRUCTIVE TESTING

A. Performed by the CQA CONSULTANT with assistance from the INSTALLER.

B. Location and Frequency of Testing

1. Installed geomembrane shall be tested at a rate of one test per 500 linear feet of welded seam at locations selected by the CQA CONSULTANT.

2. Test locations will be determined after seaming.

C. Sampling procedures are performed as follows:

1. INSTALLER shall cut samples at locations designated by the CQA CONSULTANT as the seaming progresses in order to obtain field laboratory test results before the geomembrane is covered.

2. CQA CONSULTANT will number each sample and the location will be noted on the installation as-built.

3. The CQC CONSULTANT shall remove the sample with the seam centered lengthwise, approximately 12 inches wide across the seam by 42 inches long, and test a portion of the geomembrane seam in accordance with the CQA Plan. The location shall be recorded, repaired and tested. The repair of the destructive seam samples shall be at no additional cost to the OWNER. The CQC CONSULTANT shall distribution as follows:

   a. A 12 inch by 14 inch portion to the CQA CONSULTANT for Third Party Laboratory Quality Assurance testing.

   b. A 12 inch by 14 inch portion shall be retained by the INSTALLER for field testing.

   c. A 12 inch by 14 inch portion to the OWNER for archive storage.

4. Testing performed on each sample shall include geomembrane peel adhesion and shear strength. Seam peel strength and shear strength shall meet the requirements specified in Table 02777-D.
Table 02777-D MINIMUM PEEL AND SHEAR SEAM STRENGTH VALUES

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>TEST METHOD/VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peel Strength</td>
<td>ASTM D 6392</td>
</tr>
<tr>
<td>Wedge Weld (lb/in width)</td>
<td>50</td>
</tr>
<tr>
<td>Extrusion Weld (lb/in width)</td>
<td>48</td>
</tr>
<tr>
<td>Shear Strength</td>
<td>ASTM D 6392</td>
</tr>
<tr>
<td>Wedge Weld (lb/in width)</td>
<td>60</td>
</tr>
<tr>
<td>Extrusion Weld (lb/in width)</td>
<td>60</td>
</tr>
</tbody>
</table>

5. Ten 1-inch wide strips shall be cut from the CQC CONSULTANT’S portion of the sample and these shall be tested in the field by the INSTALLER.

6. Field Testing - The ten 1-inch wide strips shall be tested by the CQC CONSULTANT in the field using a tensiometer, five for peel and five for shear, and shall meet the Specifications. If any field test sample fails to pass, then the procedures outlined in Section 3.07.C.(8) shall be followed.

7. Laboratory Testing - Testing by the CQA CONSULTANT will include Seam Strength and Peel Adhesion. A total of 5 specimens will be tested from each sample for each test method. All of the 5 specimens must pass the minimum pounds per inch value listed in Table 02777-A and -B and all specimens must separate by FTB failure for each test in order for the seam to pass destructive test sampling. The results will not be averaged. Specimens will be selected alternately, by test, from the samples (i.e., peel, shear, peel, shear). The CQA CONSULTANT will provide test results to the CONTRACTOR no more than 24 hours after the samples are received at the laboratory. The only exception shall be weekends or official holidays when the laboratories are closed. Arrangements to schedule testing of destructive samples on weekends and holidays shall be approved by the CQA CONSULTANT 24 hours in advance. Additional costs for lab work on holidays or weekends shall be at no additional expense to the OWNER and shall be paid by the CONTRACTOR.

8. Procedures for Destructive Test Failure - The following procedures shall apply whenever a sample fails the destructive test, whether the test is conducted by the CQA CONSULTANT’S laboratory or by field tensiometer. The geomembrane INSTALLER shall have two options, the cost of which shall be at no additional expense to the OWNER:

a. The geomembrane INSTALLER can reconstruct the seam between any two passed test locations.
b. The geomembrane INSTALLER can trace the welding path to an intermediate location at 10 feet, minimum, from the location of the failed test in each direction, and take a specimen for an additional field test at each location. If these additional specimens pass the test, then full laboratory destructive samples shall be taken. These additional tests shall be at the expense of the CONTRACTOR. If these laboratory samples pass the test, then the seam shall be reconstructed between these locations. If either sample fails, then the process shall be repeated to establish the zone in which the seam should be reconstructed. In any case, all acceptable seams must be bounded by two locations from which samples passing laboratory destructive tests have been taken. In cases exceeding 150 feet of reconstructed seam, a sample taken from within the reconstructed zone must pass destructive testing. Whenever a sample fails, additional testing may be required for seams that were welded by the same welder and/or welding apparatus or welded during the same time shift. Such additional testing shall be at the CONTRACTOR’s expense.

3.08 REPAIR PROCEDURES

A. All seams and non-seam areas of the geomembrane shall be inspected by the INSTALLER and CQA CONSULTANT for defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter. The surface of the geomembrane shall be clean at the time of inspection. The geomembrane surface shall be brushed, blown, or washed by the CONTRACTOR if the amount of dust, mud or debris inhibits inspection. The CQA CONSULTANT shall decide if cleaning of the geomembrane is needed to facilitate inspection. The INSTALLER shall be responsible for repair of defective areas at no additional expense to the OWNER.

B. Agreement upon the appropriate repair method shall be decided between CQA CONSULTANT and INSTALLER by using one of the following repair methods:

1. Patching - Patches shall be round or oval in shape made of the same geomembrane and extend a minimum of 6 inches beyond the edge of defects. All patches shall be of the same compound and thickness as the geomembrane specified. All patches shall have their top edge beveled with an angle grinder prior to placement on the geomembrane. Patches shall be applied using approved methods only.

2. Abrading and Re-welding - Used to repair short section of a seam.

3. Spot Welding - Used to repair pinholes or other minor, localized flaws or where geomembrane thickness has been reduced.


5. Remove the unacceptable seam and replace with new material.
C. The following procedures shall be observed when a repair method is used:

1. All geomembrane surfaces shall be clean and dry at the time of repair.

2. Surfaces of the polyethylene which are to be repaired by extrusion welds shall be lightly abraded to assure cleanliness.

3. Extend patches or caps at least 6 inches for extrusion welds and 4 inches for wedge welds beyond the edge of the defect, and around all corners of patch material.

D. Repair Verification

1. Each repair shall be non-destructively tested. In addition the CQA CONSULTANT may require a destructive seam sample be obtained from a repaired seam. Repairs that pass the non-destructive and/or destructive test shall be taken as an indication of an adequate repair. Failed tests indicate that the repair shall be repeated and retested until passing test results are achieved.

2. Number and log each patch repair (performed by CQA CONSULTANT).

3.09 ANCHOR TRENCH

A. The anchor trench shall be excavated prior to geomembrane installation. No loose soil, roots, rocks, or materials capable of damaging the geomembrane shall be allowed beneath the geomembrane. The anchor trench shall be backfilled and compacted as indicated on the Drawings, and in a manner that prevents any damage to the geomembrane. The geomembrane shall not have sharply folded corners when placed into the anchor trench. The geomembrane shall be welded the entire length of the panel, including through the entire dimension of the trench.

B. The perimeter of the geomembrane liner shall be identified. The CONTRACTOR shall provide 4x4 wooden posts spaced every 100 feet to mark the edge of the liner. The post shall be buried in the anchor trench, extend a minimum of two feet above finished grade, and be painted orange for easy identification.

3.10 OVERLYING GEOMEMBRANE

A. During placement of the geocomposite upon the geomembrane, precautions shall be taken to prevent damage to the geomembrane by restricting heavy equipment traffic. Unrolling the geocomposite can be accomplished through the use of lightweight, rubber-tired equipment such as a 4-wheel all-terrain vehicle (ATV). This vehicle can be driven directly on the geomembrane, provided the ATV makes no sudden stops, starts, or turns.

B. Geomembrane which is covered prior to approval by the CQA CONSULTANT shall be uncovered at no additional cost to the OWNER.
C. The CONTRACTOR shall schedule his work so as to permit as much time as needed for testing and CQC/CQA documentation before placing the overlying soil layer(s).

D. The CONTRACTOR shall place the overlying geocomposite layer immediately upon approval of the geomembrane by the CQA CONSULTANT to prevent damage, uplift, or degradation of the geomembrane.

3.11 SURVEY CONTROL STAKES

A. Survey stakes in the vicinity of the geomembrane shall be placed with care as not to penetrate the geomembrane liner. Plastic traffic cones, cardboard tubes or other items as approved by the ENGINEER may be used as survey control devices.

3.12 FINAL ACCEPTANCE

A. The CONTRACTOR shall retain ownership and responsibility for the installed geomembrane until final acceptance by the OWNER.

B. Final acceptance of the geomembrane by the OWNER will occur when:

   1. All installation activities are completed.
   
   2. All documentation of installation is completed and the INSTALLED’S final report is submitted to and accepted by the ENGINEER.
   
   3. All documents presented in Section 1.05 have been submitted to the ENGINEER and approved.
Table 02777-A

TEXTURED 40 MIL LLDPE GEOMEMBRANE PROPERTIES

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>TEST METHOD</th>
<th>40 mils (12)</th>
<th>TEST FREQUENCY (minimum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness (min. avg.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• lowest individual for 8 out of 10 values</td>
<td>ASTM D5994</td>
<td>38 mil</td>
<td>1 per Roll</td>
</tr>
<tr>
<td>• lowest individual for any of the 10 values</td>
<td></td>
<td>36 mil</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>34 mil</td>
<td></td>
</tr>
<tr>
<td>Asperity Height (min. avg.) (1) (2)</td>
<td>ASTM D7466</td>
<td>20 mil</td>
<td>every 2nd roll</td>
</tr>
<tr>
<td>Density (max.)</td>
<td>ASTM D1505 or D792</td>
<td>0.939 g/cc</td>
<td></td>
</tr>
<tr>
<td>Tensile Properties (min. avg.) (3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Break Strength</td>
<td>ASTM D6693 Type IV</td>
<td>60 lbs/in (min)</td>
<td>1 per 50,000 ft²</td>
</tr>
<tr>
<td>Break Elongation</td>
<td></td>
<td>250% (min)</td>
<td></td>
</tr>
<tr>
<td>Tear Resistance (min. avg.)</td>
<td>ASTM D1004</td>
<td>22 lb</td>
<td>1 per 100,000 ft²</td>
</tr>
<tr>
<td>Puncture Resistance (min. avg.)</td>
<td>ASTM D4833</td>
<td>44 lb</td>
<td>1 per 100,000 ft²</td>
</tr>
<tr>
<td>Carbon Black Content (range) (4)</td>
<td>ASTM D4218 1 per 50,000 ft²</td>
<td>(4)</td>
<td></td>
</tr>
<tr>
<td>Carbon Black Dispersion (5)</td>
<td>ASTM D5596 Note (5)</td>
<td>Note (5)</td>
<td>1 per 100,000 ft²</td>
</tr>
<tr>
<td>Oxidative Induction Time (OIT) (min. avg.) (6)(11)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Standard OIT</td>
<td>ASTM D3895</td>
<td>100 minutes min.</td>
<td>per resin lot</td>
</tr>
<tr>
<td>(b) High Pressure OIT</td>
<td>ASTM D5885</td>
<td>400 minutes min.</td>
<td></td>
</tr>
<tr>
<td>Oven Aging at 85°C (6)(7)(11)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(a) Standard OIT (min. avg.) - % retained after 90 days</td>
<td>ASTM D5721</td>
<td>35%</td>
<td>per each formulation</td>
</tr>
<tr>
<td>(b) High Pressure OIT (min. avg.) - % retained after 90 days</td>
<td>ASTM D3895</td>
<td>60%</td>
<td></td>
</tr>
<tr>
<td>UV Resistance (8)(11)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Standard OIT (min. avg.)</td>
<td>ASTM D7238</td>
<td>(9)</td>
<td>(9)</td>
</tr>
<tr>
<td>(b) High Pressure OIT (min. avg.) - % retained after 1600 hrs (10)</td>
<td>ASTM D3895</td>
<td>35%</td>
<td>per each formulation</td>
</tr>
</tbody>
</table>

Notes:

(1) The lowest individual reading must be ≥ 17 mils.
(2) Alternate the measurement side for double sided textured sheet.
(3) Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of 5 test specimens each direction.
(4) Break elongation is calculated using a gage length of 2.0 inches at 2.0 in/min.
(5) Other methods such as ASTM D1603 (tube furnace) or ASTM D6370 (TGA) are acceptable if an appropriate correlation to ASTM D4218 (muffle furnace) can be established.
(6) Carbon black dispersion (only near spherical agglomerates) for 10 different views:
(7) all in Categories 1 or 2.
(8) The manufacturer has the option to select one of the OIT methods listed to evaluate the antioxidant content in the geomembrane.
(9) It is also recommended to evaluate samples at 30 and 60 days to compare with the 90 day response.
(10) Not recommended since the high temperature of the Std-OIT test produces an unrealistic result for some of the antioxidants in the UV exposed samples.
(11) UV resistance is based on percent retained value regardless of the original HP-OIT value.
(12) Based on most recent revision of GRI GM17.
<table>
<thead>
<tr>
<th>Company name</th>
<th>Years of geomembrane installation experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Square feet installed</td>
<td></td>
</tr>
<tr>
<td>Raw material used</td>
<td></td>
</tr>
<tr>
<td>Sheet width manufactured (ft.)</td>
<td></td>
</tr>
<tr>
<td>Sheet width delivered (ft.)</td>
<td></td>
</tr>
<tr>
<td>Field Supervisor years of experience</td>
<td></td>
</tr>
<tr>
<td>Square feet of geomembrane supervised</td>
<td></td>
</tr>
<tr>
<td>Delivery time after approved layout drawings</td>
<td></td>
</tr>
<tr>
<td>Detailed company experience information attached</td>
<td>yes no</td>
</tr>
</tbody>
</table>

**END OF SECTION**
SECTION 02920

TOPSOIL

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: The WORK specified in this Section consists of furnishing all necessary labor, equipment, material and transportation necessary to furnish, place and prepare topsoil ready for planting. Topsoil is not available on-site.

B. Topsoil shall be 6-inches deep.

1.02 QUALITY ASSURANCE

A. Certification: When requested, the CONTRACTOR shall provide the necessary certification of topsoil that conforms to these requirements.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Topsoil shall be free of roots, brush, stumps, gravel, stones, heavy clay, frozen clods, cinders, slag, coarse fragment, trash or other extraneous materials and suitable for or capable of supporting the growth of grass or other plant life.

B. Topsoil shall be fertile, friable natural surface soil (i.e., loam, sandy loam, clay loam, silt loam, sandy clay loam or loamy sand) from well-drained sites. It shall not have a mixture of contrasting texture subsoil and shall not be delivered while in a muddy condition or contain predominantly clay material.

C. Topsoil as delivered to the site shall have an acidity range of pH 6.0 to 7.5 and shall contain not less than 15 percent organic matter by weight. If pH value is less than 6.0, lime shall be applied and incorporated with the topsoil to adjust the pH to 6.5 or higher. Lime shall consist of ground dolomitic limestone containing not less than 85 percent calcium and magnesium carbonate ground to permit 50 percent by weight to pass a No. 100 mesh screen and 90 percent to pass a No. 20 screen. Topsoil continuing soluble salts greater than 500 parts per million shall not be used. Topsoil sample tests for organic matter content, pH and soluble salts, if required, shall be made at the discretion of the ENGINEER.

D. Topsoil must be free of plants or plant parts of bermuda grass, quack grass, johnsongrass, nutsedge, poison ivy, thistles, or other perennial weeds or wood vegetation. No sod or seed shall be placed on soil which has been treated with soil sterilants or chemicals used for weed control until sufficient time has elapsed to permit dissipation of toxic materials.
PART 3 - EXECUTION

3.01 PREPARATION

A. Fine Grading: After structures, berms, pavements are completed and the piping trenches backfilled, the disturbed areas of the site shall be fine graded. Any lumber, undesirable materials and rocks larger than the 1-inch in size shall be removed from the surface and the surface shall be prepared for topsoil. The completed surface shall be shaped and sloped to drain water away from the structures. Grades on the areas that have been previously established shall be maintained.

B. Liming: Where the topsoil is highly acid, ground limestone shall be spread at the rate of 2 tons/acre (92 pounds per 1,000 square feet). Lime shall be distributed uniformly over designated areas and worked into the soil in conjunction with tillage operations as described in the following procedures.

C. Tilling: After the areas to be topsoiled have been brought to grade, and immediately prior to dumping and spreading the topsoil, the subgrade shall be loosened by discing or by scarifying to a depth of at least 2 inches to permit bonding of the topsoil to the subsoil. Pack by passing a bulldozer up and down over the entire surface area of the slope to create horizontal erosion check slots to prevent topsoil from sliding down the slope.

D. Grading: The topsoil shall be uniformly distributed with a consistent blend to a minimum of six (6) inches. Spreading shall be performed in such a manner that sodding or seeding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from placement of topsoil or other operations shall be corrected in order to prevent the formation of depressions or water pockets. Topsoil shall not be placed while in a muddy condition, when the subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading and seedbed preparation. Topsoil shall not be compacted. Immediately following placement of topsoil, the entire area shall be raked free of stones.

E. Dust Control: Provisions must be made to control dust during final grading. Water may be applied to the topsoil for dust control.

END OF SECTION
SECTION 02930

SODDING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. The extent of sodding consists of supplying and planting sod in the locations shown on the drawings generally limited to landfill side slopes, the run of the swales, around storm structures, areas of 4:1 or steeper, and in those areas where construction activity has damaged or destroyed the ground cover to the point where erosion may occur during a storm event.

B. The sodding WORK shall include, but not be limited to, supplying all labor, materials, and equipment necessary to perform sodding, fertilizing, watering, mowing, and cleanup.

1.02 QUALITY ASSURANCE

A. The ENGINEER reserves the right to test, reject, or accept all materials before application.

1.03 DELIVERY, STORAGE AND HANDLING

A. Deliver fertilizer in waterproof bags showing weight, chemical, analysis, and name of manufacturer.

B. The CONTRACTOR shall, at the time of delivery, furnish the ENGINEER invoices of all materials received in order that the minimum application rate of materials may be determined. Failure to supply invoices at the time of delivery will warrant that payment for those items be delayed until proper submittal of invoices is obtained and the minimum application rates of material may be verified.

PART 2 - PRODUCTS

2.01 SOD

A. Sod shall be Coastal Bermuda or Centipede Bahia with well matted roots.

B. The sod shall be commercial size rectangular measuring 12-inches by 24-inches or larger.

C. The sod shall be sufficiently thick to secure a dense stand of live grass, with a minimum thickness of 2-inches. The sod shall be live, fresh and uninjured at the time of planting. It shall have a soil mat of sufficient thickness adhering firmly to
the roots to withstand all necessary handling. It shall be reasonably free of weeds and other grasses.

D. Sod shall be planted as soon as possible after being harvested and shall be shaded and kept moist from the time of harvesting until it is planted.

E. The source of the sod may be inspected and accepted by the ENGINEER prior to construction.

2.02 FERTILIZER

A. The fertilizer shall be a commercial granular type with a chemical designation of 12-8-8.

B. The numerical designations for fertilizer indicate the minimum percentages (respectively) of (1) total nitrogen, (2) available phosphoric acid, and (3) water soluble potash, contained in the fertilizer.

1. At least 50 percent of the phosphoric acid shall be from a normal super phosphate or an equivalent source which will provide a minimum of two units of sulfur.

2. The amount of sulfur shall be indicated on the quantitative analysis card attached to each bag of container.

C. Commercial fertilizers shall comply with the State fertilizer laws.

D. Fertilizer may, at the discretion of the ENGINEER, upon satisfactory evidence of its feasibility from the manufacturer, be applied in liquid form.

2.03 WATER

A. The water used in the sodding operations may be obtained from any approved spring, pond, lake, stream, or municipal water system.

B. The water shall be free of excess and harmful chemicals, acids, alkalies, or any substance which might be harmful to plant growth or obnoxious to traffic.

C. Salt water shall not be used.

PART 3 - EXECUTION

3.01 GENERAL

The order of WORK for sod installation shall be as follows:

A. Fine grading
B. Removal of debris
C. Application of fertilizer
D. Placement of sod
E. Clean-up
F. Watering

3.02 SOIL MANIPULATION

A. All soil manipulation shall be done at right angles to the direction of the slope.

3.03 FINE GRADING

A. After removal of debris, fine grading shall be performed as required to bring all areas to receive grass to an acceptable smooth and finished grade. Areas to receive grass shall be fine graded by raking to eliminate wind rows, ridges, depressions and other irregularities.

B. All sodded areas bordered by paving shall have a finished grade (top of the sod) that is ½” below the grade established by the adjacent paving. All sodded areas bordered by planting areas shall have a finished grade (top of the sod) that is two inches above the soil level in the adjacent planting bed.

3.04 REMOVAL OF DEBRIS

A. Areas to receive grass shall be cleaned of all stones larger than 1” in diameter, sticks, stumps, paper, glass, and other debris which might interfere with the placement of sod, growth of grass or subsequent maintenance of grass area. All weeds shall be removed from areas to be sodded.

3.05 APPLICATION OF FERTILIZER

A. If fertilizer not already applied to topsoil, fertilizer (and/or lime) shall be spread uniformly as specified below.

1. Fertilizer application of 500 lbs. per acre.

2. Lime shall be spread at a minimum uniform rate of 250 lbs. per acre and thoroughly mixed with the soil to a depth of 4-inches.

B. Fertilizing operations will not be permitted when wind velocities exceed 15 miles per hour.

3.06 PLACING OF SOD

A. Sod size shall be as previously specified. The setting of pieces shall be staggered in such a manner as to avoid continuous seams where possible. Sod shall be moist and shall be placed on a moist earth bed. Sod shall be carefully placed by hand, edge to edge in rows at right angles to the slope, commencing at the base of the area to be sodded and working upward. Sod shall be immediately pressed firmly into contact with the sod bed by rolling with a one ton roller or any other
approved equipment. The rolling operation shall provide a true and even surface and ensure knitting without displacement of sod or deformation of the surfaces. Sod located on slopes should be placed carefully enough so that rolling with a power roller is not necessary. Sod located around retention areas, along pavement areas, or in swales may require staking. The repair of any erosion or sod relocation necessary prior to the sod becoming firmly rooted to the existing soil will be the responsibility of the CONTRACTOR. Stakes, if used, shall not interfere with the mowing of the lawn areas. All sod placed in areas with slopes steeper than 4:1 shall be staked, unless agreed to otherwise by the ENGINEER.

B. The CONTRACTOR shall ensure that the finished grade of sod placed directly adjacent to buildings or other walls does not vary more than ½" from a ten foot long straight edge.

3.07 CLEAN UP

A. Upon completion of the WORK, all debris, fertilizer bags, pallets, etc. shall be removed from the site. Any paved areas including curbs and sidewalks shall be thoroughly swept.

3.08 WATERING

A. The sod shall be kept in a moist condition after planting and for the duration of the Contract. Water shall be applied between the hours of 10:00 a.m. and 4:00 p.m.

3.09 MAINTENANCE

A. The CONTRACTOR shall, at his expense, maintain the planted areas in satisfactory condition for a period of 90 days after completion of the WORK. Such maintenance shall include watering, filling, leveling, and repairing any washed or eroded areas and additional fertilizer and sod applied to areas where satisfactory stand of grass has not been achieved.

B. Immediately prior to final inspection, the CONTRACTOR shall mow and remove clippings from the areas grassed under this Contract.

3.10 ACCEPTANCE

A. The CONTRACTOR shall schedule the laying of sod to allow the sod to be well established prior to the date of final completion. The OWNER shall not accept the sod unless the roots have grown into the top soil and the sod cannot be raised. The sod shall also show signs of health and good growth.

END OF SECTION
SECTION 02932

SEEDING AND MULCHING

PART 1 - GENERAL

1.01 DESCRIPTION

A. The WORK consists of establishing a stand of grass on the project area disturbed by the CONTRACTOR, exclusive of areas to be sodded as identified on the drawing. The CONTRACTOR will be responsible for maintaining seeded area for a period of 90 days after completion of the WORK. Also included are mulching, fertilizing, watering, and maintenance as required to produce a healthy stand of grass.

B. The CONTRACTOR’s landscaping company shall be utilized for this portion of the WORK. The CONTRACTOR shall coordinate all WORK activities described within this Section directly with the landscaping company.

1.02 SUBMITTALS

A. Certification: Certification of quality by producer shall be delivered to ENGINEER ten days prior to use.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Seed: Grass seed shall be a mix of common Bermuda, bahia grass, mixed with winter rye or browntop millet species available locally and be placed as stated in 3.02.A and B. below.

B. Wood Fibre Mulch (or equal):
   1. Conwed Hydro Mulch Fibers.
   2. Conwed Hydro Mulch 2000 Fibers.

C. Synthetic Mulch: Erosion control mulching fabric shall be S-75 Erosion Control Straw Blanket as supplied by North American Green, or equal.

D. Mulch: Straw.

E. Fertilizer: The chemical designation of fertilizer shall be as recommended by the Cooperative Extension Service and shall comply with the State fertilizer laws.
PART 3 - EXECUTION

3.01 PREPARATION

A. Preparation of Area to be Seeded: The ground to be seeded shall have 6 inches of topsoil placed according to Section 02920 – Topsoil. The topsoil layer shall be prepared for fertilizing and seeding by disc harrowing and thoroughly pulverizing the soil to a depth of 3 to 4 inches. The prepared soil shall be loose and reasonably smooth. It shall be reasonably free of large clods, roots and other material that will interfere with the WORK and subsequent mowing and maintenance operations. Hand picking may be required.

B. Soil analysis: Before applying fertilizer, the topsoil soil characteristics, including pH, shall have met the requirements of Section 02920 – Topsoil.

3.02 APPLICATION

A. General:

1. Weather Limitations: Fertilizing, seeding, or mulching operations will not be permitted when wind velocities exceed 15 miles per hour. Seed shall be sown only when the soil is moist and in proper condition to induce growth. No seeding shall be done when the ground is frozen or is unduly wet, or otherwise not in a tillable condition.

2. Sequence of Operations: The operations involved in the WORK shall proceed in the following sequence: Preparation and fertilizing of the ground, seeding, and installation of mulch, and placement of erosion control fabric on slopes greater than 3 horizontal to 1 vertical slope ratio.

B. Seasonal:

1. Summer application: Between April 1st and September 30th a combination of Browntop millet at 6 lbs/1000 square feet, hulled Bermuda at 2 lbs/1000 square feet and bahia grass at 6 lbs/ 1000 square feet shall be applied.

2. Winter application: Between October 1st and March 31st a combination of Winter rye at 6 lbs/1000 square feet, unhulled Bermuda at 3lbs/1000 square feet and bahia grass at 6 lbs/ 1000 square feet shall be applied.

C. Fertilizing and Seeding: While the soil is still loose and moist, the seed shall be scattered uniformly over the grassing area.

D. Rolling: Immediately after completion of the mulching, the entire seeded and mulched area shall be rolled thoroughly with the equipment specified. At least two trips over the entire area will be required.
E. Mulching fabric:

1. Mulching fabric shall be installed in accordance with the manufacturer's directions as required by the conditions.

2. On slopes greater than 3 horizontal to 1 vertical slope ratio, mulching fabric shall be applied parallel to the slope direction. In drainage swales, mulching fabric shall be installed parallel to the direction of flow.

3. Fabric shall be draped loosely, without stretching, so that continuous ground contact is maintained.

4. Overlapping and joining of adjacent rolls of fabric should be done in accordance with the manufacturer's instructions.

5. Where mulching fabric is not required, straw mulch or wood fibre mulch shall be applied at the following rates:
   a. Straw mulch shall be applied at a rate of 1000 pounds per acre.
   b. Hydraulic Mulching: Wood fibre mulch shall be applied at the following rates:
      1) Flat surfaces to 3 to 1 slopes 2,000 lbs./acre
      2) Critical areas, and > 3 to 1 slopes erosion control fabric

F. Watering: The seeded area shall be watered so as to provide optimum growth conditions for the establishment of the grass. In no case, however, shall the period of maintaining such moisture be less than one week after the planting.

G. Single Hydraulic Application: Using the standard hydraulic mulching equipment, the wood fiber mulch, seed, and fertilizer, may be applied as a combined slurry in a single application, provided that the seed and fertilizer are increased by 25% by weight.

H. Maintenance:

1. The CONTRACTOR shall, at his expense, maintain the seeded areas in a satisfactory condition for 90 days after completion of the WORK. Such maintenance shall include the repairing of mulching fabric or any damaged areas where the establishment of the grass stand does not appear to be developing satisfactorily, or where erosion has washed away an area and filling and leveling are required.

2. Replanting or repair necessary due to the CONTRACTOR's negligence, carelessness or failure to provide routine maintenance shall be at the CONTRACTOR's expense.

END OF SECTION
DIVISION 11

EQUIPMENT

[Stamp with North Carolina Professional Engineer Seal]

Albert Glenn
1/9/2020
SECTION 112170
CONDENSATE SUMPS

PART 1 - GENERAL

1.01 DESCRIPTION
A. Scope of Work: The CONTRACTOR shall provide all equipment, materials, and labor needed to install prefabricated condensate sumps as specified herein and as indicated on the Drawings.

B. Related Work Described Elsewhere:
   1. Construction Drawings
   2. Division 31 - Earthwork
   3. Division 33 - Utilities

1.02 SUBMITTALS
A. The CONTRACTOR shall prepare and submit to the ENGINEER, for review and approval, three (3) copies of catalog cuts on materials furnished; shop drawings showing dimensions, materials, and configuration of the sump assemblies; structural or buoyancy calculations sealed by a professional engineer registered in one of the 50 states; test results; and manufacturers’ information and instructions pertaining to the storage, handling, installation, and inspection of the assemblies.

PART 2 - PRODUCTS

2.01 SUMP
A. The sumps shall be fabricated of PE 340B Extra High Molecular Weight (EHMW) High Density Polyethylene (HDPE) Cell Class 345444C, or equal. Tank walls, top, and bottom shall be designed and fabricated to withstand the following pressures and forces:
   1. A vacuum (negative pressure) of 60 inches of water.
   2. Resistance to a buoyancy force of eight feet of water.
   3. The earthen backfill will create the equivalent of 35 pcf of fluid pressure.
   4. The forces and impacts that typically occur in loading, unloading, shipping, handling at the job site, and installation.
B. Joints shall be fused for their entire lengths. The complete sump shall be airtight, air-tested in the factory and results provided. Air testing shall be at 5 psig for a minimum of 1-hour. There shall be no pressure drop except for what can be documented for an air temperature difference.

2.02 APPURTENANCES

A. Appurtenances such as the pipe stub-outs, access manway, and interior piping, shall be fabricated of like material or compatible HDPE material.

PART 3 - EXECUTION

3.01 EXCAVATION AND BACKFILL

A. Excavation, temporary sheeting, shoring, and bracing, and backfill shall comply with Division 31 specifications and the Construction Drawings.

B. According to site information, groundwater is within the sump excavation.

C. Excavated soil material can be used to backfill around the installed sump.

D. Backfill shall be compacted in 1-foot lifts using suitable equipment approved by the ENGINEER.

3.02 INSTALLATION

A. The sump assembly shall be placed on a minimum of 6 inches of NCDOT #57 stone.

B. The CONTRACTOR shall use care in handling and installing the sump assemblies, and in backfilling so as to avoid damage. The CONTRACTOR shall be responsible for repairing any damage. Installation shall comply with the manufacturers’ recommendations and approved by the ENGINEER.

3.03 TESTING

A. Air pressure tested at the factory, and air-test results provided. Air testing shall be at 5 psig for a minimum of 1-hour. There shall be no pressure drop except for what can be documented for an air temperature difference.

END OF SECTION
DIVISION 30

LANDFILL GAS (LFG)
SECTION 312000
EARTH MOVING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope: CONTRACTOR shall provide all labor, materials, soils, equipment, and incidentals to excavate, trench, and backfill to install pipe and appurtenances, and regrade disturbed areas as shown on the Construction Drawings, and described in this Section.

B. The WORK specified in this Section includes the trenching and trench backfilling activities associated with installation of the LFG extraction wells, LFG lateral pipe, air supply pipe and LFG condensate dewatering forcemain; and any other WORK requiring drilling, excavation, or trenching and trench backfilling.

C. WORK under this Section includes trenching activities both in and outside of municipal solid waste (MSW).

D. No classification of type of excavated materials will be made. Excavation includes all soil, and waste materials if encountered, regardless of type, character, composition, moisture, or condition thereof.

1.02 PROJECT CONDITIONS

A. Existing Structures within the project limits include, but are not limited to above and below ground structures such as:

1. Stormwater drainage structures
2. Existing landfill gas wells
3. Header and lateral pipe
4. Above and below ground utilities
5. Drainage culverts
6. Leachate pump stations
7. Leachate forcemain
8. Leachate cleanouts
9. Roads
B. 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.

C. Structures shall be supported and protected from damage by the CONTRACTOR. If structures are broken or injured, CONTRACTOR shall restore structures to their original condition at no additional cost to the OWNER. Repair of damaged features or structures shall be approved by the ENGINEER and OWNER.

1.03 SITE ACCESS

WORK shall be performed so as to not block or hinder site access, except as authorized by the OWNER.

1.04 SAFETY

A. All WORK shall be performed in strict accordance with the Health and Safety requirements set forth in the General Conditions of the Contract Documents.

B. All work shall be performed in strict accordance with all local, State, U.S. Occupational Safety and Health Administration (OSHA) and other applicable Federal regulations regarding trenching operations and trench safety.

C. Excavation may be made without sheeting and bracing within the limitations and requirements of the governmental agencies having jurisdiction. Failure of the ENGINEER to order the use of bracing or sheeting and shoring or direct changes to systems in place, shall not in any way or to any extent relieve the CONTRACTOR of any responsibility concerning the condition of excavations or of his obligations under the Contract. The CONTRACTOR shall be responsible for the condition of all excavations. All slides and caves shall be removed without extra compensation, at whatever time and under whatever circumstances that they may occur.

D. All excavation shall comply with the applicable requirements as stated in the following:

   1. OSHA trenching and excavation safety regulations Subpart P of Part 1926, as revised.

   2. Trench safety guidelines as specified by the Landfill Gas Division of the Solid Waste Association of North America (SWANA).

1.05 SUBMITTALS

A. Health and Safety Plan, as described in the General Conditions of the Contract Documents.
B. CONTRACTOR daily logs detailing length of trench excavated and backfilled, with reference to pipe stationing and details sufficient to properly describe the work completed to date.

PART 2 - PRODUCTS

2.01 PIPE BEDDING AND SOIL BACKFILL

A. To the maximum extent practical, CONTRACTOR shall separate excavated cover soils overlying refuse and reuse clean soils for pipe bedding and trench backfill.

B. For excavations outside the limits of waste, or above the geomembrane cap, CONTRACTOR shall reuse excavated soils from trenching for backfilling around installed pipe, unless directed otherwise by ENGINEER. Reused soils shall conform to Part 2.01 D. and E. of this Section.

C. Beyond the reusable quantities of soil described above, the CONTRACTOR shall provide appropriate pipe bedding and soil backfill material from an off-site source.

D. These soils shall generally be free of sticks, roots, organic matter, and stones larger than 1-inch in any dimensions. Pipe bedding and backfill soils shall be approved by the ENGINEER.

E. Pipe bedding material shall be appropriate for spreading with hand tools and compaction with vibratory compactor to provide a level and stable surface for pipe placement. Pipe bedding and backfill soils shall be approved by the ENGINEER.

2.02 NON-CALCAREOUS STONE

A. Stone beneath concrete shall be classified as Alternate Base Course (ABC).

PART 3 - EXECUTION

3.01 PREPARATION

A. Identify required lines, levels, contours and datum locations.

B. Locate, identify and protect utilities from damage.

C. Protect benchmarks, survey control points, monitoring wells, geomembrane cap (where present), existing structures and fences from excavating equipment and vehicular traffic.
3.02 PRE-CONSTRUCTION LAYOUT

A. Prior to trenching and pipe installation, CONTRACTOR shall stake out the entire proposed trench alignment both within and outside the limits of waste. The proposed alignment must be approved by the ENGINEER prior to the CONTRACTOR beginning excavation activities. This pipeline route staking need not be completed by a licensed surveyor.

B. Survey stakes shall be set to a depth so as to not penetrate the existing geomembrane cap below grade. Any damage to the cap shall be repaired by CONTRACTOR at no additional cost to the OWNER.

C. LFG header and lateral route on the landfill shall be staked to allow for the minimum pipe slopes listed in this specification and on the Plans.

D. Survey notes with proposed pipe slope calculations shall be submitted to the ENGINEER for approval prior to pipe installation. Notes of pre-construction survey shall identify conflicts between the proposed WORK and existing features.

3.03 EXCAVATION

A. Excavated cover material shall be separated from excavated refuse wherever possible and any cover material free of refuse may be reused as backfill material, pursuant to the requirements of Part 2.01 of this Section.

B. Waste materials shall be direct loaded into transport vehicles and hauled by CONTRACTOR to the operating portion of the landfill for disposal during normal operating hours. At no time shall excavated waste be stockpiled adjacent to the excavations.

C. Excavate to lines, grades and dimensions necessary to complete the WORK.

D. Trenching Tolerances:

1. Excavate to install pipes in straight runs at a uniform grade, without sags or humps, between vertical and horizontal control points in accordance with the Construction Drawings.

2. Minimum trench width shall be as shown on the Plans.

3. Maintain a minimum of 1.5 feet of soil cover over the top of the pipe, except where shown otherwise on the Plans, or approved by ENGINEER.

E. CONTRACTOR may not excavate more trench daily than can be completely backfilled after installation of the pipe the same day. Excavations shall not be left open overnight.
F. CONTRACTOR shall use appropriate survey/level instrumentation during excavation to ensure proper trench slope. Verification of installed pipe slope shall be as specified in Part 3.06.

G. Minimum trench slopes shall be as shown on the Plans or approved by the ENGINEER. Landfill gas laterals shall be installed with at least 3 percent slope toward the header into which it connects.

3.04 DEWATERING

A. Water that enters excavations in refuse shall be considered landfill leachate and shall not be discharged to the ground or other means that are typical for stormwater. Water in trench excavations in the refuse shall be pumped into sealed tanks and hauled and discharged into the on-site leachate lagoon.

B. The CONTRACTOR shall at all times during construction provide and maintain proper equipment and facilities to remove water entering excavations. CONTRACTOR shall keep such excavations dry so as to obtain a satisfactory foundation condition for all work.

C. 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 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.

D. For excavations not in refuse, 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.

E. Disposal of Water Removed by Dewatering System:

1. Water conveyed away from excavations which has not contacted refuse materials shall be discharged to areas, as approved by the ENGINEER.

2. Dispose of water by procedures approved by the ENGINEER in such a manner as to cause no inconvenience to the OWNER, the ENGINEER, or others involved in work about the site.
3. Water conveyed away from excavations which has contacted refuse materials shall be pumped into spill-proof containers and discharged into the leachate collection sump as directed by the OWNER.

F. If pipe trench becomes watered-in after placement of pipe, but before backfilling, CONTRACTOR shall dewater the trench, demonstrate that the pipe bedding and pipe slope remain satisfactory, and upon approval by the ENGINEER, backfill the pipe with clean dry soil in accordance with Part 2.01 of this Section.

3.05 ROAD CROSSING

A. CONTRACTOR shall schedule and coordinate all road crossings with OWNER to minimize disruption of waste disposal operations.

B. HDPE pipes shall be encased in a corrugated metal pipe (CMP) for protection. The inner diameter of the CMP shall be a minimum of four (4) inches larger than the outside diameter of the HDPE pipe or pipes.

3.06 PIPE SURVEY

A. CONTRACTOR shall verify that pipe slope meets the requirements specified in this Section and on the Construction Drawings at 10-foot intervals along LFG laterals and header and record such information in the project notes. Station numbering shall be used and marked on the pipe, as approved by the ENGINEER.

1. CONTRACTOR shall measure each length of installed pipe and mark the 10-foot stations.

2. Survey equipment shall be used to measure the change in relative elevation between each 10-foot station.

3. The change in elevation and slope for each 10-foot section shall be recorded in the CONTRACTOR’s project notes.

4. A trench laser will not be considered acceptable survey equipment for the purpose of verifying pipe slope.

B. The project notes detailing the required pipe slope confirmation shall be provided daily to the ENGINEER and shall be checked by the OWNER or ENGINEER prior to proceeding with backfilling.

C. A conformance survey shall be conducted on all installed pipe and structures prior to backfilling the trench or after using temporary survey markers. The survey shall document the horizontal and vertical location of the top of the landfill gas laterals, air supply lines, and forcemain pipes at a minimum 100-foot interval and at each change in pipe direction, grade break, fitting, connection, pipe crossover, and tie-in along the entire pipeline routes. The survey shall also document the type of pipe, location (horizontal and vertical coordinate) of structures and appurtenances such as, but not limited to, valves, road crossing CMP casing, pipe crossing, and tie-ins. This surveying shall be sealed by a licensed North Carolina
Professional Land Surveyor as described in Section 017700, Field Engineering and Survey.

3.07 BACKFILLING

A. Backfill materials shall be as described in Part 2 of this Section.

B. CONTRACTOR shall notify OWNER or Owner Representative prior to beginning backfilling. The OWNER or Owner Representative shall inspect all pipe, fittings and connections prior to approving backfilling. If CONTRACTOR backfills pipe without inspection of the pipe while pipe is installed in the open trench, CONTRACTOR shall uncover all uninspected buried pipe so that it may be properly inspected. This shall be done at no additional cost to the OWNER.

C. Place bedding material in trench to the lines and grades shown on the Plans.

D. Bedding material shall be placed in the trench ensuring material is placed under the haunch of the pipe. The bedding shall be poured into place, not pushed, and shall be raked by hand and then compacted using a mechanical compaction device such as walk-behind vibratory compactor, in a loose lift not to exceed six (6) inches above the top of the pipe.

E. Backfilling procedures shall be modified as necessary as approved by ENGINEER in order to not displace (either horizontally or vertically) piping installed in trench during backfill or bedding placement.

F. Place soil backfill in maximum 6 inch lifts above pipe bedding to the existing grade. CONTRACTOR shall compact soil backfill in 6 inch lifts with a mechanical compaction device such as a walk-behind vibratory compactor. Compaction shall be to a density where subsequent passes with the mechanical compaction device will not reduce the surface elevation of the bedding material by more than three-quarters of an inch shall.

3.08 WASTE DISPOSAL

A. The CONTRACTOR shall notify the OWNER a minimum of 24 hours in advance of planned excavation of landfill refuse. In the event landfill refuse is inadvertently excavated or disturbed, the CONTRACTOR shall notify the OWNER immediately.

B. The CONTRACTOR shall be responsible for loading and transporting refuse to the landfill working face, or other area as directed by the OWNER for disposal. The OWNER will not charge CONTRACTOR a tipping fee, but CONTRACTOR shall be responsible for all other costs. Excavated refuse shall be direct-loaded into transport vehicles and hauled by CONTRACTOR to the landfill working face. At no time shall excavated waste be stockpiled adjacent to the excavations.
3.09 GRADING DISTURBED AREAS

CONTRACTOR shall regrade and return to their original condition, as determined by the OWNER and the ENGINEER, all areas disturbed by CONTRACTOR’s work. This includes, but is not limited to ruts caused by construction equipment, soil stockpile areas, and landfill benches and terraces used for access.

3.10 REVEGETATION

A. Disturbed areas within the MSW Landfill shall be sodded. Areas outside of the MSW Landfill shall be seeded and matted with ENGINEER approved seed mixture and temporary erosion control straw matting. CONTRACTOR shall apply fertilizer and topsoil as necessary to provide suitable conditions for growth.

B. CONTRACTOR shall maintain (i.e., fertilize and water only, as necessary) revegetated areas until grass becomes established as determined by the OWNER.

C. Until accepted by OWNER as established vegetation, areas of dead grass or no or marginal grass shall be replaced by CONTRACTOR at no additional cost to the OWNER.

3.11 GEOMEMBRANE CAP

A. At each extraction well installed, CONTRACTOR shall repair geomembrane and geocomposite cap components to the satisfaction of the OWNER.

B. CONTRACTOR shall avoid damaging geomembrane cap during trenching and pipe installation. The approximate limits of the cap are shown on the Construction Drawings. The CONTRACTOR is encouraged to review the Record Drawings for the partial closure areas to become familiar with the cap system.

C. CONTRACTOR shall repair any damage caused to cap geomembrane or geocomposite by any work or activities related to this project at no additional cost to the OWNER.

D. CONTRACTOR shall conduct at their own cost all necessary geomembrane and geocomposite patches, fusing, testing and certification of repairs to the satisfaction of the ENGINEER in accordance with industry standard practices and protocol.

END OF SECTION
SECTION 330533
HIGH DENSITY POLYETHYLENE PIPE

PART 1 - GENERAL

1.1 DESCRIPTION

A. CONTRACTOR shall supply all materials, equipment, and labor needed to install and ready for use all HDPE pipe, pipe fittings, and appurtenances as specified herein and as indicated on the Construction Drawings.

1.2 SUBMITTALS

A. CONTRACTOR shall prepare and submit to the ENGINEER, for review and approval, certificates of compliance on materials furnished and manufacturer's brochures containing complete information and instructions pertaining to the storage, handling, installation, inspection, maintenance, and repair of each type of pipe and pipe fitting furnished. Cut sheets with dimensions shall be submitted for each fitting.

1.3 REFERENCE

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. The latest editions of these documents at the time of contract award are the applicable versions.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 1248     Specification for Polyethylene Plastics Molding and Extrusion Materials

ASTM D 2321     Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe

ASTM F 714      Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter

ASTM D 2774     Practice for Underground Installation of Thermoplastic Pressure Piping

ASTM D 3350     Specification for Polyethylene Plastics Pipe and Fittings Materials

PART 2 - PRODUCTS

2.1 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

A. General:

1. All pipe and fittings intended for landfill gas shall be high density polyethylene pipe using a PE3408 or PE4710 type resin, or approved equal.

2. Pipe shall be extruded from a Type III, Class C, Category 5, Grade PE34 compound as described in ASTM D 1248. It shall be classified as cell 345464C according to ASTM D 3350 and have the material designation of PE 3408. The pipe shall be manufactured to meet the requirements of ASTM F 714. Manufacturer's literature shall be adhered to when "manufacturer's recommendations" are specified. Acceptable manufacturers include Performance Pipe, Central Plastics, Rinker Materials Polypipe, or approved equal.

B. 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. For storage over 5 days, a location shall be chosen out of direct sunlight or the piping and fittings shall be covered.

2.2 FLANGES FOR HDPE PIPE

A. Flanges for HDPE pipe shall have convoluted ASTM 316 stainless steel back-up rings, with a minimum thickness of 1-inch.

B. Studs and bolts, nuts, and washers for flanges shall be ASTM 316 stainless steel or as shown on the Construction Drawings.
2.3 QUICK DISCONNECT COUPLINGS

A. Quick disconnect couplings shall consist of Delrin Acetal bodies with stainless steel springs, latches and pins, rated at a minimum of 120 psi. The coupling shall be ¼-inch NPT, shutoff type as manufactured by Colder Products Company or equal.

PART 3 - EXECUTION

3.1 HDPE PIPE HANDLING

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.
   a. Mechanical Joining 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.
   b. 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. Branch saddle fusions shall be made in accordance with manufacturer's recommendations and step by step procedures. Branch saddle fusion equipment shall be of the size to facilitate saddle fusion within the trench. Heat fusion shall be performed outside of the trench 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.
   c. No fusion shall be performed in the rain or wet conditions.
   d. Electrofusion couplings may be installed in accordance with the manufacturer’s recommendations.

3.2 HDPE PIPE INSTALLATION

A. Pipe installation shall comply with the requirements of ASTM D 2321, PPI TR-31/9-79, and the manufacturer's recommendations.
B. ENGINEER shall be notified prior to any pipe being installed in the trench 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. Proper trench slope.
5. Trench contour to ensure the pipe will have uniform and continuous support.

C. Any irregularities found by the ENGINEER 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.

D. Tie-ins shall be made out of the trench whenever possible. When tie-ins can only be made in the trench, a bell hole shall be excavated large enough to ensure an adequate and safe work area.

E. All branch saddle connections shall be made within the trench. For such operations, a bell hole shall be excavated large enough to ensure an adequate and safe work area.

3.3 FLANGED CONNECTIONS

A. Flanged connections for PE pipe shall be made with two PE flange adapters with stainless steel back-up rings for bolting.

B. CONTRACTOR shall wrap and tape the flanges and bolts in 5-mil polyethylene sheeting prior to backfilling to help protect the assembly from corrosion.

3.4 SEGMENT TESTING FOR HDPE PIPE

A. All HDPE pipes shall be subjected to an air test as described herein and in accordance with ASTM F 1417 to detect any leaks in the piping. Testing shall be performed below grade (inside the trench). CONTRACTOR shall accept the responsibility for location, uncovering (if previously backfilled), and repairing any leaks detected during testing. For dual containment piping, segment testing shall be performed separately on both product and containment pipes.

B. Segments shall be connected to a testing apparatus on one end and fitted with caps on all openings.
C. The segment to be tested shall be allowed time to reach constant and/or ambient temperature before initiating the test.

D. The test shall 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.

E. The test pressure for LFG pipe shall be at 4 psig and the forcemain and compressed air pipe at 100 psig, or as approved by ENGINEER.

F. Pressure drop during the test shall not exceed 10 percent of the testing gauge pressure over a period of one (1) hour. This pressure drop shall be corrected for temperature changes before determining pass or failure. The ENGINEER or OWNER’s CQA REPRESENTATIVE shall document test compliance.

G. The ENGINEER or OWNER’s CQA REPRESENTATIVE shall be notified prior to commencement of the testing procedure and shall be present during the test.

END OF SECTION
SECTION 335120
LFG SYSTEM VALVES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: The CONTRACTOR shall provide all materials, equipment, and labor needed to install and make ready all valves as specified herein and as indicated on the Drawings.

B. Related Work Described Elsewhere:

1. Section 330533 - High Density Polyethylene Pipe
2. Construction Drawings

1.02 SUBMITTALS

A. The CONTRACTOR shall prepare and submit to the ENGINEER, for review and approval, manufacturer's brochures containing complete information and instructions pertaining to the storage, handling, installation, inspection, maintenance, operation, and repair of each type of valve furnished. Shop drawings shall be submitted for butterfly valve assemblies requiring spacers per this specification.

PART 2 - MATERIALS

2.01 GENERAL

A. All valves shall be complete with all necessary operators, actuators, handwheels, 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.

B. Valves shall be suitable for the intended service. Renewable parts including discs, packing, and seats shall be of types recommended by valve manufacturer for intended service, but not of a lower quality than specified herein.

C. Valves and operators shall be suitable for buried or exposed conditions, as applicable. Valves shall have all safety features required by OSHA.

D. Unless otherwise shown on the Construction Drawings, valves shall be the same size as the adjoining pipe.
E. Monitoring parts and hoses shall be provided at each buried isolation valve. Ports threaded into header shall be Swagelock ¼-inch SS-420-1-4 x1/4” MPT, or approved equal. Monitoring hose shall be stainless steel teflon-lined hose with Swagelock tube ends, model SS-4BHT-36, or approved equal, of adequate length to extend above grade (above-specified length is for 3-foot long tubing section). Sampling end shall have a ¼-inch female connector SS-420-7-4 with a quick-connect polypropylene monitoring port by Ryan Herco, Part No. 0812-002.

2.02 BUTTERFLY VALVES

A. Header isolation 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. Stem extensions shall be stainless steel in a CPVC Body with CPVC disc with a gear box assembly and visual valve position indicator mounted on top and equipped with a removable manual operating wheel. Monitoring ports at the butterfly valves shall be quick-connects as specified above and shown on the Drawings.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Valves shall be installed in accordance with the manufacturer's recommendations and the following:

1. Butterfly valves shall be installed between two flanges as shown on the Drawings; care shall be taken to avoid stripping bolts when tightening.

2. Flanges shall be joined with 316 stainless steel studs and nuts. All below grade studs and nuts shall be coated with anti-seize compound, or approved equivalent, after installation and prior to backfilling. Stud and nut diameters shall be sized as recommended by the manufacturer for each size valve. Stud lengths shall accommodate the required distance between flanges including spacers, if necessary.

B. The CONTRACTOR shall wrap and tape the valve, flanges, and bolts in 5-mil polyethylene sheeting prior to backfilling to help protect the valve assembly from corrosion.

C. Flanged butterfly valves may require spacers between the flange adapters and the valve body in order to allow full travel of the internal disk. If spacers are necessary for any butterfly valve, the CONTRACTOR will install valve spacers subject to the approval by the ENGINEER.