

# CONTRACT DOCUMENTS

FOR THE CONSTRUCTION OF THE



## CAJA DEL RIO LANDFILL CELL NO. 5B CONSTRUCTION

**BID No. '14/43/B**

### SPECIFICATIONS

VOLUME 1 OF 1  
DIVISION 0 – DIVISION 16

PREPARED FOR THE  
SANTA FE SOLID WASTE MANAGEMENT AGENCY  
SANTA FE, NEW MEXICO

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For information regarding this project, contact  
Kerrie L. Greenfelder, P.E., BCEE  
CDM Smith, Inc.  
(505) 243-3200

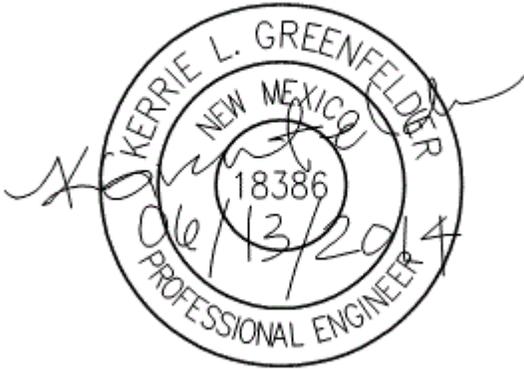


CDM Smith Project No. 1257-91152  
June 2014

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I, Kerrie L. Greenfelder, Registered Professional Engineer No. 18386 hereby certify that these contract documents for Santa Fe Solid Waste Management Agency, Caja del Rio Landfill, Cell No. 5B Liner Construction were prepared by me, or directly under my supervision, and are true and correct to the best of my knowledge and belief.



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Registered Professional Engineer  
State of New Mexico

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**SANTA FE SOLID WASTE  
MANAGEMENT AGENCY**

**REQUEST FOR BIDS**

**BID NO. '14/43/B**



**CONTRACT DOCUMENTS  
AND SPECIFICATIONS  
FOR  
CAJA DEL RIO LANDFILL  
CELL 5B LINER CONSTRUCTION**

**JUNE 16, 2014**

**BIDS DUE:**

**JULY 11, 2014 at 2:00 P.M.**

**PURCHASING OFFICE**

**CITY OF SANTA FE**

**2651 SIRINGO ROAD – BUILDING “H”**

**SANTA FE, NEW MEXICO 87505**

**CAJA DEL RIO LANDFILL  
CELL 5B LINER CONSTRUCTION  
BID NO. '14/43/B**

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# **Section 1 Invitation to Bid**

**SANTA FE SOLID WASTE MANAGEMENT AGENCY  
ADVERTISEMENT FOR BIDS**

INVITATION TO BID NO.: '14/43/B

SEALED BID FOR: Santa Fe Solid Waste Management Agency (SFSWMA)  
Caja del Rio Landfill  
Cell 5B Liner Construction

BID SCHEDULE  
Advertisement: June 16, 2014  
Issuance of Bid Packages: June 16, 2014  
Pre-Bid Conference: June 30, 2014 @ 10:00 a.m. @ SFSWMA  
Bid Opening: July 11, 2014 @ 2:00 p.m.  
Bid Award (Joint Powers Board): August 21, 2014  
Notice to Proceed: September 8, 2014 (Estimated)

TO BE OPENED AT: City Purchasing Office  
City of Santa Fe  
2651 Siringo Road, Building H  
Santa Fe, NM 87505

TIME: 2:00 p.m. Local Prevailing Time

DATE: July 11, 2014

ADDRESSED TO: Mr. Robert Rodarte  
Purchasing Director  
City of Santa Fe  
2651 Siringo Road, Building H  
Santa Fe, NM 87505

**PRE-BID CONFERENCE:** A non-mandatory pre-bid conference will be held at 10:00 a.m. on June 30, 2014, at the Nancy Rodriguez Community Center in the Traditional Village of Agua Fria, 1 Prairie Dog Loop, Santa Fe, NM 87507. The pre-bid conference will provide significant aspects of the project and address any potential bidder questions. Immediately after the pre-bid conference, bidders may participate in an optional site visit of the liner construction project at the Caja del Rio Landfill with representatives from CDM Smith Inc. (Engineer) and Santa Fe Solid Waste Management Agency (Owner).

Bids will be received until the above time, then opened publicly at the City of Santa Fe Purchasing Office, 2651 Siringo Road, Building H, Santa Fe, New Mexico and read aloud. Bids received after the above time will be returned unopened.

Contract Documents may be reviewed at the following address:

Santa Fe Solid Waste Management Agency  
Attn: Rosalie Cardenas  
(505) 424-1850  
Caja del Rio Landfill  
149 Wildlife Way  
Santa Fe, NM 87506

**OBTAINING CONTRACT DOCUMENTS:** Construction Plans, Specifications and other Contract Documents may be obtained at the following address:

Academy Reprographics  
8900-N San Mateo Blvd NE  
Albuquerque, NM 87113  
Phone: (505) 821-6666  
Email: [plot@acadrepro.com](mailto:plot@acadrepro.com)

Prospective bidders may go directly to Academy Reprographics' web site ([www.acadrepro.com](http://www.acadrepro.com)) to review or obtain (for a fee) a complete set of the Contract Documents, including plans and specifications. Bidders are advised that the cost of the CD and/or any costs to reproduce hard copies of the Contract Documents or portions thereof are non-refundable. Bidders may also view the Contract Documents at <http://www.santafenm.gov/bids.aspx>.

Bids for the project will be presented in the form of a unit price or lump sum bid as indicated on the **Bid Form**. The bidder shall bid all items listed. Each bidder must conform to the conditions specified in the section entitled **Instructions for Bidders**.

**BID GUARANTEE:** Each bid shall be accompanied by an acceptable form of bid Guarantee (Bid Security) in an amount equal to at least five percent (5%) of the amount of the bid payable to the Santa Fe Solid Waste Management Agency as a guarantee that if the bid is accepted, the Bidder will execute the Contract and file acceptable **Performance and Labor and Material Payment Bonds** within fifteen (15) days after the award of the Contract.

The bid shall also include a signed **Non-Collusion Affidavit of Prime Bidder**, a signed **Certificate of Bidder Regarding Equal Employment Opportunity**, **Certificate of Nonsegregated Facilities**, and **Acknowledgement for Receipt of Addenda**. The successful Bidder shall, upon notice of award of Contract, secure from each of his subcontractors a signed **Non-Collusion Affidavit of Subcontractor**. Bidders must possess an applicable license to perform the Work under this Contract, provided for in the New Mexico Construction Industries Rules and Regulations.

**The Work specified in the Contract Documents shall be complete within seventy five (75) calendar days following issuance of a notice-to-proceed to the successful Bidder. Following the seventy five (75) calendar day contract time, SFSWMA will impose liquidated damages for failure to comply with this time limit, as specified in the Contract Documents.**

**Performance Bond and Labor & Material Payment Bond**, each 100% of the Contract sum, will be required of the successful Bidder entering into the construction Contract.

Bids will be held for sixty (60) days subject to action by the Owner.

**OWNERS RIGHTS RESERVED:** The Santa Fe Solid Waste Management Agency, herein referred to as the Owner, reserves the right to reject any or all bids and to waive any formality or technicality in any bid in the best interest of the Owner.

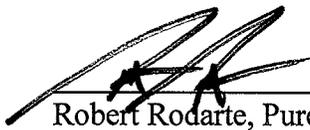
The Work to be performed in this project consists of furnishing all equipment, labor and materials for the construction of the Caja del Rio Landfill Cell 5B Liner Construction in accordance with the Construction Plans, Specifications, and other Contract Documents.

Wages paid on this project shall not be less than the minimum prevailing wage rates listed in the Contract Documents.

To receive a resident or resident veteran contractor preference pursuant to Section 13-4-2 NMSA 1978, a resident or resident veteran contractor shall submit with its bid a copy of a valid resident or resident veteran contractor certificate issued by the New Mexico Taxation and Revenue Department pursuant to Section 13-1-22 NMSA 1978.

**EQUAL OPPORTUNITY IN EMPLOYMENT:** All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, or national origin. Bidders on this work will be required to comply with the Presidents Executive Order No. 11246 as amended.

**ATTEST:**

  
\_\_\_\_\_  
Robert Rodarte, Purchasing Officer

Received by the Santa Fe New Mexican on: June 11, 2014  
To be published on: June 16, 2014

Received by the Albuquerque Journal on: June 11, 2014  
To be published on: June 16, 2014

## **Section 2**

# **Instructions to Bidders**

## **INSTRUCTIONS FOR BIDDERS**

Bids are requested by the Santa Fe Solid Waste Management Agency for Construction of the Caja del Rio Landfill Cell 5B Liner in accordance with the Construction Plans, Specifications and Contract Documents.

1. **LOCATION AND DESCRIPTION OF WORK:** The Work under this Contract is located on-site at the Caja del Rio Landfill, 149 Wildlife Way, Santa Fe, New Mexico 87506. The Work consists of construction for Cell 5B, including earthwork, berms, subgrade, geosynthetic clay liner, geomembrane, geotextile, in-cell piping, drainage layer, leachate pumps, and solar powered leachate level sensors, as shown and specified in the Construction Plans, Specifications and Contract Documents.
2. **TIME AND PLACE OF RECEIVING AND OPENING BIDS:** This information will be found in the "Advertisement for Bids" form attached hereto. A bid received after the specified time will not be considered and will be returned to the Bidder unopened.
3. **SPECIFICATIONS:** The construction of this project will be in accordance with the General and Supplemental Conditions, Technical Specifications, and Construction Plans contained in the Contract Documents.
4. **CONTRACT DOCUMENT DEPOSIT:** Prospective bidders may go directly to Academy Reprographics' web site ([www.acadepro.com](http://www.acadepro.com)) to review or obtain (for a fee) a complete set of the Contract Documents, including plans and specifications. Bidders are advised that the cost of the CD and/or any costs to reproduce hard copies of the Contract Documents or portions thereof are non-refundable.
5. **DEFINED TERMS:** Terms used in these Instructions to Bidders have the meanings assigned to them in the General and Supplemental Conditions.
6. **EXAMINATION OF CONTRACT DOCUMENTS AND SITE:** Before submitting the bid, each Bidder must (a) examine the Contract Documents thoroughly, (b) visit the site to familiarize himself with local conditions that may in any manner affect performance of the Work, (c) familiarize himself with Federal, State and local laws, ordinances, rules and regulations affecting performance of the Work; and (d) carefully correlate his observations with the requirements of the Contract Documents. The submission of a Bid constitutes representation by Bidder that Bidder has complied with every requirement of this section and that the Contract Documents are sufficient in scope to indicate and convey understanding of all terms and conditions for performance of the Work.
7. **THE COMPLETE CONTRACT DOCUMENTS CONTAIN THE FOLLOWING:** Everything that is bound herein, as well as project Construction Plans, General and Supplemental Conditions, and Technical Specifications referenced herein.
8. **INTERPRETATIONS:** All questions about the meaning or intent of the Contract Documents shall be submitted to the Owner in writing. Replies will be issued by Addenda mailed, emailed, or faxed to all parties recorded by the Owner as having received the Documents at least two (2) days before the scheduled bid opening date. Questions received less than five (5) days prior to the date for opening of bids will not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

Any and all such interpretations and any supplemental instructions will be in the form of

written addenda to the specifications which, if issued, will be mailed, emailed, or faxed to all prospective bidders, no later than two days prior to the date fixed for the opening of the bids. Failure of any bidder to receive any such addendum or interpretations shall not relieve such bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the Contract Documents.

The Agency reserves the right to not comply with these time frames if a critical addendum is required or if the proposal deadline needs to be extended due to critical reason in the best interest of the Santa Fe Solid Waste Management Agency.

9. **BID SECURITY:** Bid security (bid guarantee) in the amount of 5% of the amount of the bid shall accompany the Bid Form and must be in the form of a certified or bank cashier's check made payable to the Owner or a bid bond issued by a surety licensed to conduct business in the State of New Mexico, or other supplies in a form satisfactory to the Owner. The Bid Security of the successful Bidder will be retained until he has executed the Construction Agreement and furnished the required Contract Security (Performance and Labor and Material Payment Bonds), whereupon it will be returned. If he fails to execute and deliver the Construction Agreement and furnish the required Contract Security within ten (10) days of the Notice of Award, the Owner may annul the Notice of Award and the Bid Security of that Bidder will be forfeited. The Bid Security of any Bidder whom the Owner believes to have a reasonable chance of receiving the award may be retained by the Owner until either the seventh day after the executed Construction Agreement is delivered by the Owner to Contractor and the required Contract Security is furnished; or the sixty-first day after the bid opening, whichever is earlier. Bid security of other Bidders will be returned within fifteen (15) days of the bid opening, or sooner.

10. **RESIDENT PREFERENCE:**

**INTENT AND POLICY:** The Owner recognizes that the intent of the state resident preference statute is to give New Mexico businesses and contractors an advantage over those businesses, manufacturers and contractors from outside the State of New Mexico. The underlying policy is to give a preference to those persons and companies who contribute to the economy of the State of New Mexico by maintaining plants and other facilities within the State and giving employment to residents of the State (1969 OP. Attorney. Gen. No. 6942).

**APPLICATION-IN-STATE AND OUT-OF-STATE BIDDERS:** With acknowledgement of this intent and policy, the preference will only be applied when bids are received from in state businesses, manufacturers and contractors that are within five (5) percent of low bids received from out-of state businesses, manufacturers and contractors (13-1-21 (A-1-21 (-F) and 134-2 (C)) NMSA 1978).

To be considered a resident for application of the preference, the in-state Bidder must have included a valid state purchasing certification number with the submitted bid.

Thus it is recommended that in-state Bidders obtain a state purchasing certification number and use it on all bids, in order to have the preference applied to their advantage, in the event an out of-state bid is submitted. In submitting a bid, it should never be assumed that an out of-state bid will not be submitted.

For information on obtaining a state purchasing certification number, the potential Bidder should contact the State of New Mexico General Services Department - Purchasing Office (Joseph Montoya Building - 1100 S. St. Francis Drive – 505 827-0472).

All resident preferences shall be verified through the State Purchasing Office. Applications for resident preference not confirmed by the state purchasing office will be rejected. The certification must be under the business name of the Bidder submitting the bid.

**NON-APPLICATION OF COMPETING IN-STATE BIDDERS:** If the lowest responsive bid and the next responsive bids within five (5) percent of the lowest bid and are all from the State of New Mexico, then the resident preference will not be applied and the state purchasing certification number will not be considered. To be considered an in-state Bidder in this situation, the Bidders must meet the definition criteria of Chapter 13-1-21 (A) (1) and Chapter 13-4-2 (A) NMSA 1978. The bid documents issued shall include questions regarding residency, which the Bidder shall answer and certify. After examining the information included in the bid submitted, the City Purchasing Officer may seek additional information of proof to verify that the business is a valid New Mexico business. If it is determined by the City Purchasing Officer that the information is not factual and the low responsive bid is actually an out-of state Bidder and not a New Mexico business, then the procedures in the previous section may be applied.

If the Bidder has met the above criteria, the lowest responsive "resident" bid shall be multiplied by 0.95. If that amount is then lower than the low responsive bid of a "nonresident" Bidder, although the award will be based taking into consideration the resident preference of five (5) percent.

Preferences shall not be applied when expenditures of Federal funds designated for a specific contract is involved.

A Bidder may not claim a five (5) percent preference as a manufacturer and a five (5) percent preference as a business for a cumulative ten (10) percent.

New Mexico Resident Preference Number (if applicable): \_\_\_\_\_

**NEW MEXICO RESIDENT VETERAN PREFERENCE:** New Mexico law, Section 13-1-22 NMSA 1978, provides a preference in the award of a public works contract for a "resident veteran business". Certification by the NM Department of Taxation and Revenue for the resident veteran business requires the Offeror to provide evidence of annual revenue and other evidence of veteran status.

An Offeror who wants the veteran business preference to be applied to its proposal is required to submit with its proposal the certification from the NM Department of Taxation and Revenue and the sworn affidavit attached hereto in Section 3, Bid Proposal.

If an Offeror submits with its proposal a copy of a valid and current veteran resident business certificate, 7%, 8%, or 10% of the total weight of all the evaluation factors used in the evaluation of proposal may be awarded as set forth in NMSA 1978, § 13-1-21 and 13-1-22.

The resident business preference is not cumulative with the resident veteran business preference.

New Mexico Resident Veteran Contractor Number (if applicable): \_\_\_\_\_

LOCAL PREFERENCE: An offeror who submits to the Agency a valid Local Preference Certification Form, pursuant to the City of Santa Fe Purchasing Manual, or a Santa Fe County Preference Certificate, issued by Santa Fe County, shall receive a 5% preference as set forth in Santa Fe County Ordinance No. 2012-4. The local preference applies only to offers received when the Agency procures services through a competitive sealed proposal process.

An offeror is eligible for the local preference in addition to either the in-state preference or the resident veteran preference.

Local Preference Certificate Number (if applicable): \_\_\_\_\_

11. CONTRACT TIME: The number of days for the completion of Work (the Contract Time) is seventy-five (75) calendar days as set forth in the Bid Proposal and will be included in the executed Construction Agreement.

12. SUBCONTRACTORS, SUPPLIERS AND OTHERS:

- A. The Contractor, in the bid documents, must identify in writing to the Owner those portions of the Work that he proposes to subcontract and after the Notice of Award, may only subcontract other portions of the work with the Owner's written consent.
- B. Contractor will not be required to employ any other subcontractor, other person or organization against whom he has reasonable objection.
- C. The Contractor shall list all Subcontractor names, addresses and type of work to be performed.
- D. The Subcontractor threshold amount for this project is \$5,000. The General Contractor must list all subcontractors who will perform work in excess of this threshold. Only one Subcontractor may be listed for each category as defined by the Contractor. The Subcontractor Fair Practice Act (13-4-31 thru 14-3-43 NMSA 1988) shall apply.
- E. EXEMPTION: In accordance with the "SUBCONTRACTOR'S FAIR PRACTICES ACT", Section 13-4-35, the Contractor shall not be required to submit a Subcontractor's Listing form with the bid for contracts for construction, improvement or repair of streets or highways, including bridges, underground utilities within easements, including but not limited to waterlines, sewer lines and storm sewer lines. The SUBCONTRACTOR'S FAIR PRACTICES ACT shall apply, however, to that portion of contracts for construction, improvement or repair of streets or highways which covers street lighting and traffic signals.

The Bidder shall list the Subcontractor(s) or material supplier(s) he proposes to use for all trades or items on the Subcontractor Listing Form attached to the Bid Form. The listing must include Subcontractors specifically identified in Paragraph D above. If awarded the contract, the Bidder shall use the firm listed, or himself if "General Contractor" has been listed, unless a request for a change or substitution is approved by the Owner of any reason as outlined herein.

- F. For subcontract work involving the provision of "SUBCONTRACTOR'S FAIR PRACTICES ACT 13-4-31...43 NMSA 1978" summarized as follows, shall apply:
1. A Contractor may not substitute any Subcontractor listed, unless the Owner approves, in writing, the substitution based on the following situations:
    - a. The Subcontractor fails or refuses to execute a contract due to bankruptcy or insolvency;
    - b. The Subcontractor fails or refuses to perform;
    - c. The Contractor demonstrates to the Owner that the listed Subcontractor was due to an inadvertent clerical error;
    - d. Acceptance of an alternate by the Owner causes the original Subcontractor's bid not to be low;
    - e. The Contractor can substantiate to the Owner that a Subcontractor's bid is incomplete, or;
    - f. The Subcontractor fails or refuses to meet bond requirements of the Contractor.
  2. Prior to approval of the Contractor's request for substitution, the Owner shall give notice to the listed Subcontractor by certified mail. The Subcontractor shall have five (5) working days to submit written objections to the Owner. Failure to respond shall constitute Subcontractor's consent to the substitution. If written objections are received, the Owner shall give five (5) working days notice of a hearing.
  3. No other substitution of Subcontractors may be permitted by the Contractor, other than for requested change orders in the scope of the work or unless the Contractor can show that no bids were received.
  4. It shall be the responsibility of the Subcontractor to be prepared to submit performance or payment bonds if requested by the Contractor. If the Subcontractor does not furnish such requested bonding, the Contractor may substitute another Subcontractor, as per the provisions of item 1 above. (The requirement of such bonding must be included in the Contractor's written or published request for Subcontract bids.)
  5. If the Contractor does not specify a Subcontractor, he represents that he shall perform the work.
  6. If the Contractor is claiming an inadvertent clerical error, notice shall be given to the Owner and to the involved Subcontractor within two (2) working days of the bid opening. The Subcontractor shall have six (6) working days from the bid opening to submit written objections. Failure to respond shall constitute Subcontractor's agreement that an error was made.
  7. If determined to be an emergency, upon written finding, subcontracting may be permitted although not originally designated in the bid.
  8. By State statute, violation of this act may allow the Owner to cancel the Contract or assess the Contractor a penalty up to ten (10) percent of the subcontract involved, but in no case less than the difference between the amount of the listed Subcontractor and the Subcontractor used. The Contractor shall be entitled a hearing after notice of intent of assess a penalty.

9. If a hearing is held, the dispute shall be stated in writing and the Owner shall evaluate the issues of both sides and render a determination within ten (10) days of the hearing and provide the parties with a written copy of the decision by certified mail. The Owner may also refer the matter to arbitration.

13. BID FORM:

- A. The Bid Form is included in the Contract Documents; additional copies may be obtained from SFSWMA, Caja Del Rio Landfill, 149 Wildlife Way, Santa Fe, NM, 87506.
- B. The Bid Form must be completed in either ink or typewritten. The bid price of each item on the form must be stated in numerals and written words; in case of an error in extensions in the unit price schedule the unit price shown in written words shall govern.
- C. Bids by corporations must be executed in the corporate name by the president or a vice president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.
- D. Bids by partnerships must be executed in the partnership name and signed by a partner, his title must appear under his signature and the official address of the partnership must be shown below the signature.
- E. All names must be typed or printed below the signature.
- F. The bid shall contain an acknowledgement of receipt of all Addenda (the numbers of which shall be filled in on the Bid Form).

14. QUALIFICATION OF BIDS: All Bidders must have a valid New Mexico Contractor's License appropriate to the Work herein specified.

15. SUBMISSION OF BIDS: Bids shall be submitted at the time and place indicated in the Advertisement for Bids and shall be enclosed in an opaque sealed envelope, marked with the project title, name and address of the Bidder, N.M. License Number, and accompanied by the Bid Security, list of subcontractors and other required documents. The Bid Form shall not be detached from the bound set of Contract Documents. All blanks must be filled in. Conditional bids will not be considered. The envelope shall be addressed to:

Mr. Robert Rodarte  
Purchasing Director  
2651 Siringo Road Bldg. H  
Santa Fe, NM 87505

16. MODIFICATION AND WITHDRAWAL OF BIDS: Bids may be modified or withdrawn by an appropriate document duly executed and delivered to the place where bids are to be submitted at any time prior to the opening of bids.

17. BID OPENING PROCEDURE: The person or persons opening the bids will adhere to the following procedure:

- A. Bid Proposal;
- B. Bid Form and Completed Bid Schedule - Name of Bidder and Bidder's New Mexico Contractor's License with a check for proper signatures, subcontractor/material listing, and acknowledgement of Addenda, if any;

- C. Bid Bond or Check for Bid Security;
- D. Statement of Bidder's Qualifications;
- E. Non-Collusion Affidavit of Prime Bidder;
- F. Non-Collusion Affidavit of Subcontractor(s);
- G. Certification of Nonsegregated Facilities;
- H. Certification of Bidder regarding Equal Employment Opportunity;
- I. Certification of Subcontractor regarding Equal Employment Opportunity; and
- J. Resident Veteran Contractor / Resident Contractor / Local Contractor Certification.

If any of the other requirements have not been met, the bid shall be disqualified and considered a non responsive bid. Any disqualified bids will not be read.

18. **BIDS TO REMAIN OPEN:** If a Contract is to be awarded, it will be awarded to the lowest responsible base bid whose evaluation indicates to the Owner that the award will be in the best interests of the project and the Owner. All bids shall remain open for sixty (60) days after the day of the bid opening, but the Owner may, in its sole discretion, release any bid and return the Bid Security prior to that date.
19. **AWARD OF CONTRACT:**
- A. The Owner reserves the right to reject any and all bids and waive any and all informalities or technicalities and the right to disregard all nonconforming or conditional bids or counter bids.
  - B. If a Contract is to be awarded, it will be awarded to the lowest responsible base bid whose evaluation indicates to the Owner that the award will be in the best interests of the project and the Owner. Additive Alternatives may be added all or in part, based on available funding or timing to be exercised by the Owner at its discretion. If Alternatives are to be awarded, the Owner will award the Contract to the responsible Bidder submitting the low Base Bid, excluding NMGRT, including any combination of any Additive Alternates or Deductive Alternates.
  - C. Simultaneously with delivery of the executed counterparts of the Agreement to the Owner, Contractor shall deliver to the Owner the required Contract Bonds.
  - D. If a Contract is to be awarded, the Owner will give the apparent successful Bidder a Notice of Award within thirty (30) days after the day of the bid opening.
  - E. If the lowest responsible Bidder has otherwise qualified, the lowest Bidder may negotiate with the Owner for a lower bid if the lowest bid is within ten percent over budgeted project funds. No change in the original scope of the terms or terms and conditions will be allowed. Terms and conditions refer to the Contract requirements, warranties, and bonds. Negotiation may be permitted with product, materials, and equipment alternatives as determined to be in the best interest of the Owner.
20. **WAGE RATES:** The Bidder's attention is directed to the fact that wages to be paid on this project shall not be less than the prevailing wage rates as listed by the New Mexico State Labor and Industrial Commission. It shall be the successful Bidder's responsibility to inform himself thoroughly of all state, federal and local laws and statutes pertaining to the

employment of labor, the freedom of organization and the conditions of employment and shall strictly adhere to such laws and regulations as are applicable. There shall be no discrimination because of race, creed, color, national origin or legal political affiliation in the employment of persons qualified by training and experience for work under this contract.

21. REQUIRED SUBMITTALS:

- A. Bid Proposal;
- B. Bid Form and Completed Bid Schedule- Name of Bidder and Bidder's New Mexico Contractor's License with a check for proper signatures, subcontractor/material listing, and acknowledgement of Addenda, if any;
- C. Bid Bond or Check for Bid Security;
- D. Non-Collusion Affidavit of Prime Bidder;
- E. Non-Collusion Affidavit of Subcontractor(s);
- F. Certification of Nonsegregated Facilities;
- G. Certification of Bidder regarding Equal Employment Opportunity;
- H. Certification of Subcontractor regarding Equal Employment Opportunity; and
- I. Resident Veteran Contractor / Resident Contractor / Local Contractor Certification.

If any of the above requirements have not been met, the bid shall not be read.

- 22. SUBSTITUTIONS: The bid shall not be qualified by the bid of substitutions for specified materials or equipment.
- 23. PREFERENCES: In the construction of this project, the Owner has no preference for any process, type of equipment, or kind of material, but will consider all processes, types of equipment or kinds of material offered on a usual competitive basis if they are in fact the equal to that specified and will accomplish the purpose intended. The Owner reserves the right to be the sole judge as to whether or not a different process, type of equipment or kind of material offered is in fact equal to that specified.
- 24. LICENSE OR ROYALTY FEES: Licenses and/or royalty fees for products or for processes must be paid for directly by the Contractor.
- 25. PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND: The Contractor will be required to furnish surety bonds in an amount at least equal to one hundred percent (100%) each of the total Contract price as security for faithful performance of the Contract and payment for all labor and materials. The surety company must be authorized to do business in the State of New Mexico and must be acceptable to the Owner.
- 26. ADDENDUM: Each Addendum shall be made a part of the Contract Documents to the same extent as though contained in the original Documents and itemized listing thereof. Each Bidder shall acknowledge receipt of each Addendum in the space provided on the Bid Form.
- 27. COLLUSION: No Bidder shall be interested in more than one bid. Collusion among Bidders or the submission of more than one bid under different names by any firms or individual shall be cause for rejection of all bids in question without consideration.
- 28. QUANTITIES: The quantities set forth in the Bid Form are estimated quantities on which

bids will be compared and which will be the basis for Award of Contract. Payment will be made for the Work actually performed.

29. UTILITY INSPECTION: All work done on the existing Owner owned utilities shall be inspected by a representative of the Owner before backfilling.
30. POWER OF ATTORNEY: Attorneys in fact who sign bonds must attach certified effective copies of their Power of Attorney to all bonds.
31. PRE-BID CONFERENCE: A non-mandatory pre-bid conference will be held at 10:00 a.m. on June 30, 2014, at the Nancy Rodriguez Community Center in the Traditional Village of Agua Fria, 1 Prairie Dog Loop, Santa Fe, NM 87507, as specified in the Advertisement for Bids.
32. PROTEST PROCEDURE: Any Bidder or Contractor who is aggrieved in connection with a procurement may protest to the City Purchasing Director. The protest must be in writing and be submitted within fifteen (15) days after the facts or occurrences.

The complete procedures and requirements regarding protests and resolution of protests are available from the Purchasing Office upon request.

### 33. CONSIDERATION OF BIDS

#### 33.1 RECEIPT, OPENING AND RECORDING

Bids received on time will be opened publicly and will be read aloud, and an abstract of the amounts of the Base Bids and Alternates or Bid Items, if any, will be made available to the Bidders. Each Bid shall be open to public inspection.

#### 33.2 BID EVALUATION AND AWARD

- 33.2.1 It is the intent of the Owner to award a contract to the lowest responsible base bid, provided the Bid has been submitted in accordance with the requirements of the Contract Documents. The unreasonable failure of a Bidder to promptly supply information in connection with an inquiry with respect to responsibility is grounds for a determination that the Bidder is not responsible Bidder. Post-Bid information that may be required of a Contractor as to qualifications can include, but not be limited to those items listed in paragraph 33.
- 33.2.2 If the Base Bid is within the amount of funds available to finance the construction Contract, Contract award will be made to the responsible Bidder submitting the low Base Bid, excluding New Mexico gross receipts tax (NMGRT). If alternatives are to be awarded the Owner will award the Contract to the responsible Bidder submitting the low Base Bid, excluding NMGRT, including any combination of any Additive Alternates or Deductive Alternates.
- 33.2.3 Discrepancies in the Bid Form between words and figures will be resolved in favor of words. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

33.3 COMPETITIVE SEALED BIDS

Contracts solicited by competitive sealed bids shall require that the bid amount exclude applicable New Mexico Gross Receipts Taxes or applicable local option taxes, but that the Owner shall be required to pay the applicable taxes, including any increase in the applicable tax which becomes effective after the date the Contract is entered into. The applicable Gross Receipts Tax shall be computed and shown as a separate amount on the Bid Form and on each request for payment made under the Contract.

33.4 NOTICE OF AWARD

A written Notice of Award shall be issued by the Owner after review and approval of the Bid and related documents by the Governing Authority, as defined in the Supplementary Provisions, with reasonable promptness.

33.5 IDENTICAL BIDS

When two or more of the Bids submitted are identical in price and are the low Bid, the Owner may:

- A. Award pursuant to the multiple source award provisions of the Procurement Code;
- B. Award to a resident business if the identical low Bids are submitted by a resident business and a nonresident business;
- C. Award to a resident manufacturer if the identical low Bids are submitted by a resident manufacturer and a non-resident manufacturer;
- D. Award by letter to one of the identical low Bidders;
- E. Reject all Bids and re-solicit Bids for the required services, construction, or items of tangible personal property.

33.6 CANCELLATION OF AWARD

When in the best interest of the public, the Owner may cancel the award of any contract at any time before the execution of said contract by all parties without any liability against the Owner.

34. POST-BID INFORMATION

34.1 RETURN OF BID SECURITY

All Bid Security in the form of checks, except those retained by the owner per paragraph 8.0 of this Instruction to Bidders will be returned within fifteen (15) days following the bid opening. The retained Bid Security of the Successful Bidder(s), if in the form of a check, will be returned after satisfactory Contract Bonds have been furnished and the Contract has been executed as stated in the above referenced paragraph 8.0. Bid Securities in the form of Bid Bonds will be returned only upon the request of the unsuccessful Bidder, but will be released by the Owner after the Notice of Award is sent by the Owner.

34.2 NOTICE TO PROCEED

The Owner will issue a written Notice to Proceed to the Contractor stipulating the date from which Contract Time will be charged and the date Contract Time is to expire, subject to valid modifications of the Contract authorized by Change Order.

34.3 FAILURE TO EXECUTE CONTRACT

Failure to return the signed Contract with acceptable Contract Bonds and Certificate of Insurance within ten (10) calendar days after the date of the Notice of Award shall be just cause for the cancellation of the Award and the forfeiture of the Bid Security, which shall become damages sustained. Award may then be made to the next lowest responsible Bidder, or the work may be readvertised and constructed under contract or otherwise, as the Owner may decide.

34.4 CONTRACTOR'S QUALIFICATION STATEMENT

Bidder to whom award of a Contract is under consideration shall submit, upon request, information and data to prove that their financial resources, production or service facilities, personnel, and service reputation and experience are adequate to make satisfactory delivery of the services, construction, or items of personal property described in the Contract Documents and the form of submittal shall be a Statement of Bidder's Qualifications.

34.5 CONTRACT BONDS REQUIREMENTS

The Successful Bidder, where the Contract Price exceeds twenty five thousand dollars (\$25,000), shall post a one hundred (100) percent Performance Bond and one hundred (100) percent Labor and Material Payment Bond. Bonds shall be executed on Performance Bond and Labor and Material Payment Bond forms attached hereto, with amount payable conforming to the terms of the Contract. Surety shall be a company licensed to do business in the State of New Mexico and acceptable to the Owner.

34.6 INSURANCE REQUIREMENTS

34.6.1 The Contractor shall carry insurance to protect the Owner from and against all claims, demands, actions, judgments, costs, expenses and liabilities which may arise or result directly or indirectly from or by reasons of loss, injury or damage related to the Project. The Contractor shall file with the Owner current certificates evidencing public liability insurance with limits as provided in the New Mexico Tort Claims Act, Section 41-4-19 NMSA 1978, and as that section or successors section may be amended from time to time. The Contractor shall also carry such insurance as it deems necessary to protect it from all claims under any workmen's compensation law in effect that may be applicable to the Contractor. All insurance required by this Agreement shall be kept and remain in full force and effect for the entire life of this Agreement.

34.6.2 The insurance coverage shall include worker's compensation, employer's liability, comprehensive general liability (Premises-Operations, independent contractors, products and completed operations, broad form property damage, contractual liability, explosion and collapse hazard, underground hazard, personal injury) comprehensive automobile liability

(owned and hired), excess liability (umbrella form), and all-risk builder's risk.

34.6.3 All insurance coverage must be maintained for the entire life of the Project. Products and completed operations coverage shall be maintained for a minimum period of one (1) year after final payment.

34.6.4 A valid certificate of insurance must be submitted to the Owner prior to issuance of a Notice-to-Proceed.

### 35. MINIMUM WAGE RATES

Any Contract entered into in excess of sixty thousand dollars (\$60,000) for construction, alteration, demolition, or repair, or any combination of these, including painting and decorating of public buildings or public works, is subject to the minimum wage rate determination issued by the New Mexico State Labor and Industrial Commission for this Project. Federal Funded Contracts in excess of \$2,000.00 are subject to Federal Labor Standards Requirements of Davis Bacon Act. The Bidder shall ensure that, in submitting his Bid, the minimum wage rate determination, included herein, has been utilized in preparing his Bid.

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## **Section 3 Bid Proposal**

**BID PROPOSAL  
BID No. '14/43/B  
CAJA DEL RIO LANDFILL  
CELL 5B LINER CONSTRUCTION**

CONTRACTOR NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

To Santa Fe Solid Waste Management Agency, State of New Mexico (Owner):

The undersigned proposes to furnish and deliver all the material and to do all the work and labor required in the construction of "Cell 5B Liner Construction" at the Caja del Rio Landfill in City of Santa Fe, State of New Mexico, according to the Construction Plans and Specifications at the prices named and shown on the Bid Form.

The undersigned declares that the only person or parties interested in the bid as principals are those named herein; that the bid is made without collusion with any person, firm or corporation; that he has carefully examined the specifications, including General and Supplemental Conditions, if any, and that he has made a personal examination of the site of the work, that he is to furnish all the necessary machinery, tools, apparatus and other means of construction and do all the work and finish all the materials specified in the manner and the time prescribed; that he understands that the quantities are approximate only and subject to increase or decrease, and that he is willing to perform any increased or decreased quantities of work at the unit price bid.

The undersigned hereby agrees to execute and deliver the Construction Agreement and required bonds within ten (10) days, or such further time as may be allowed in writing by the Owner after receiving notification of the acceptance of this bid, and it is hereby mutually understood and agreed that in case we do not, we forfeit the accompanying check or bid bond to the Owner as liquidated damages, and the said Owner may proceed to award the contract to others.

The undersigned hereby agrees to commence the work within ten (10) days, or such further time as may be allowed in writing by the after notification to proceed, and to complete the Work within seventy-five (75) calendar days, as outlined in these Contract Documents.

The undersigned proposes to furnish Labor and Material Payment Bond and Performance Bond in the amount of one hundred (100%) percent of the Contract Amount each as surety conditioned for the full complete and faithful performance of this contract, and to indemnify and save harmless the Owner from any damage or loss of which the Owner may become liable by the default of said Contractor, or by reason of any neglect or carelessness on the part of said Contractor, his agents or employees, or by or on account of any act or omission of said Contractor, his servants, agents or employees, in performance of this contract.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

# **Section 4 Bid Form**

**BID FORM  
SANTA FE SOLID WASTE MANAGEMENT AGENCY  
CAJA DEL RIO LANDFILL – CELL 5B LINER CONSTRUCTION  
CONTRACTING AGENCY AND OWNER**

NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_  
Hereinafter called Bidder.

TO: Mr. Robert Rodarte  
Purchasing Director  
City of Santa Fe  
2651 Siringo Road, Building H  
Santa Fe, NM 87505

Hereinafter called Owner,

**BID FOR: CAJA DEL RIO LANDFILL  
CELL 5B LINER CONSTRUCTION**

Santa Fe Solid Waste Management Agency: Bid No. '14/43/B

1. The Bidder has familiarized itself with the existing conditions on the Project area affecting the cost of the Work and with the Contract Documents which includes:
  - a. Advertisement for Bids
  - b. Instructions for Bidders
  - c. Bid Proposal
  - d. Bid Form
  - e. Supplemental Bid Forms
  - f. Construction Agreement
  - g. Performance Bond
  - h. Labor and Material Payment Bond
  - i. General and Supplemental Conditions
  - j. Technical Specifications
  - k. Construction Plans.

The Bidder hereby proposes to furnish all supervision, technical personnel, labor, materials, tools, appurtenances, equipment, and services (including all utility and transportation services) required to construct and complete the improvements, all in accordance with the above listed Documents.

2. Bidder agrees to perform all Work to construct the Cell 5B Liner described in the Specifications and shown on the Construction Plans for the following unit prices provided in the Bid Schedule (Unit Prices) below.

Amounts are to be shown in both words and figures. In case of discrepancy, the amount shown in words will govern.

**BID SCHEDULE (UNIT PRICES)  
BID NO. '14/43/B**

<b>Item No.</b>	<b>Estimated Quantity</b>	<b>Brief Description of Item With Unit Bid Price in Words</b>	<b>Unit Bid Price In Figures</b>	<b>Amount In Figures</b>
1.	L.S.	Mobilization and Demobilization.  _____ Dollars and Cents per lump sum.	\$	\$
2.	Allow	Quality Control/Quality Assurance Testing Allowance.  <u>Fifteen Thousand and Zero Cents</u> Dollars and Cents per Allowance.	\$15,000	\$15,000
3.	L.S.	Subgrade Preparation  _____ Dollars and Cents per linear foot.	\$	\$
4.	422,000 S.F.	Geosynthetic Clay Liner.  _____ Dollars and Cents per square foot.	\$	\$
5.	422,000 S.F.	60 mil HDPE Textured Geomembrane.  _____ Dollars and Cents per square foot.	\$	\$
6.	422,000 S.F.	10 oz/yd <sup>2</sup> Non-Woven Geotextile  _____ Dollars and Cents per square foot.	\$	\$

Item No.	Estimated Quantity	Brief Description of Item With Unit Bid Price in Words	Unit Bid Price In Figures	Amount In Figures
7.	23,500 C.Y.	Cell 5B Drainage Material - Basalt.  _____ Dollars and Cents per cubic yard.	\$	\$
8.	3,000 C.Y.	Cell 5B Drainage Material - Glass.  _____ Dollars and Cents per cubic yard.	\$	\$
9.	L.S.	Leachate Collection System - Piping.  _____ Dollars and Cents per lump sum.	\$	\$
10.	L.S.	Leachate Collection System – Level Sensors and Solar Panels.  _____ Dollars and Cents per lump sum.	\$	\$
11.	L.S.	Leachate Collection System - Pumps.  _____ Dollars and Cents per lump sum.	\$	\$

SUBTOTAL - BASE BID AMOUNT FOR ITEMS 1-11:           \$ \_\_\_\_\_

NEW MEXICO GROSS RECEIPTS TAX @ 6.8750%           \$ \_\_\_\_\_

TOTAL – BASE BID PLUS NM GROSS RECEIPTS TAX       \$ \_\_\_\_\_

**TWO COMPLETE COPIES OF THE BID SUBMITTAL IS REQUIRED**

3. In submitting this bid, the Bidder understands that the right is reserved by the Owner to reject any irregular or all bids, waive any technicalities in the bids, and accept the bid deemed to be in the best interest of the Agency and that the Owner intends to award one contract (if at all) for the items bid. If written notice of the acceptance of this bid is mailed, telegraphed or otherwise delivered to the undersigned within sixty (60) days after the opening thereof or at any time thereafter before this bid is withdrawn, the undersigned agrees to execute and deliver.



- f. Certification of Nonsegregated Facilities;
- g. Certification of Bidder regarding Equal Employment Opportunity;
- h. Certification of Subcontractor regarding Equal Employment Opportunity; and
- i. Resident Veteran Contractor / Resident Contractor / Local Contractor Certification.

**TWO COMPLETE COPIES OF THE BID SUBMITTAL IS REQUIRED**

Respectfully Submitted:

Name of Bidder \_\_\_\_\_

By: \_\_\_\_\_  
(Signature)

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Official Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Telephone No.: \_\_\_\_\_

New Mexico Contractor's License Number and Types: \_\_\_\_\_

United States Treasury Number: \_\_\_\_\_

New Mexico State Residence Preference Certification Number

if any: \_\_\_\_\_



**RESIDENT VETERAN CONTRACTOR / RESIDENT CONTRACTOR /  
LOCAL CONTRACTOR CERTIFICATION**

Check Here If Bidder Has Submitted:

\_\_\_ A copy of a valid resident veteran contractor certificate with its bid to receive a resident veteran contractor preference pursuant to Section 13-4-2 NMSA 1978. If checked, please select appropriate preference based upon annual revenues:

\_\_\_ A bid submitted by a resident veteran contractor with annual revenues of one million dollars (\$1,000,000) or less shall be deemed to be ten percent (10%) less than the bid actually submitted.

\_\_\_ A bid submitted by a resident veteran contractor with annual revenues of more than one million dollars (\$1,000,000) but less than five million dollars (\$5,000,000) shall be deemed to be eight percent (8%) less than the bid actually submitted, subject to the limitation that the preference shall be limited, in any calendar year, to an aggregate of ten million dollars (\$10,000,000) in public works contracts from all resident veteran contractors receiving the preference.

\_\_\_ A bid submitted by a resident veteran contractor with annual revenues of five million dollars (\$5,000,000) or more shall be deemed to be seven percent (7%) less than the bid actually submitted, subject to the limitation that the preference shall be limited, in any calendar year, to an aggregate of ten million dollars (\$10,000,000) in public works contracts from all resident veteran contractors receiving the preference.

\_\_\_ A copy of a valid resident contractor certificate with its bid to receive a resident contractor preference pursuant to Section 13-4-2 NMSA 1978. (Five percent (5%) less than the bid actually submitted.)

\_\_\_ A copy of a valid Local Preference Certification Form, pursuant to the City of Santa Fe Purchasing Manual, or a Santa Fe County Preference Certificate, issued by Santa Fe County to receive a local contractor preference pursuant to Santa Fe County Ordinance No. 2012-4. (Five percent (5%) less than the bid actually submitted).

\_\_\_ A joint bid by a combination of a resident veteran, resident or nonresident contractor. If checked, state the dollar amount of goods and services that will be provided by each of the joint parties under the contract:

\$ \_\_\_\_\_ \$ \_\_\_\_\_ \$ \_\_\_\_\_  
(Non-Resident) (Resident) (Resident Veteran)

NM Resident Veteran Contractor Number \_\_\_\_\_

NM Department of Workforce Solutions Registration Number \_\_\_\_\_

Local Preference Certificate Number \_\_\_\_\_

Bidder declares under penalty of perjury that this statement is true to the best of its knowledge and understands that giving false or misleading statements about material fact regarding this matter constitutes a crime.

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## **Section 5 Bid Bond**

**BID BOND**

A. KNOW ALL MEN BY THESE PRESENTS, THAT WE \_\_\_\_\_, hereinafter called the PRINCIPAL, and the \_\_\_\_\_, of \_\_\_\_\_ a Corporation duly organized under the laws of the State of \_\_\_\_\_, and, authorized to do business in the State of New Mexico, hereinafter called the SURETY, as SURETY are held and firmly bound unto the Santa Fe Solid Waste Management Agency, hereinafter called the OBLIGEE, in the sum of \_\_\_\_\_ dollars (\$ \_\_\_\_\_) for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted the accompanying bid, dated \_\_\_\_\_, 2014, (Bid No. '14/43/B) for the construction of the Santa Fe Solid Waste Management Agency, Cell 5B Liner, 149 Wildlife Way, Santa Fe, NM 87056.

B. NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof or in the event of the failure of the Principal to enter such contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

C. SIGNED AND SEALED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 2014.

\_\_\_\_\_  
BIDDER

\_\_\_\_\_  
WITNESS

By: \_\_\_\_\_ (SEAL)  
PRINCIPAL

\_\_\_\_\_  
WITNESS

By: \_\_\_\_\_  
SURETY

\_\_\_\_\_  
TITLE

## **Section 6 Supplemental Bid Forms**

**SUPPLEMENTAL BID FORMS**

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Certification of Subcontractor Regarding Equal Employment Opportunity .....	6-8

**NON-COLLUSION AFFIDAVIT OF PRIME BIDDER**

STATE OF NEW MEXICO

COUNTY OF \_\_\_\_\_

\_\_\_\_\_ being first duly sworn, deposes and says that:

- (1) He is the \_\_\_\_\_ of the Bidder that has submitted the attached Bid Proposal;
- (2) He is fully informed respecting the preparation and contents of the attached Bid Proposal and of all pertinent circumstances respecting such bid;
- (3) Such bid is genuine and is not a collusive or sham bid;
- (4) Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affidavit, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham bid in connection with the Contract for which the attached bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communications or conference with any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Contracting Agency or any person interested in the proposed Contract; and
- (5) The price or prices quoted in the attached bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affidavit.

(SIGNED) \_\_\_\_\_

TITLE \_\_\_\_\_

SUBSCRIBED AND SWORN to before me this \_\_\_\_\_ day of \_\_\_\_\_ 2014.

\_\_\_\_\_  
NOTARY PUBLIC

My Commission Expires \_\_\_\_\_

## SUBCONTRACTS

- A. The Contractor shall not execute an agreement with any subcontractor or permit any Subcontractor to perform any work included in this contract until he has submitted a Non-Collusion Affidavit from the Subcontractor, which is substantially the form that follows: (page 5 of 7), and has received written approval of such Subcontractor from the Owner.
- B. No proposed Subcontractor shall be disapproved by the Owner except for cause.
- C. The Contractor shall be as fully responsible to the Owner for the acts and omissions of his Subcontractors and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.
- D. The Contractor shall cause appropriate provision to be inserted in all subcontracts relative to the work to require compliance by each Subcontractor with the applicable provisions of the Contract for the improvements embraced.
- E. Nothing contained in the Contract shall create any contractual relation between any Subcontractor and the Owner.

**NON-COLLUSION AFFIDAVIT OF SUBCONTRACTOR**

STATE OF NEW MEXICO

COUNTY OF \_\_\_\_\_

\_\_\_\_\_ being first duly sworn, deposes and says that:

- (1) He is the \_\_\_\_\_ of \_\_\_\_\_, hereinafter referred to as the "Subcontractor".
- (2) He is fully informed respecting the preparation and contents of the Subcontractor's proposal submitted by the Subcontractor to \_\_\_\_\_, the Contractor, for certain work in connection with the \_\_\_\_\_ contract pertaining to the \_\_\_\_\_ project in \_\_\_\_\_.
- (3) Such Subcontractors proposal is genuine and is not a collusive or sham proposal.
- (4) Neither the Subcontractor nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affidavit, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham bid in connection with the Contract for which the attached bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communications or conference with any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Contracting Agency or any person interested in the proposed Contract; and
- (5) The price or prices quoted in the Subcontractor's proposal are fair and proper and are, not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affidavit.

(SIGNED) \_\_\_\_\_

(PRINT NAME) \_\_\_\_\_

TITLE \_\_\_\_\_

SUBSCRIBED AND SWORN to before me this \_\_\_\_\_ day of \_\_\_\_\_ 2014.

\_\_\_\_\_  
NOTARY PUBLIC

My Commission Expires \_\_\_\_\_

**CERTIFICATION OF NON-SEGREGATED FACILITIES**

(Applicable to construction contracts and related subcontracts exceeding \$10,000 which are not exempt from the Equal Opportunity Clause).

The construction Contractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The construction Contractor certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The construction Contractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this contract. As used in this certification, the term "segregated facilities" means any waiting room, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clock, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreating or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. The construction Contractor agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed SUBCONTRACTORS prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause and that he will retain such certifications in his files.

(SIGNED) \_\_\_\_\_

PRINT NAME \_\_\_\_\_

TITLE \_\_\_\_\_

SUBSCRIBED AND SWORN to before me this \_\_\_\_\_ day of \_\_\_\_\_ 2014.

\_\_\_\_\_  
NOTARY PUBLIC

My Commission Expires \_\_\_\_\_

**CERTIFICATION OF BIDDER REGARDING  
EQUAL EMPLOYMENT OPPORTUNITY**

**INSTRUCTIONS**

This certification is required pursuant to Executive Order 11246 (30 F. R. 12319-25). The implementing rules and regulations provide that any bidder or prospective contractor, or any of their proposed subcontractors, shall state as an initial part of the bid or negotiations of the contract or subcontract whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and, if so, whether it has filed all compliance reports due under applicable instructions.

Where the certification indicates that the bidder has not filed a compliance report due under applicable instructions, such bidder shall be required to submit a compliance report within seven calendar days after bid opening. No contract shall be awarded unless such report is submitted.

---

**CERTIFICATION OF BIDDER**

Bidder's Name: \_\_\_\_\_

Address: \_\_\_\_\_

1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause.  
Yes \_\_\_\_\_ No \_\_\_\_\_
2. Compliance reports were required to be filed in connection with such contract or subcontract.  
Yes \_\_\_\_\_ No \_\_\_\_\_
- 

Certification: The information above is true and complete to the best of my knowledge and belief.

\_\_\_\_\_  
NAME AND TITLE OF SIGNER (PLEASE TYPE)

\_\_\_\_\_  
SIGNATURE

\_\_\_\_\_  
DATE

**CERTIFICATION OF SUBCONTRACTOR REGARDING  
EQUAL EMPLOYMENT OPPORTUNITY**

**INSTRUCTIONS**

This certification is required pursuant to Executive Order 11246 (30 F. R. 12319-25). The implementing rules and regulations provide that any bidder or perspective contractor, or any of their proposed subcontractors, shall state as an initial part of the bid or negotiations of the contract or subcontract whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and, if so, whether it has filed all compliance reports due under applicable instructions.

Where the certification indicates that the bidder has not filed a compliance report due under applicable instructions, such bidder shall be required to submit a compliance report within seven calendar days after bid opening. No contract shall be awarded unless such report is submitted.

---

**CERTIFICATION OF SUBCONTRACTOR**

Subcontractor's Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

1. Subcontractor has participated in a previous contract or subcontract subject to the Equal Opportunity Clause.

Yes \_\_\_\_\_ No \_\_\_\_\_

2. Compliance reports were required to be filed in connection with such contract or subcontract.

Yes \_\_\_\_\_ No \_\_\_\_\_

---

Certification: The information above is true and complete to the best of my knowledge and belief.

---

NAME AND TITLE OF SIGNER (PLEASE TYPE)

---

SIGNATURE

---

DATE

## **Section 7**

# **Agreement between Owner and Contractor**

**SANTA FE SOLID WASTE MANAGEMENT AGENCY**

**AGREEMENT BETWEEN  
OWNER AND CONTRACTOR**

**CAJA DEL RIO LANDFILL**

**CELL 5B LINER CONSTRUCTION**

This Agreement, entered into this \_\_\_\_\_ day of \_\_\_\_\_, 2014, by and between the **SANTA FE SOLID WASTE MANAGEMENT AGENCY**, herein known as the Owner, and \_\_\_\_\_, herein known as the Contractor for the following:

PROJECT: Caja del Rio Landfill  
Cell 5B Liner Construction

PROJECT No.: '14/43/B

ENGINEER OF RECORD: CDM Smith Inc.  
6000 Uptown Boulevard, Suite 200  
Albuquerque, NM 87110

DISTRIBUTION:

OWNER SANTA FE SOLID WASTE MANAGEMENT AGENCY

CONTRACTOR \_\_\_\_\_

ENGINEER CDM SMITH INC.

USER AGENCY \_\_\_\_\_

OTHER \_\_\_\_\_

**RECITALS**

WHEREAS, the Owner, through its Solid Waste Joint Powers Board, is authorized to enter into a Construction Contract for the project; and

WHEREAS, the Owner, has let this contract according to the established State and Local Purchasing procedures for contracts of the type and amount let; and

WHEREAS, construction of this Project was approved by the Solid Waste Joint Powers Board of SFSWMA at its meeting of.

The OWNER and the CONTRACTOR agree:

**ARTICLE 1**  
**THE CONTRACT DOCUMENTS**

The Contract Documents consist of this Agreement, the Conditions of the Contract (General, Supplementary, and other Conditions), the Construction Plans, the Specifications, all Addenda issued prior to and all Modifications issued after execution of this Agreement. These documents form the Contract, and all are as fully a part of the Contract as if attached to this Agreement or repeated herein.

**ARTICLE 2**  
**THE WORK**

The Contractor shall perform all the Work required by the Contract Documents for SFSWMA, Caja del Rio Landfill Cell 5B Liner Construction, 149 Wildlife Way, Santa Fe, NM 87506.

**ARTICLE 3**  
**TIME OF COMMENCEMENT AND SUBSTANTIAL COMPLETION**

The work to be performed under this Contract shall be commenced not later than ten (10) consecutive calendar days after the date of written Notice to Proceed. Substantial Completion for the Bid Work shall be achieved within seventy-five (75) calendar days after the date of written Notice to Proceed [the Contract Time] except as hereafter extended by valid written Change Order by the Owner.

**ARTICLE 4**  
**CONTRACT SUM**

The Owner shall pay the Contractor in current funds for the performance of the Work, subject to additions and deductions by Change Order as provided in the Contract Documents, the Contract Sum of \_\_\_\_\_ dollars (\$\_\_\_\_\_).

The Contract Sum is determined as follows:

Base Bid Work	\$ _____
NM Gross Receipts Tax	\$ _____
TOTAL	\$ _____

**ARTICLE 5**  
**PROGRESS PAYMENTS**

Based upon Application for Payment submitted to the Owner by the Contractor and Certificates for Payment issued by the Owner, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided in the Contract Documents for the period ending the last day of the month as follows:

Not later than twenty-one (21) days following the end of the period covered by the Application for Payment, ninety five percent (95%) of the portion of the Contract sum properly allocable to labor, materials, and equipment incorporated in the work and ninety five percent (95%) of the portion of the Contract sum properly allocable to materials and equipment suitably stored at the site or some other location agreed upon in writing for the period covered by the Application for Payment, less the aggregate of previous payments made by the Owner; and upon substantial completion of the entire work, a sum sufficient to increase the total payments to ninety-eight percent (98%) of the Contract Sum, less such amounts as the Owner shall determine for all incomplete work and unsettled claims as provided in the Contract Documents.

**ARTICLE 6**  
**LIQUIDATED DAMAGES**

Should the Contractor neglect, refuse, or otherwise fail to complete the work within the Contract Period of seventy-five (75) calendar days or any extension in the Contract thereof, the Contractor agrees to pay to the Owner the amount of One Thousand dollars (\$1,000) per consecutive calendar days of delay until the work is completed and accepted or until voided pursuant to the provisions of the General Conditions of the Contract, not as a penalty, but as liquidated damages for such breach of the Contract.

**ARTICLE 7**  
**FINAL PAYMENT**

Final payment, constituting the entire unpaid balance of the Contract Sum, shall be paid by the Owner to the Contractor within twenty-one (21) calendar days after all deficiencies to the Contract document that were noted during the Substantial Completion Inspection and listed on the attachment to the Certificate of Substantial Completion have been corrected, and provided the Contract has been fully performed and a final Certificate for Payment has been issued by the Owner. In addition, the Contractor shall provide to the Owner a certified statement of Release of Lien (AIA Document G706A or approved form), Consent of Surety, Warranty from Prime Contractor, Warranties from Suppliers and Manufacturers, training sessions, equipment/operating manuals, and as-built drawings.

**ARTICLE 8**  
**SCHEDULE**

The Contractor shall, within five (5) days after the effective date of Notice to Proceed, prepare and submit five (5) copies of a progress schedule covering project operations for the seventy-five (75) calendar-day Contract Period for the Work. This progress schedule shall be of the type generally referred to as a Critical Path Method (CPM), Critical Path Schedule (CPS), and Critical Path Analysis (CPA), and other similar designations. The CPM shall be used to control the timing and sequences of the project. All work shall be done in accordance with the CPM Planning and Scheduling. A written statement of explanation shall be submitted with the

progress schedule. All costs incurred by the Contractor to implement the CPM shall be borne by the Contractor, and are part of their contract.

**ARTICLE 9**  
**GENERAL AND SPECIAL PROVISIONS**

- 9.1 This Agreement shall be governed exclusively by the provisions hereof and by the laws of the State of New Mexico as the same from time to time exist.
- 9.2 Terms used in this agreement which are defined in the Conditions of the Contract shall have the meanings designated in those Conditions.
- 9.3 The Contractor shall defend, indemnify, and hold harmless the Owner against any and all injury, loss, or damage, including, without limitation, cost of defense, court costs and attorney's fees arising out of the acts, errors, or omissions of the Contractor.
- 9.4 An enumeration of the Contractor's Liability Insurance requirements appears in the General Conditions of the Contract for construction. Insurance requirements are also described in the Instructions to the Bidder section of the Project Manual. Contractor shall maintain adequate insurance in at least the aggregate maximum amounts which the Owner could be liable under the New Mexico Tort Claims Act and shall provide proof of such insurance coverage to the SFWMA. It is the sole responsibility of the Contractor to be in compliance with the law.
- 9.5 This Agreement shall not become effective until: (1) approved by the SFSWMA signed by all parties required to sign this Agreement.
- 9.6 The Contractor and the Contractor's agents and employees are independent contractors performing professional and technical services for the Owner and are not employees of the Owner. The Contractor and the Contractor's agents and employees shall not accrue leave, retirement, insurance, bonding, use of Owner's vehicles, or any other benefits afforded to employees of the Owner as a result of this Agreement.
- 9.7 The Contractor shall not subcontract any portion of the services to be performed under this Agreement without the prior written approval of the Owner.
- 9.8 The Contractor shall maintain detailed time records, which indicate the date, time and nature of services rendered. These records shall be subject to inspection by the Owner, the Department of Finance and Administration and the State Auditor. The Owner shall have the right to audit the billing both before and after payment; payment under this Agreement shall not foreclose the right of the Owner to recover excessive illegal payments.
- 9.9 The terms of this Agreement are contingent upon sufficient appropriations and authorization being made by the Owner for the performance of this Agreement. If sufficient appropriations and authorization are not made by the Owner, this Agreement shall terminate upon written notice being given by the Owner to the Contractor. The Owner's decision as to whether sufficient appropriations are available shall be accepted by the Contractor and shall be final.
- 9.10 The Contractor warrants that the Contractor presently has no interest and shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance or services required under this Agreement.

- 9.11 The Contractor hereby warrants that the Contractor is in compliance with the Americans with Disabilities Act, 29 CFR 1630.
- 9.12 The Contractor, upon final payment of the amounts due under this Agreement, releases the Owner, the Owner's officers and employees, and SFSWMA from all liabilities and obligations arising from or under this Agreement, including, without limitation, to all damages, losses, costs, liability, and expenses, including, without limitation, to attorney's fees and costs of litigation that the Contractor may have.
- 9.13 The Contractor agrees not to purport to bind the Owner to any obligation not assumed herein by the Owner, unless the Contractor has express written authority to do so, and then only within the strict limits of that authority.
- 9.14 Notices. Any and all notices provided for hereunder shall be in writing and shall be deemed delivered, given and received when (i) personally delivered, or (ii) 5 days after the same are deposited in the United States mail, postage prepaid, registered or certified mail, return receipt requested, addressed to the applicable party at the address indicated below for such party, or at such other address as may be designated by either party in a written notice to the other party.

OWNER: Santa Fe Solid Waste Management Agency  
149 Wildlife Way  
Santa Fe, NM 87506  
Atten: Mr. Randall Kippenbrock, Executive Director

CONTRACTOR:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

New Mexico License No. \_\_\_\_\_

- 9.15 Gender, Singular/Plural. Words of any gender used in this Agreement shall be held and construed to include any other gender, and words in the singular number shall be held to include the plural, unless the context otherwise requires.
- 9.16 Captions and Section Headings. The captions and section headings contained in this Agreement are for convenience of reference only, and in no way limit, define, or enlarge the terms, scope and conditions of this Agreement.
- 9.17 This document shall be executed in no less than five (5) counterparts, each of which shall be deemed an original.
- 9.18 Certificates and Documents Incorporated. All certificates and documentation required by the provisions of the Agreement shall be attached to this Agreement at the time of execution, and are hereby incorporated by reference as though set forth in full in this Agreement to the extent they are consistent with its conditions and terms.
- 9.19 Separability. If any clause or provision of this Agreement is illegal, invalid or unenforceable under present or future laws effective during the term of this Agreement,

- then and in that event, it is the intention of the parties hereto that the remainder of this Agreement shall not be affected thereby.
- 9.20 Waiver. No provision of this Agreement shall be deemed to have been waived by either party unless such waiver be in writing signed by the party making the waiver and addressed to the other party; nor shall any custom or practice which may evolve between the parties in the administration of the terms hereof be construed to waive or lessen the right of either party to insist upon the performance by the other party in strict accordance with the terms hereof. Further, the waiver by any party of breach by the other party of any term, covenant, or condition hereof shall not operate as a waiver of any subsequent breach of the same or any other term, covenant, or condition thereof.
- 9.21 Entire Agreement. This Agreement represents the entire Contract between the parties and, except as otherwise provided herein, may not be amended, changed, modified, or altered without the written consent of the parties hereto. This Agreement incorporates all of the conditions, agreements, and understandings between the parties concerning the subject matter of this Contract, and all such conditions, understandings, and agreements have been merged into this written Agreement. No prior conditions, agreements, or understandings, verbal or otherwise, of the parties or their agents shall be valid or enforceable unless embodied in this written Agreement.
- 9.22 Interchangeable Terms. For purposes of all provisions within this Agreement and all attachments hereto, the terms "Agreement" and "Contract" shall have the same meaning and shall be interchangeable.
- 9.23 Words and Phrases. Words, phrases, and abbreviations which have well-known technical or trade meanings used in the Contract documents shall be used according to such recognized meaning. In the event of a conflict, the more stringent meaning shall govern.
- 9.24 Relationship of Contract Documents. The Contract Documents are complementary, and any requirement of one contract document shall be as binding as if required by all.
- 9.25 Pursuant to Section 13-1-191, NMSA 1978, reference is hereby made to the Criminal Laws of New Mexico (including Sections 30-14-1, 30-24-2, and 30-41-1 through 30-41-3, NMSA 1978) which prohibit bribes, kickbacks, and gratuities, the violation of which constitutes a felony. Further, the Procurement Code (Sections 13-1-28 through 13-1-199, NMSA 1978) imposes civil and criminal penalties for its violation.
- 9.26 By entering into this Agreement, the parties do not intend to create any right, title or interest in or for the benefit of any person other than the Owner and the Contractor. No person shall claim any right, title of interest under this Agreement or seek to enforce this Agreement as a third party beneficiary of this Agreement.

9.27 This Agreement is entered into as of the day and year first written above.

SOLID WASTE JOINT POWERS BOARD

\_\_\_\_\_  
MIGUEL CHAVEZ  
CHAIR PERSON

ATTEST:

\_\_\_\_\_  
GERALDINE SALAZAR, COUNTY CLERK

CONTRACTOR

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

DATE: \_\_\_\_\_

NM TAXATION AND REVENUE CRS

NO. \_\_\_\_\_

APPROVED AS TO FORM:

\_\_\_\_\_  
JUSTIN W. MILLER  
SFSWMA ATTORNEY

DATE: \_\_\_\_\_

## **Section 8 Performance Bond**

## **PERFORMANCE BOND**

A. KNOW ALL MEN BY THESE PRESENTS, that \_\_\_\_\_ (here insert the name and address or legal title of the Contractor) as Principal, hereinafter called Contractor, and \_\_\_\_\_ (here insert the legal title of Surety) as Surety, hereinafter called Surety, are held firmly bound unto the Santa Fe Solid Waste Management Agency as Oblige, 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.

B. WHEREAS, the Contractor has by written agreement dated, \_\_\_\_\_, 2014, entered into a Contract with the Santa Fe Solid Waste Management for the \_\_\_\_\_ in accordance with Construction Plans and Specifications prepared by the Owner which Contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

C. NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

1. The Surety hereby waives notice of any alteration or extension of time made by the Owner.
2. Whenever Contractor shall be, and declared by the Owner to be in default under the Contract, the Owner having performed Owner's obligations thereunder, the Surety may promptly remedy the default or shall promptly:
  - a. Complete the Contract in accordance with its terms and conditions or
  - b. Obtain a bid or bids for submission to Owner for completing the Contract in accordance with its terms and conditions, and upon determination by Owner and Surety of the lowest responsible bidder, arrange for a contract between such bidder and Owner, and make available as work progresses (even though there should be a default or a secession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price, but not exceeding, including other costs and damages for which the surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the Contract price" as used in this paragraph, shall mean the total amount payable by Owner to Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.
3. Any suit under this bond must be instituted before the expiration of two (2) years

from the date on which final payment under the contract falls due.

4. No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators or successors of the Owner.

(SIGNED) \_\_\_\_\_

TITLE \_\_\_\_\_

SUBSCRIBED AND SWORN to before me this \_\_\_\_\_ day of \_\_\_\_\_, 2014.

NOTARY PUBLIC

My Commission Expires \_\_\_\_\_

\_\_\_\_\_  
Contractor- Principal

By: \_\_\_\_\_

Title: \_\_\_\_\_

Approved as to form:

Surety

Title: \_\_\_\_\_

Countersigned: \_\_\_\_\_

Surety's Authorized New Mexico Agent

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## **Section 9 Labor and Material Payment Bond**

## LABOR AND MATERIAL PAYMENT BOND

A. KNOW ALL MEN BY THESE PRESENTS THAT

(HERE INSERT THE NAME AND ADDRESS OR LEGAL TITLE OF THE CONTRACTOR)  
as Principal, hereinafter called Principal, and \_\_\_\_\_

(HERE INSERT THE LEGAL TITLE OF SURETY)

As Surety, hereinafter called Surety, are held and firmly bound unto the Santa Fe Solid Waste Management Agency as Obligee, hereinafter called Owner, for the use and benefits of claimants as herein below defined, in the amount of \_\_\_\_\_  
DOLLARS, (\$ \_\_\_\_\_) for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

B. WHEREAS, Principal has by written agreement dated \_\_\_\_\_,  
2014 entered into a contract with the Santa Fe Solid Waste Management Agency for the

\_\_\_\_\_ in accordance with Construction Plans and Specifications prepared by the Santa Fe Solid Waste Management Agency, which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

C. NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, than this obligation shall be void; otherwise, it shall remain in full force, subject, however, to the following conditions.

1. A claimant is defined as one having a direct contract with the principal or with a subcontractor of the principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.
2. 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 the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by 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 payment of any cost or expenses of any such suit.
3. No suit or action shall be commenced hereunder by any claimant:
  - a. Unless claimant, or other than one having a direct contract with the principal, shall have written notice to any two of the following: the Principal, the Owner, or the

- Surety above named, within ninety (90) days after such said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed.
- b. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner or Surety, at any place where an office is regularly maintained for the transaction of business, or revised in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such services need not be made by a public officer.
  - c. After the expiration of one (1) year following the date on which Principal ceased work on said Contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.
  - d. Other than in a state court of competent jurisdiction in and for the Owner 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.
4. The amount of this bond shall not be reduced by and to the extent of any payments made in good faith hereunder, inclusive of the payment by Surety of mechanics liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

SIGNED AND SEALED on \_\_\_\_\_, 2014

In the presence of:

\_\_\_\_\_  
NOTARY PUBLIC

My Commission Expires: \_\_\_\_\_

\_\_\_\_\_  
NAME OF COMPANY

By: \_\_\_\_\_

Title: \_\_\_\_\_

\_\_\_\_\_  
Surety

By: \_\_\_\_\_

Title: \_\_\_\_\_

Countersigned:

\_\_\_\_\_  
Surety's Authorized New Mexico Agent

This bond is issued simultaneously with performance bond in favor of contracting agency for the faithful performance of the contract.

**Section 10  
Certificate of Owner's Attorney**

**CERTIFICATE OF OWNER'S ATTORNEY**

I, the undersigned, SFSWMA Attorney, the duly authorized and acting legal representative of Santa Fe Solid Waste Management Agency, do hereby certify as follows:

I have examined the attached contract(s) and surety bonds and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions and provisions thereof.

\_\_\_\_\_  
Justin W. Miller, SFSWMA Attorney

Date: \_\_\_\_\_

# **Section 11**

## **General Conditions**

## NOTICE

This document has been prepared by the Capital Improvements Program (CIP) and Contract Compliance staff of the Owner for use in construction projects.

### DOCUMENT - SECTION 00710

#### GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

(THIS DOCUMENT HAS IMPORTANT LEGAL CONSEQUENCES;  
CONSULTATION WITH AN ATTORNEY IS ENCOURAGED WITH  
RESPECT TO ITS COMPLETION OR MODIFICATION.)

#### TABLE OF ARTICLES

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| 1. CONTRACT DOCUMENTS                       | 9. PAYMENTS AND COMPLETION             |
| 2. ENGINEER / OWNER                         | 10. PROTECTION OF PERSONS AND PROPERTY |
| 3. OWNER                                    | 11. INSURANCE                          |
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**ARTICLE 1**

**CONTRACT DOCUMENTS**

**1.1 DEFINITIONS**

**1.1.1 THE CONTRACT DOCUMENTS**

The Contract Documents consist of the Owner-Contractor Agreement, the Conditions of the Contract (General, Supplementary, and Other Conditions), the Construction Plans, the Specifications, and all Addenda issued prior to and all Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a written interpretation issued by the Engineer pursuant to Subparagraph 2.2.6, or (4) a written order for a minor change in the work issued by the Engineer pursuant to Paragraph 12.4. The Contract Documents do not include Bidding Documents such as the Advertisement or Invitation to Bid, the Instructions to Bidders, sample forms, the Contractor's Bid, or portions of Addenda relating to any of these, or any other documents, unless specifically enumerated in the Owner-Contractor Agreement.

**1.1.2 THE CONTRACT**

The Contract Documents form the Contract for Construction. This Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification as defined in Subparagraph 1.1.1. The Contract Documents shall not be construed to create any contractual relationship of any kind between the Engineer and the Contractor, but the Engineer shall be entitled to performance of obligations intended for his benefit, and to enforcement thereof. Nothing contained in the Contract Documents shall create any contractual relationship between the Owner or the Engineer and any Subcontractor or Sub-subcontractor.

**1.1.3 THE WORK**

The work comprises the design and completed construction required by the Contract Documents, and includes design specifications, and all labor necessary to produce such construction, and all materials and equipment incorporated or to be incorporated in such construction.

**1.1.4 THE PROJECT**

The Project is the total design and construction of which the work performed under the Contract Documents may be the whole or a part.

**1.2 EXECUTION, CORRELATION AND INTENT**

1.2.1 No fewer than five (5) copies of the Contract Documents shall be signed by the Owner and the Contractor. If either the Owner or the Contractor or both do not sign the Conditions of the Contract, Construction Plans, Specifications, or any of the other Contract Documents, the Engineer shall identify such Documents.

1.2.2 By executing the Contract, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the work is to be performed, and correlated his observations with the requirements of the Contract Documents.

1.2.3 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the work. The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all work not covered in the Contract Documents

will not be required unless it is consistent therewith and is reasonably inferable therefrom as being necessary to produce the intended results. Words and abbreviations which have well-known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings. In the event of a conflict between the Contract Documents, the more stringent requirements shall govern.

- 1.2.4 The organization of the Specifications into divisions, sections and articles, and the arrangement of Construction Plans shall not control the Contractor in dividing the work among Subcontractors or in establishing the extent of work to be performed by any trade.

### **1.3 OWNERSHIP AND USE OF DOCUMENTS**

- 1.3.1 All designs, Construction Plans, specifications, notes, and other work developed in the performance of this Contract shall be and remain the sole property of the Owner and may be used on any other work without additional compensation to the Engineer. With respect thereto, the Engineer agrees not to assert any rights and not to establish any claims under the design patent of copyright laws.

## **ARTICLE 2**

### **ENGINEER/ OWNER**

#### **2.1 DEFINITION**

- 2.1.1 The Engineer is the person lawfully licensed to practice Engineering, or an entity lawfully practicing Engineering identified as such in the Owner-Contractor Agreement, and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term “Engineer” mean the Owner or authorized representative.

#### **2.2 ADMINISTRATION OF THE CONTRACT – COMMUNITY FACILITIES SECTION**

- 2.2.1 The Engineer will provide administration of the Contract as hereinafter described.
- 2.2.2 The Engineer will be the Owner’s representative during construction and until final payment is due. The Engineer will advise and consult with the Owner. The Owner’s instructions to the Contractor shall be forwarded through the Engineer. The Engineer shall have the authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified by written instrument in accordance with Subparagraph 2.2.17.
- 2.2.3 The Engineer shall submit to the Owner, for approval, a list of critical inspection points based upon the construction schedule furnished by the Contract (Paragraph 4.11.1). The Engineer and his staff (including the on-site representative, if agreed upon) shall make visits to the site at those critical points and at other times as the Engineer deems appropriate during the progress of the work. Additionally, the Engineer shall familiarize himself with the progress and quality of the work and determine if the work is proceeding in accordance with the Contract Documents. On the basis of on-site observations, as an Engineer, he shall guard the Owner against defects and deficiencies in the construction. Should the Engineer determine that any portion of the work varies from the intent of the Contract Documents he shall immediately notify the Contractor and the Owner of the non-compliance and the nature of the work required to correct such non-compliance. The Engineer shall recommend to the Owner, in writing, to issue a “stop work order” for any portion of the work that does not substantially comply with the intent of the Contract Documents, except as follows.
- 2.2.4 The Engineer shall not be responsible for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the work. Additionally, the Engineer shall not be responsible for the Contractor’s failure to carry out the work in accordance

- with the Contract Documents. The Engineer shall reject work which does not meet or exceed the standards established by the Contract Documents. Whenever, in his reasonable opinion, he considers it necessary or advisable to ensure the proper implementation of the intent of the Contract Documents, he will have authority to require special inspection or testing of any work in accordance with the provisions of the Contract Documents whether or not such work be then fabricated, installed or completed.
- 2.2.5 The Engineer shall at all times have access to the work wherever it is in preparation and progress. The Contractor shall provide facilities for such access so the Engineer may perform his functions under the Contract Documents.
- 2.2.6 Based on the Engineer's observations and an evaluation of the Contractor's Application for Payment, the Engineer will determine the amounts owing to the Contractor and will issue Certificates for Payment in such amounts, as provided in Paragraph 9.4.
- 2.2.7 The Engineer will be the interpreter of the requirements of the Contract Documents and the judge of the performance there under by both the Owner and the Contractor.
- 2.2.8 The Engineer will render interpretations necessary for the proper execution or progress of the work, with reasonable promptness and in accordance with any time limit agreed upon. Either party to the Contract may make written request to the Engineer for such interpretations.
- 2.2.9 Claims, disputes, and other matters in question between the Contractor and the Owner relating to the execution or progress of the work or the interpretation of the Contract Documents shall be referred to the Engineer for decision which he will render in writing within a reasonable time.
- 2.2.10 All interpretations and decisions of the Engineer shall be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of Construction Plans. In his capacity as interpreter and judge, he will endeavor to secure faithful performance by both the Owner and the Contractor, will not show partiality to either, and will not be liable for the result of any interpretation or decision rendered in good faith in such capacity.
- 2.2.11 The Engineer's decisions in matters relating to artistic effect may be final if consistent with the intent of the Contract Documents.
- 2.2.12 The Engineer will have authority to reject work which does not conform to the Contract Documents. Whenever, in his opinion, he considers it necessary or advisable for the implementation of the intent of the Contract Documents, he will have authority to require special inspection or testing of the work in accordance with Subparagraph 7.7.2 whether or not such work be then fabricated, installed or completed. However, neither the Engineer's authority to act under this Subparagraph 2.2.12, nor any decision made by him in good faith either to exercise or not to exercise such authority, shall give rise to any duty or responsibility of the Engineer to the Contractor, any Subcontractor, any of their agents or employees, or any other person performing any of the work.
- 2.2.13 The Engineer will review and approve or take other appropriate action upon Contractor's submittals such as Shop Drawings, Product Data and samples, but only for conformance with the design concept of the work and with the information given in the Contract Documents. Such action shall be taken with reasonable promptness so as to cause no delay. The Engineer's approval of a specific item shall not indicate approval of an assembly of which the item is a component.
- 2.2.14 The Engineer will prepare Change Orders in accordance will Article 12 and will have authority to order minor changes in the work as provided in Subparagraph 12.4.1.
- 2.2.15 The Engineer will conduct inspections to determine the dates of Substantial Completion and Final

Completion, will receive and forward to the Owner for the Owner's review of written warranties and related documents required by the Contract and assembled by the Contractor and will issue a final Certificate of payment upon compliance with the requirements of Paragraph 9.9

- 2.2.16 If the Owner and Engineer agree, the Engineer will provide one or more Project Representatives to assist the Engineer in carrying out his responsibilities at the site. The duties, responsibilities and limitations of authority of any such Project Representative shall be as set forth in an exhibit to be incorporated in the Contract Documents.
- 2.2.17 The duties, responsibilities and limitations of authority of the Engineer as the Owner's representative during construction as set for in the Contract Documents will not be modified or extended without written consent of the Owner, the Contractor and the Engineer.
- 2.2.18 In case of the termination of the employment of the Engineer, the Owner shall appoint an Engineer whose status under the Contract Documents shall be that of the former Engineer.

### **ARTICLE 3**

#### **OWNER**

#### **3.1 DEFINITION**

- 3.1.1 The Owner is the person or entity identified as such in the Owner-Contractor Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term "Owner" means the Owner or his authorized representative.

#### **3.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER**

- 3.2.1 The Owner shall, at the request of the Contractor, at the time of execution of the Owner-Contractor Agreement, furnish to the Contractor reasonable evidence that he had made financial arrangements to fulfill his obligations under the Contract. Unless such reasonable evidence is furnished, the Contractor is not required to execute the Owner-Contractor Agreement or to commence the work.
- 3.2.2 The Owner shall furnish all surveys describing the physical characteristics, legal limitation and utility locations for the site for the Project, and a legal description of the site.
- 3.2.3 Except as provided in Subparagraph 4.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments, and charges required for the construction, use or occupancy of permanent structures or for permanent changes in existing facilities.
- 3.2.4 Information or services under the Owner's control shall be furnished by the Owner with reasonable promptness to avoid delay in the orderly progress of the work.
- 3.2.5 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, all copies of Construction Plans and Specifications reasonable necessary for the execution of the work.
- 3.2.6 The Owner shall forward all instructions to the Contractor through the Engineer.
- 3.2.7 The foregoing are in addition to other duties and responsibilities of the Owner enumerated herein and especially those in respect to work by Owner or by Separate Contractors, Payments and Completion, and Insurance in Articles 6, 9 and 11 respectively.

#### **3.3 OWNER'S RIGHT TO STOP THE WORK**

- 3.3.1 If the Contractor fails to correct defective work as required by Paragraph 13.2 or persistently fails

to carry out the work in accordance with the Contract Documents, the Owner, by a written order signed personally or by an agent specifically so empowered by the Owner in writing, may order the Contractor to stop the work, or any portion thereof, until the cause of such order has been eliminated; however, this right of the Owner to stop the work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Subparagraph 6.1.3.

### **3.4 OWNER'S RIGHT TO CARRY OUT THE WORK**

3.4.1 If the Contractor defaults or neglects to carry out the work in accordance with the Contract Documents and fails within seven days after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, after seven days following receipt by the Contractor of an additional written notice and without prejudice to any other remedy he may have, make good such deficiencies. In such case, an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Engineer additional services made necessary by such default, neglect or failure. Such action by the Owner and the amount charged to the Contractor are both subject to the prior approval of the Engineer. If the payments then or thereafter due to the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

## **ARTICLE 4**

### **CONTRACTOR**

#### **4.1 DEFINITION**

4.1.1 The Contractor is the person or entity identified as such in the Owner-Contractor Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term "Contractor" means the Contractor or his authorized representative.

#### **4.2 REVIEW OF CONTRACT DOCUMENTS**

4.2.1 The Contractor shall carefully study and compare the Contract Documents and shall at once report to the Engineer any error, inconsistency or omission he may discover. The Contractor shall not be liable to the Owner or the Engineer for any damage resulting from any such errors, inconsistencies or omissions in the Contract Documents. The Contractor shall perform no portion of the work at any time without Contract Documents or, where required, approved Shop Drawings, Product Data or Samples for such portion of the work.

#### **4.3 SUPERVISION AND CONSTRUCTION PROCEDURES**

4.3.1 The Contractor shall supervise and direct the work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the work under the contract.

4.3.2 The Contractor shall be responsible to the Owner for the acts and omissions of his employees, Subcontractors and their agents and employees, and other persons performing any of the work under a contract with the Contractor.

4.3.3 The Contractor shall not be relieved from his obligations to perform the work in accordance with the Contract Documents either by the activities or duties of the Engineer in his administration of the Contract, or by inspections, tests or approvals required or performed under Paragraph 7.8 by persons other than the Contractor.

#### **4.4 LABOR AND MATERIALS**

- 4.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the work, whether or not incorporated or to be incorporated in the work.
- 4.4.2 The Contractor shall at all times enforce strict discipline and good order among his employees and shall not employ on the work any unfit person or anyone not skilled in the task assigned to him.

#### **4.5 WARRANTY**

- 4.5.1 The Contractor warrants to the Owner and Engineer that all materials and equipment furnished under this Contract will be new unless otherwise specified, and that all work will be of good quality, free from faults and conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. If required by the Engineer, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. This warranty is not limited by the provisions in Paragraph 13.2.
- 4.5.2 The Contractor shall and hereby does warrant and guarantee all workmanship, labor, and materials performed and supplied by him or his Subcontractors for a period of one (1) year from the date of completion as evidenced by the date of the Engineer's Final Certificate of Payment of this Contract. This also included all labor required for replacing materials or equipment found to be defective with the one (1) year period. All guarantees for a longer period of time required by the work sections of these Specifications shall be secured by the Contractor from Subcontractors and delivered to the Engineer and are hereby warranted by the Contractor as much as if countersigned by him.

#### **4.6 TAXES**

- 4.6.1 The Contractor shall pay all sales, consumer gross receipts tax, use and other similar taxes for the work or portions thereof provided by the Contractor which are legally enacted at the time Bids are received, whether or not yet effective.

#### **4.7 PERMITS, FEES AND NOTICES**

- 4.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and for all other permits and governmental fees, licenses and inspections necessary for the proper execution and completion of the work which are customarily secured after execution of the Contract and which are legally required at the time the Bids are received.
- 4.7.2 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the performance of the work.
- 4.7.3 It is not the responsibility of the Contractor to make certain that the Contract Documents are in accordance with applicable laws, statutes, building codes and regulations. If the Contractor observes that any of the Contract Documents are at variance therewith in any respect, he shall promptly notify the Engineer in writing, and any necessary changes shall be accomplished by appropriate Modification.
- 4.7.4 If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Engineer, he shall assume full responsibility therefore and shall in turn notify the Owner's Representative of such action.

#### **4.8 ALLOWANCES**

- 4.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by these allowances shall be supplied for such amounts and by these allowances shall be supplied for such amounts and by such persons as the Owner may direct, but the Contractor will not be required to employ persons against whom he makes a reasonable objection.
- 4.8.2 Unless otherwise provided in the Contract Documents:
- A. These allowances shall cover the cost to the Contractor, less any applicable trade, discount of the materials and equipment required by the allowance delivered at the site, and all applicable taxes;
  - B. The Contractor's costs for unloading and handling on the site, labor, installations costs, overhead, profit and other expenses contemplated for the original allowance shall be included in the Contract Sum and not in this allowance;
  - C. Whenever the cost is more than or less than the allowance, the Contract Sum shall be adjusted accordingly by Change Order, the amount of which will recognize changes, if any, in handling costs on the site, labor, installation costs, overhead, profit and other expenses.

#### **4.9 SUPERINTENDENT**

4.9.1 The Contractor shall employ a competent Superintendent and necessary assistants who shall be in attendance at the project site during the progress of the work. The Superintendent shall represent the Contractor, and all communications given to the Superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be so confirmed on written request in each case.

#### **4.10 PROGRESS SCHEDULES**

- 4.10.1 The Contractor shall, within ten (10) days after the effective date of Notice to Proceed, furnish five copies of a preliminary progress schedule covering his operations for the first thirty (30) days. The preliminary progress schedule shall be a bar graph or an arrow diagram showing the items the Contractor intends to commence and complete the various work stages, operations, and contract means planned to be started during the first thirty (30) days.
- 4.10.2 Unless otherwise specified in the Special Provisions, the Contractor shall submit for approval by the Engineer, within ten (10) days after the effective date of Notice to Proceed, five copies of a critical-path-type analysis. The critical-path-type analysis shall include as a minimum; a graphic network diagram; a computer printout or list of activities; and a brief written explanation of the proposed schedule.
- 4.10.3 The graphic network diagram shall consist of an arrow diagram or a geometric figure and connector diagram which clearly depicts the major subdivisions of the work, the order and interdependencies of activities planned by the Contractor, as well as, activities by others which affect the Contractor's planning. The intended time for starting and completing each activity, the associated float time and the quantity and kinds of major equipment to be used shall be shown for each construction operation. For those activities lasting more than 30 days, either the estimated time for 25-50 and 75 percent completion or other significant milestones in the course of the activity, shall be shown. In addition to the actual construction operations, the network diagram shall show such items as submittal of samples and Shop Drawings, delivery of materials and equipment, construction in the area by other forces, traffic detour controls, and other significant

items related to the progress of construction. The graphic network diagram shall be printed or neatly and legibly drawn to a linear scale.

- 4.10.4 Activities shown shall be coordinated insofar as possible with the Contract Bid items, types of work and maximum number of activities of each type.
- 4.10.5 The computer printout or list of activities shall show for each activity the estimated duration, the earliest starting and finishing dates, the latest starting and finishing dates, and float or slack time. Activities which constitute the critical sequence shall be identified showing a total job duration equal to the Contract Time.
- 4.10.6 The written explanation shall contain sufficient information to describe the construction methods to be used and to enable the Engineer to evaluate the schedule and supporting analysis for validity and practicability. If the schedule or written explanation is not accepted by the Owner, the Contractor shall resubmit the rejected items within ten (10) days after rejection.
- 4.10.7 The analysis may employ the use of an electric computer or may consist of a non-computer analysis if the latter is suitable to analyze the number of activities required. The adequacy of the system selected shall be acceptable to the Engineer.
- 4.10.8 The Contractor shall submit to the Engineer monthly progress status reports on dates directed by the Engineer. Such reports shall list those uncompleted activities which have less than 30 days float and which are either in progress or scheduled to be started within the next reporting period. For each of the listed activities, the following shall be shown:
  - A. Starting date scheduled in last critical-path-analysis.
  - B. Actual or intended starting date.
  - C. Revised activity duration, if any.

If the noted starting dates or duration delay the scheduled project completion date, the delay shall be named. Reasons for the delay shall be given with an explanation of the Contractor's proposed corrective action. The Contract shall also note each activity completed during the report period.

- 4.10.9 A revised critical-path-type analysis shall be submitted when one or more of the following conditions occur:
  - A. When an approved change Order significantly affects the contract completion date, or the sequence of activities.
  - B. When progress of any critical activity falls significantly behind the scheduled progress.
  - C. When delay on a non-critical activity is of such magnitude as to change the course of the critical path.
  - D. At any time the Contractor elects to change any sequence of activities affecting the critical path.

The revised analysis shall be made in the same form and detail as the original submittal and shall be accompanied by an explanation of the reasons for the revisions.

- 4.10.10 The Contractor shall prosecute the work in accordance with the latest critical path type analysis. Deviations therefrom shall be submitted to the Engineer for review. In the event that the progress of items along the critical path is delayed, the Contractor shall revise his planning to include

additional forces, equipment, shifts or hours necessary to meet the contract completion date. All additional cost resulting therefrom will not be borne by the Owner.

#### **4.11 DOCUMENTS AND SAMPLES AT THE SITE**

4.11.1 The Contractor shall maintain at the site, for the Owner, one record copy of all Construction Plans, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record all changes made during construction, and approved Shop Drawings, Product Data and Samples. These shall be available to the Owner upon completion of the work.

#### **4.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES**

4.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the work by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the work.

4.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the work.

4.12.3 Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the work will be judged.

4.12.4 The Contractor shall review, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the work or in the work of the Owner of any separate Contractor, all Shop Drawings, Product Data and Sample required by the Contract Documents.

4.12.5 By approving and submitting Shop Drawings, Product Data and Samples, the Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the work and of the Contract Documents.

4.12.6 The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Engineer's approval of Shop Drawings, Product Data or Samples under Subparagraph 2.2.13 unless the Contractor has specifically informed the Engineer in writing of such deviation at the time of submission and the Engineer has given written approval to the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples by the Engineer approval thereof.

4.12.7 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data or Samples, to revisions other than those requested by the Engineer on previous submittals.

4.12.8 No portion of the work requiring submission of a Shop Drawing, Product Data or Sample shall be commenced until the submittal has been approved by the Engineer as provided in Subparagraph 2.2.13. All such portions of the work shall be in accordance with approved submittals.

#### **4.13 USE OF SITE**

4.13.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not reasonably encumber the site with any materials or equipment.

4.13.2 The Contractor shall hold and save the Owner free and harmless from liability of any nature or kind arising from use, trespass or damage occasioned by third persons.

#### **4.14 CUTTING AND PATCHING OF WORK**

- 4.14.1 The Contractor shall be responsible for all cutting, fitting or patching that may be required to complete the work or to make its several parts fit together properly.
- 4.14.2 The Contractor shall not damage or endanger any portion of the work or the work of the Owner or any separate contracts by cutting, patching or otherwise altering any work, or by excavation. The Contractor shall not cut or otherwise alter the work of the Owner or any separate Contractor except with the written consent of the Owner and of such separate Contractor. The Contractor shall not unreasonably withhold from the Owner any separate Contractor his consent to cutting or otherwise altering the work.

#### **4.15 CLEANING UP**

- 4.15.1 The Contractor at all times shall keep the premises free from accumulation of waste materials (e.g., liner materials and pipe), trash or debris caused by his operations. At the completion of the work, he shall remove all his waste materials, trash and debris from and about the Project as well as all his tools, construction equipment, machinery and surplus materials.
- 4.15.2 If the Contractor fails to clean up at the completion of the work, the Owner may do so as provide in Paragraph 3.4, and the cost thereof shall be charged to the Contractor.
- 4.15.3 The Contractor shall be solely responsible for performance of the following clean up as they apply:
- A. Debris: Regardless of the nature of the debris, it shall be immediately cleared from the work area. Each trade shall cooperate with other trades in the removal of debris and in keeping a clean job throughout.

#### **4.6 COMMUNICATIONS**

- 4.16.1 The Contractor shall forward all communications to the Owner through the Engineer.

#### **4.17 ROYALTIES AND PATENTS**

- 4.17.1 The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof, except that the Owner shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified; but if the Contractor has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the Engineer.

#### **4.18 INDEMNIFICATION**

- 4.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner and the Engineer and their agents and employees from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees arising out of or resulting from the performance of the work, provided that any such claim, damage, loss or expense (1) 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 (2) is caused in whole or in part by any negligent act or omission on the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder. Such negligent shall not

be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnify which would otherwise exist as to any party or person described in this Paragraph 4.18.

- 4.18.2 In any and all claims against the Owner or the Engineer or any of their agents or employees by an employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Paragraph 4.18 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.
- 4.18.3 The obligation of the Contractor under this Paragraph 4.18 shall not extend to the liability of the Engineer, his agents or employees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs, or specifications, or (2) the giving of or the failure to give directions by the Engineer, his agents or employees, provided such giving or failure to give is the primary cause of the injury or damage.

## **ARTICLE 5**

### **SUBCONTRACTOR**

#### **5.1 DEFINITION**

- 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform any of the work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Subcontractor or his authorized representative. The term "Subcontractor" does not include any separate Contractor or his Subcontractors.
- 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform any of the work at the Site.

#### **5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK**

- 5.2.1 Unless otherwise required by the Contract Documents of the Bidding Documents, the Contractor, as soon as practicable after the award of the Contract, shall furnish to the Owner and the Engineer in writing the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the work. The Engineer will promptly reply to the Contractor in writing stating whether or not the Owner or the Engineer, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or the Engineer to reply promptly shall constitute notice of no reasonable objection.
- 5.2.2 The Contractor shall not contract with any such proposed person or entity to whom the Owner or the Engineer has made reasonable objection under the provisions of Subparagraph 5.2.1. The Contractor shall not be required to contract with anyone to whom he has a reasonable objection.

#### **5.3 SUBCONTRACTUAL RELATION**

- 5.3.1 By an appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Documents, assumes toward the Owner and the Engineer. Said agreement shall preserve and protect the rights of the Owner and the Engineer under the Contract Documents with respect to the work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor,

unless specifically provided otherwise in the Contractor-Subcontractor agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with his Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the Subcontract, copies of the Contract Documents to which the Subcontractor will be bound by this Paragraph 5.3, and identify the Subcontractor any terms and conditions of the proposed Subcontract which may be at variance with the Contract Documents. Each Subcontractor shall similarly make copies of such Documents available to his Subcontractors.

## **ARTICLE 6**

### **WORK BY OWNER OR BY SEPARATE CONTRACTORS**

#### **6.1 OWNER'S RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS**

- 6.1.1 The Owner reserves the right to perform work related to the Project with his own forces, and to award separate contracts in connection with other portions of the Project or other work on the site under these or similar Conditions of the Contract. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, he shall make such claim as provided elsewhere in the Contract Documents.
- 6.1.2 When separate contracts are awarded for different portions of the Project or other work on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.
- 6.1.3 The Owner will provide for the coordination of the work of his own forces and of each separate Contractor with the work of the Contractor, who shall cooperate therewith as provided in paragraph 6.2.

#### **6.2 MUTUAL RESPONSIBILITY**

- 6.2.1 The Contractor shall afford the Owner and the Separate Contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall connect and coordinate his work with theirs as required by the Contract Documents.
- 6.2.2 If any part of the Contractor's work depends for proper execution or results upon the work of the Owner or any separate Contractor, the Contractor shall, prior to proceeding with the work, promptly report to the Engineer any apparent discrepancies or defects in such other work that render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acceptance of the Owner's or the separate Contractor's work as fit and proper to receive his work, except as to defects which may subsequently become apparent in such work by others.
- 6.2.3 Any costs caused by defective or ill-timed work shall be borne by the party responsible thereof.
- 6.2.4 Should the Contractor wrongfully cause damage to the work or property of the Owner, or to other work on the site, the Contractor shall promptly remedy such damage as provided in Subparagraph 10.2.5.
- 6.2.5 Should the Contractor wrongfully cause damage to the work or property of any separate Contractor, the Contractor shall upon due notice promptly attempt to settle with such other Contractor by agreement, or otherwise to resolve the dispute. If such separate Contractor sues or initiates an arbitration proceeding against the Owner on account of any damage alleged to have been cause by the Contractor, the Owner shall notify the Contractor, who shall defend such proceedings at the Owner's expense, and if any judgment or award against the Owner arises

therefrom, the Contractor shall pay or satisfy it and shall reimburse the Owner for all attorneys' fees and court or arbitration costs which the Owner has incurred.

**6.3 OWNER'S RIGHT TO CLEAN UP**

6.3.1 If a dispute arises between the Contractor and separate Contractors as to their responsibility for cleaning up as required by Paragraph 4.15, the Owner may clean up and charge the cost thereof to the Contractors responsible therefor as the Engineer shall determine to be just.

**ARTICLE 7**

**MISCELLANEOUS PROVISIONS**

**7.1 GOVERNING LAW**

7.1.1 The Contract shall be governed by the law of the State of New Mexico.

7.1.2 The Owner and the Contractor each binds himself, his partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party in respect to all covenants, agreements, and obligations contained in the Contract Documents. Neither part to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any moneys due or to become due to him thereunder, without the previous written consent of the Owner.

**7.2 WRITTEN NOTICE**

7.2.1 Written notice shall be deemed to have dully served if delivered in person to the individual or member of the firm or entity or to an officer of the corporation for whom it was intended, or if delivered at or sent by registered or certified mail to the last business address known to him who gives the notice.

**7.3 CLAIMS FOR DAMAGES**

7.3.1 Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the other party or of any of his employees, agents or others for whose acts he is legally liable, claim shall be made in writing to such other party within a reasonable time after the first observance of such injury or damage.

**7.4 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND**

7.4.1 The Contractor to whom the Contract is awarded shall furnish and pay for reputable and approved Performance and Labor and Material Payment Bonds, each for the full amount of the Contract Sum. Bonds shall be executed on standard AIA forms.

**7.5 RIGHTS AND REMEDIES**

7.5.1 The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

7.5.2 No action or failure to act by the Owner, the Engineer, or the Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be

specifically agreed in writing.

## **7.6 TESTS**

7.6.1 If the Contract Document, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any portion of the work to be inspected, tested or approved, the Contractor shall give the Engineer timely notice of its readiness so the Engineer may observe such inspection, testing or approval. The Contractor shall bear all costs of such inspections, tests or approvals. Tests specifically called for by specifications shall be made by a professional testing laboratory acceptable to the Engineer, and the Contractor shall employ same and pay all charges in connection therewith. Records of tests shall be delivered to the Engineer in duplicate on acceptable forms.

7.6.2 If the Engineer determines that any work requires special inspection, testing, or approval which Subparagraph 7.6.1 does not include, he will, upon written authorization from the Owner, instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice as provided in Subparagraph 7.6.1. If such special inspection or testing reveals a failure of the work to comply with the requirements of the Contract Documents, the Contractor shall bear all costs thereof, including compensation for the Engineer's additional services made necessary by such failure; otherwise the Owner shall bear such costs, and an appropriate Change Order shall be issued.

## **7.7 INTEREST**

7.7.1 The Owner will not pay interest on payments due and unpaid under the Contract Document.

# **ARTICLE 8**

## **TIME**

### **8.1 DEFINITIONS**

8.1.1 Unless otherwise provided, the Contract Time is the period of time allotted in the Contract Documents for Substantial Completion of the work as defined in Subparagraph 8.1.3, including authorized adjustments thereto.

8.1.2 The date of commencement of the work is the date established in a Notice to Proceed. If there is no Notice to Proceed, it shall be the date of the Owner-Contractor Agreement or such other date as may be established therein.

8.1.3 The Date of Substantial Completion of the work or designated portion thereof is the Date certified by the Engineer and approved by the Owner when construction is deficiently complete, in accordance with the Contract Documents, so the Owner can occupy or utilize the work or designated portion thereof for the use for which it is intended.

8.1.4 The term "day" as used in the Contract Document shall mean calendar day unless otherwise specifically designated.

### **8.2 PROGRESS AND COMPLETION**

8.2.1 All time limits stated in the Contract Documents are the essence of the Contract.

8.2.2 The Contractor shall begin the work on the date of commencement as defined in Subparagraph

8.2.3 He shall carry the work forward expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

### **8.3 DELAYS AND EXTENSIONS OF TIME**

- 8.3.1 If the Contractor is delayed at any time in the progress of the work by any act or neglect of the Owner or the Engineer or by any employees of either, or by any separate Contractor employed by the Owner or by changes ordered in the work, or by labor disputes, fire, unusual delay in unavoidable casualties, or any causes beyond the Contractor's control or by delay authorized by the Owner pending arbitration, or by any other cause which the Engineer determines may justify the delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Engineer may determine.
- 8.3.2 Any claim for extension of time shall be made in writing to the Engineer not more than twenty days after the commencement of the delay; otherwise it shall be waived. In the case of a continuing delay, only one claim is necessary. The Contractor shall provide an estimate of the probable effect of such delay on the progress of the work.
- 8.3.3 If written agreement is made stating the dates upon which interpretations as provided in Subparagraph 2.28 shall be furnished, then no claim for delay shall be allowed on account of failure to furnish such interpretations until fifteen days after written request is made for them, and not then unless such claim is reasonable.
- 8.3.4 This Paragraph 8.3 does not exclude the recovery of damages for delay by either party under other provisions of the Contract Documents.

## **ARTICLE 9**

### **PAYMENTS AND COMPLETION**

#### **9.1 CONTRACT SUM**

- 9.1.1 The Contract Sum is stated in the Owner-Contractor Agreement and including authorized adjustments thereto, is the total amount payable by the Owner to the Contractor for the performance of the work under the Contract Documents.

#### **9.2 SCHEDULE OF VALUES**

- 9.2.1 Before the first Application for Payment, the Contractor shall submit to the Engineer a schedule of values allocated to the various portion of the work, prepared in such form and supported by such data to substantiate its accuracy as the Engineer may require. This schedule, unless objected to by the Engineer, shall be used only as a basis for the Contractor's Applications for payment.

#### **9.3 APPLICATIONS FOR PAYMENT**

- 9.3.1 At least ten days before the date for each progress payment established in the Owner-Contractor Agreement, the Contractor shall submit to the Engineer an itemized Application for Payment, notarized if required, supported by such data substantiating the Contractor's right to payment.
- 9.3.2 Unless otherwise provided in the Contract Documents, payments will be made on account of materials or equipment not incorporated in the work but delivered and suitably stored at the site; and, if approved in advance by the Owner payments may similarly be made for materials or equipment suitably stored at some other location agreed upon in writing. Payments for materials or equipment stored on or off the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Owner's title to such materials or equipment or otherwise protect the Owner's interest, including applicable insurance and transportation to the site for those materials and equipment stored off the site.

- 9.3.3 The Contractor warrants that title to all work, materials and equipment covered by an Application for Payment will pass to the Owner either by incorporation in the construction or upon the receipt of payment by the Contractor, whichever occurs first, free and clear of all liens, claims, security interest or encumbrances hereinafter referred to in this Article 9 as “liens”; and that no work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor, or by any other person performing work at the site or furnishing materials or equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.

#### **9.4 CERTIFICATES FOR PAYMENT**

- 9.4.1 The Engineer will within seven days after the receipt of the Contract’s Application for Payment, either issue a Certificate for Payment to the Owner with a copy to the Contractor for such amount as the Engineer determines is properly due, or notify the Contractor in writing of his reasons for withholding a Certificate as provided in Subparagraph 9.6.1.
- 9.4.2 The issuance of Certificate for Payment will constitute a representation by the Engineer to the Owner, based on his observations at the site as provided in Subparagraph 2.2.3 and the data comprising the Application for Payment, that the work has progressed to the point indicated; that, to the best of his knowledge, information and belief, the quality of the work is in accordance with the Contract Documents (subject to an evaluation of the work for conformance with the Contract Documents upon Substantial Completion, to the results of any subsequent tests required by or performed under the Contract Documents correctable prior to completion, and to any specific qualifications stated in his Certificate); and that the Contractor is entitled to payment in the amount certified. However, by issuing a Certificate for Payment, the Engineer shall not thereby be deemed to represent that he has made exhaustive or continuous on-site inspections to check the quality or quantity of the work or that he has reviewed the construction means, methods, techniques, sequences or procedures, or that he has made any examination to ascertain how or for what purpose the Contractor has used the moneys previously paid on account of the Contract Sum.

#### **9.5 PROGRESS PAYMENTS**

- 9.5.1 After the Engineer has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents.
- 9.5.2 The Contractor shall promptly pay each Subcontractor upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor’s work, the amount to which said Subcontractor is entitled, reflecting the percentage actually retained, if any, from payments to the Contractor on account of such Subcontractor’s work. The Contractor shall, by an appropriate agreement with each Subcontractor, require each Subcontractor to make payment to his Subcontractors in similar manner.
- 9.5.3 The Engineer may, on request and at his discretion, furnish to any Subcontractor, if practicable, information regarding the percentages of completion or the amounts applied for by the Contractor on the action taken thereon by the Engineer on account of work done by such Subcontractor.
- 9.5.4 Neither the Owner nor the Engineer shall have any obligation to pay or to see to the payment of any moneys to any Subcontractor except as may otherwise be required by law.
- 9.5.5 No Certificate for progress payment, no progress payment, nor any partial or entire use of occupancy of the Project by the Owner shall constitute an acceptance of any work not in accordance with the Contract Documents.

#### **9.6 PAYMENT WITHHELD**

- 9.6.1 The Engineer may decline to certify payment and may withhold his Certificate in whole or in part, to the extent necessary to reasonably protect the Owner, if in his opinion he is unable to make representations to the Owner as provided in Subparagraph 9.4.2.
- 9.6.2 If the Engineer is unable to make representations to the Owner, as provided in Subparagraph 9.4.2 and to certify payment in the amount of the Application, he will notify the Contractor as provided in Subparagraph 9.4.1. If the Contractor and Engineer cannot agree on a revised amount, the Engineer will promptly issue a Certificate for Payment for the amount for which he is able to make such representations to the Owner. The Engineer may also decline to certify payment, or because of subsequently discovered evidence or subsequent observations, he may nullify the whole or any part of any Certificate for Payment previously issued, to such extent as may be necessary in his opinion to protect the Owner from loss because of:
- A. Defective work not remedied;
  - B. Third party claims filed or reasonable evidence indicating probable filing of such claims;
  - C. Failure of the Contractor or make payments properly to Subcontractors or for labor, materials or equipment;
  - D. Reasonable evidence that the work cannot be completed for the unpaid balance of the Contract Sum;
  - E. Damage to the work of another Contractor;
  - F. Reasonable evidence that the work will not be completed within the Contract Time; or,
  - G. Failure to carry out the work in accordance with the Contract Documents.
- 9.6.2 When the above grounds in Subparagraph 9.6.1 removed, payment shall be made for amounts withheld because of them.

## **9.7 FAILURE OF PAYMENT**

- 9.7.1 If the Engineer does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents any amount certified by the Engineer, then the Contractor may, upon seven additional days' written notice to the Owner and the Engineer, stop the work until payment of the amount owing has been received. The Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, which shall be effected by appropriate Change Order in accordance with Paragraph 12.3.

## **9.8 SUBSTANTIAL COMPLETION**

- 9.8.1 When the Contractor considers that the work, or a designated portion thereof which is acceptable to the Owner, is substantially complete as defined in Subparagraph 8.1.3, the Contractor shall prepare for submission to the Engineer a list of items to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all work in accordance with the Contract Documents. When the Engineer, with the Owner, on the basis of an inspection determines that the work or designated portion thereof is substantially complete, he will then prepare a Certificate of Substantial Completion Form, AIA Document G704-1978, which shall establish the Date of Substantial Completion, shall state the responsibilities of the Owner and the Contractor for security, maintenance within which the Contractor shall complete the items listed therein. Warranties required by the Contract Document shall commence on the date of Final Completion of the work or designated portion there of unless

otherwise provided in the Certificate of Substantial Completion. The Certificate of Substantial Completion shall be submitted to the Contractor and the Owner for their written acceptance of the responsibilities assigned to them in such Certificate.

- 9.8.2 Upon Substantial Completion of the work or designated portion thereof and upon application by the Contractor and certification by the Engineer, the Owner shall make payment, reflecting adjustment in retainage, if any, for such work or portion thereof, as provided in the Contract Documents.

## **9.9 FINAL COMPLETION AND FINAL PAYMENT**

- 9.9.1 Upon receipt of written notice that the work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Engineer will promptly make such inspection and, if he finds the work acceptable under the Contract Documents and the Contract fully performed, he will promptly issue final Certificate for Payment stating that, to the best of his observations and inspections, the work has been completed in accordance with the terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in said Final Certificate, is due and payable. The Engineer's Final Certificate of payment will constitute a further representation that the conditions precedent to the Contractor's being entitled to final payment as set forth in Subparagraph 9.9.2 have been fulfilled.

- 9.9.2 Neither the final payment nor the remaining retained percentage shall become due until the Contractor submits to the Engineer (1) an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the work for which the Owner or his property might in any way be responsible have been paid or otherwise satisfied, (2) consent of surety, if any, to final payment, and (3) if required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of liens arising out of the Contract, to the extent and in such form as may be designed by the Owner. If any Subcontractor refuses to furnish a release or waiver required by the Owner the Contractor may furnish a bond satisfactory to the Owner to indemnify him against any such lien. If any such lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all moneys that the latter may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

- 9.9.3 If, after Substantial Completion of the work, final completion thereof is materially delayed through no fault of the Contractor or by the issuance of Change Orders affecting final completion, and the Engineer so confirms, the Owner shall, upon application by the Contractor and certification by the Engineer and without terminating the Contract, make payment of the balance for that portion of the work fully completed and accepted. If the remaining balance for work not fully completed or corrected is less than the retainage stipulated in the Contract Document, and if bonds have been furnished as provided in Paragraph 7.5, 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 the Contractor to the Engineer prior to certification of such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

- 9.9.4 The making of final payment shall constitute a waiver of all claims by the Owner except those arising from:

- A. Unsettled liens;
- B. Faulty or defective work appearing after Substantial Completion;
- C. Failure of the work to comply with the requirements of the Contract Documents; and
- D. Terms of any special warranties required by the Contract Documents.

- 9.9.5 The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and identified by the Contractor as unsettled at the time of the final Application for Payment.

## **ARTICLE 10**

### **PROTECTION OF PERSONS AND PROPERTY**

#### **10.1 SAFETY PRECAUTIONS AND PROGRAMS**

- 10.1.1 The Contractor shall be responsible in initiating, maintaining and supervising all safety precautions and programs in connection with the work.

#### **10.2. SAFETY OF PERSONS AND PROPERTY**

- 10.2.1 The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:
- A. All employees on the work and all other persons who may be affected thereby;
  - B. All the work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors or Sub-subcontractors; and
  - C. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities no designated for removal, relocation or replacement in the course of construction.
- 10.2.2 The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations, and lawful orders of any public authority bearing on the safety of persons or property or their protection from damage, injury or loss.
- 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and progress of the work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying Owners and users of adjacent utilities.
- 10.2.4 When the use of storage of explosives or other hazardous materials or equipment is necessary for the execution of the work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.
- 10.2.5 The Contractor shall promptly remedy all damage or loss (other than damage of loss insured under paragraph 11.3) to any property referred to in Clauses 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, any Subcontractor or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable and for which the Contractor is responsible under clauses 10.2.1.2 and 10.2.1.3, except damage or loss attributable to the acts or omissions of the Owner or the Engineer or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and no attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to his obligations under Paragraph 4.18.
- 10.2.6 The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's Superintendent unless otherwise designated by the Contractor in writing to the Owner and the Engineer.

10.2.7 The Contractor shall not load or permit any part of the work to be loaded so as to endanger its safety.

### 10.3 EMERGENCIES

10.3.1 In any emergency affecting the safety of persons or property, the Contractor shall act, at his reasonable discretion, to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall; be determined as provided in Article 12 for Changes in the work.

## ARTICLE 11

### INSURANCE

#### 11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.1 The Contractor shall maintain in effect, and shall require all Subcontractors and others performing any portion of this Contract to maintain in effect, insurance of the types and respective minimum limits set for in Article 11. Such insurance shall cover all operations under this Contract. Maintenance of such insurance in at least the specified minimum amounts shall not relieve the Contractor or liability for loss in excess of the limits of liability specified herein or otherwise not covered by the coverage's required herein. The Contractor shall bear the cost of such insurance and include its costs in the Bid. The following limits of insurance shall be maintained, unless otherwise listed in the Certificate of Insurance.

##### **Type of Required Coverage**

Workman's compensation (including accident and occupational disease coverage) Statutory  
Employer's Liability

Comprehensive General Liability (including endorsements providing broad form property damage coverage, personal injury coverage, and contractual assumption of liability coverage for all liability the Contractor has assumed under his Contract)

Auto Liability (including non-owned auto coverage)

##### **Minimum Limits of Liability**

Carry such insurance as it deems necessary to protect it from all claims under any workman's compensation law in effect that may be applicable to the Contractor.

With limits of coverage in the maximum amount which the Owner could be held liable under the New Mexico Tort Claims Act for each person injured and for each accident resulting in damage to property.

Same limits as General Liability

11.1.2 Certificates of Insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the work. These Certificates shall contain a provision that coverage afforded under the policies will not be canceled until at least thirty days; prior written notice has been given to the Owner. The Contractor shall furnish one (1) copy of each of the Certificates of insurance herein required for each copy of the contract.

#### 11.2 OWNER'S LIABILITY INSURANCE

11.2.1 The Owner shall be responsible for purchasing and maintaining his own liability insurance and, at his option, may purchase and maintain such insurance as will protect him against all claims which may arise from operations under the Contract.

#### 11.3 PROPERTY INSURANCE

11.3.1 The Contractor shall maintain builder's risk property insurance or self insurance, or a combination of insurance and self insurance, upon the work at the site for at least the actual cash value thereof. The builder's risk insurance shall cover the interests of the Owner, the Contractor, Subcontractors,

and Sub-subcontractors in the work. The insurance shall insure against at least the following perils: fire extended coverage, vandalism, and malicious mischief. The Contractor shall bear the cost of such insurance and include its cost in the Bid.

- 11.3.2 Any loss insured or self insured under Subparagraph 11.3.1 is to be adjusted with the Owner and made payable to the Owner as trustee for the insured, as their interests may appear subject to the requirements of any applicable mortgage clause. The Owner shall deposit the proceeds in a separate account and shall distribute them in accordance with such agreement as the parties in interest, including the Owner, may reach. The Contractor shall pay each Subcontractor a just share of any insurance proceeds which the Contractor receives and shall required by written agreement signed by the Subcontractor that the Subcontractor will make payments to his Sub-subcontractors in a similar manner. If after such loss no other special agreement is made, replacement of damaged work shall be covered by an appropriate order.
- 11.3.3 To the extent permitted under their respective property insurance policies, the Owner and the Contractor hereby waive all rights, each against the other, for damages caused by fire or other perils to the extent covered by Insurance obtained pursuant to this Article 11 or any other property insurance applicable to the work, except such rights as they may have to the proceeds of such Insurance held by the Owner as trustee. The Owner or the Contractor, as appropriate, shall require the Engineer, other Contractors, Subcontractors, and Sub-subcontractors to similarly waive rights of subrogation or property insurers.
- 11.3.4 If the Owner finds it necessary to occupy use of any portion of the work prior to Substantial Completion, such occupancy or use shall not commence prior to the time mutually agreed to by the Owner and the Contractor and, if required by the applicable insurance or self insurance coverage not prior to the time the builder's risk property insurer has consented to such occupancy or use. The Contractor's consent to such occupancy or use shall not be unreasonably withheld.

#### **11.4 LOSS OF USE INSURANCE**

- 11.4.1 The Owner, at his option, may purchase and maintain such insurance as will insure him against loss of use of his property due to fire or other hazards, however caused.

### **ARTICLE 12**

#### **CHANGES IN THE WORK**

##### **12.1 CHANGE ORDERS**

- 12.1.1 A Change Order is a written order to the Contractor signed by the Engineer and the Contractor and approved in writing by the Owner. A Change Order may be issued only after the execution of the Contract and shall be the only means used to order changes in the work for which the Contractor requires additional compensation, changes to the Contract Time, or changes to the Contract Sum. Minor changes in the work for which the Contractor requires no additional compensation or time shall be executed in accordance with the provision of Subparagraph 12.4.1.
- 12.1.2 The Owner, without invalidating the Contract, may order changes in the work within the general scope of the Contractor consisting of additions, deletions or other revisions, the Contract Sum and the Contract Time being adjusted accordingly. All such changes in the work shall be authorized by Change Order and shall be performed under the applicable conditions of the Contract Documents.
- 12.1.3 The cost or credit to the Owner resulting from a change in the work shall be determined in one or more of the following ways:
- A. By mutual acceptance of a lump sum properly itemized and supported by sufficient

- substantiating data to permit evaluation;
- B. By unit prices stated in the Contract Documents or subsequently agreed upon;
  - C. By cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
  - D. By the method provided in Subparagraph 12.1.4.
- 12.1.4 If none of the methods set forth in Clauses 12.1.2., 12.1.3. or 12.1.3. is agreed upon, the Contractor, provided he receives a written order signed by the Owner, shall promptly proceed with the work involved. The cost of such work shall be determined by the Engineer on the basis of the reasonable expenditures and savings of those performing the work attributable to the change, including, in the case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. In such case, the Contractor shall keep and present, in such form as the Engineer may prescribe, an itemized accounting together with appropriate supporting data for inclusion in a Change Order. Unless otherwise provided in the Contract Documents, cost shall be limited to the following: cost of materials, including sales tax and cost of delivery; cost of labor, including social security, old age and unemployment insurance, and fringe benefits, required by agreement or custom, workers' or workmen's compensation insurance; bond premiums; rental value of equipment and machinery; and the additional costs of supervision and field office personnel directly attributable to the change. Pending final determination of cost to the Owner payments on account shall be made on the Engineer's Certificate for payment. The amount of credit to be allowed by the Contractor to the Owner for any deletion or change which results in a net decrease in the Contract Sum will be the amount of the actual net cost as confirmed by the Engineer. When both additions and credits covering related work or substitutions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase, if any, with respect to that change.
- 12.1.5 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if the quantities originally contemplated are so changed in a proposed Change Order that application of the agreed unit prices to the quantities of work proposed will cause substantial inequity to the Owner or the Contractor, the applicable unit prices shall be equitably adjusted.
- 12.1.6 By submission of a Bid, the Contractor agrees and binds himself to the following method of calculating Change Order costs. The Owner also agrees to the following method of calculating the cost of any changes to the Contract. With each proposal for a change in the amount of the Contract, the Contractor shall submit an itemized breakdown of all increases or decreases in the cost of the Contractor's and all Subcontractor's and Sub-subcontractor's work to include at least the following detail in the general order listed:
- A. Material quantities and unit costs;
  - B. Labor amounts and hourly rates (identified with specific items of material to be placed or operation to be performed);
  - C. Costs inherent in use of Contractor/Sub-subcontractor owned equipment;
  - D. Equipment rental, if any;
  - E. Workmen's compensation and public liability insurance;
  - F. General administration, overhead, supervision, project insurance and profit, based on the following schedule:

<b><u>Subtotal before Applying the Percentage Shown</u></b>	<b><u>\$500 &amp; Less</u></b>	<b><u>Over \$500</u></b>
Contractor for work performed by his own forces	22%	19%
Contractor for work performed by Subcontractor	10%	8%
Subcontractor for work performed by his own forces	18%	15%
Subcontractor for work performed by Sub-subcontractor	10%	8%
Sub-subcontractor for work performed by his own forces	18%	15%
G. Employment taxes under FICA and FUTA; and		
H. State gross receipts tax (Contractor only).		

12.1.7 The quotation for work under a Change Order shall be binding for sixty (60) days from the date submitted by the Contractor.

## **12.2 CONCEALED CONDITIONS**

12.2.1 Should concealed conditions encountered in the performance of the work below the surface of the ground or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the Contract Documents, or should unknown physical conditions below the surface of the ground or should concealed or unknown conditions in an existing structure of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in work of the Character provided for in this Contract, be encountered, the Contract Sum shall be equitably adjusted by change Order upon verified claim by either party made within twenty days after the first observance of the conditions.

12.2.2 If the Contractor wishes to make a claim for an increase in the Contract Sum, he shall give the Engineer written notice thereof within twenty days after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute the work, except in an emergency endangering life or property, in which case the Contractor shall proceed in accordance with Paragraph 10.3. No such claim shall be valid unless so made. If such claims are justified and the Owner authorizes an increase in the Contract Sum, the Owner and the Contractor shall proceed to negotiate the amount of the adjustment in the Contract Sum. If the Owner and the Contractor cannot agree on the amount of the adjustment in the Contract Sum, it shall be determined by the Engineer. Any change in the Contract Sum resulting from such claim shall be authorized by Change Order.

12.2.3 If the Contractor claims that additional cost is involved because of, but not limited to, (1) any written interpretation pursuant to Subparagraph 2.2.8, (2) any order by the Owner to stop the work pursuant to Paragraph 3.3 where the Contractor was not at fault, (3) any written order for a minor change in the work issued pursuant to Paragraph 12.4, or (4) failure of payment by the Owner pursuant to Paragraph 9.7, the Contractor shall make such claims provided in Subparagraph 12.3.1.

## **12.3 MINOR CHANGES IN THE WORK**

12.3.1 The Engineer will have authority to order minor changes in the work not involving an adjustment in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the Owner and the Contractor. The Contractor shall carry out such written orders promptly.

**ARTICLE 13**

**UNCOVERING AND CORRECTION OF WORK**

**13.1 UNCOVERING OF WORK**

- 13.1.1 If any portion of the work should be covered contrary to the request of the Engineer or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Engineer, be uncovered for his observation and shall be replaced at the Contractor's expense.
- 13.1.2 If any portion of the work has been covered which the Engineer has not specifically requested to observe prior to begin covered, the Engineer may request to see such work and it shall be uncovered by the Contractor. If such work be found in accordance with the Contract Documents, the cost of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such work be found not in accordance with the Contract Documents, the Contractor shall pay such costs unless it be found that this condition was caused by the Owner or a separate Contractor as provided in Article 6, in which even the Owner shall be responsible for the payment of such costs.

**13.2 CORRECTION OF WORK**

- 13.2.1 The Contractor shall promptly correct all work rejected by the Engineer as defective or as failing to conform to the Contract Documents whether observed before or after Substantial completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected work, including compensation for the Engineer's additional services made necessary thereby.
- 13.2.2 If, within one year after the Date of Substantial Completion of the work or designated portion thereof or within one year after acceptance by the Owner of designated equipment or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents, any of the work is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so unless the Owner has previously given the Contractor a specific written acceptance of such condition. This obligation shall survive termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.
- 13.2.3 The Contractor shall remove from the site all portions of the work which are defective or non-conforming and which have not been corrected under Subparagraphs 4.5, 13.2.1 and 13.2.2, unless removal is specifically waived in writing by the Owner.
- 13.2.4 If the Contractor fails to correct defective or non-conforming work as provided in Subparagraph 4.5.1, 13.2.1 and 13.2.2, the Owner may correct it in accordance with Paragraph 3.4.
- 13.2.5 If the Contractor does not proceed with the correction of such defective or non-conforming work within a reasonable time fixed by written notice from the Engineer, the Owner may remove it and may store the materials or equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten days thereafter, the Owner may upon ten additional days' written notice sell such work at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs that should have been borne by the Contractor including compensation for the Engineer's additional services made necessary thereby. If such proceeds of sale do not cover all costs which the Contractor should have borne, the difference shall be charged to the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

- 13.2.6 The Contractor shall bear the cost of making good all work of the Owner or separate Contractors destroyed or damaged by such correction or removal.
- 13.2.7 Nothing contained in this Paragraph 13.2 shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents, including Paragraph 4.5 hereof. The establishment of the time period of one year after the Date of Substantial Completion or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents relates only to the Contractor to correct the work and has no relationship to the time within which his obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to his obligations other than specifically to correct the work.

### **13.3 ACCEPTANCE OF DEFECTIVE OR NON-CONFORMING WORK**

- 13.3.1 If the Owner prefers to accept defective or non-conforming work, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect a reduction in the Contract Sum where appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

## **ARTICLE 14**

### **TERMINATION OF THE CONTRACT**

#### **14.1 TERMINATION BY THE CONTRACTOR**

- 14.1.1 If the work is stopped for a period of thirty days under an order of court or other public authority having jurisdiction, or as a result of an act of government, such as a declaration of a national emergency making materials unavailable, through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing any of the work under a contract with the Contractor because the Engineer has not issued a Certificate for payment as provided in Paragraph 9.7 or because the Owner has not made payment thereon as provided in paragraph 9.7, then the Contractor may, upon seven additional days' written notice to the Owner and the Engineer, terminate the Contract and recover from the Owner payment for all work executed and for any proven loss sustained upon any materials, equipment, tools, construction equipment and machinery, including reasonable profit and damages.

#### **14.2 TERMINATION BY THE OWNER**

- 14.2.1 If the Contractor is adjudged bankrupt, or if he makes a general assignment for the benefit of his creditors, or if a receiver is appointed on account of his insolvency, or if he persistently or repeatedly refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if he fails to make prompt payment to Subcontractors for material of labor, or persistently disregards laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a provision of the Contract Documents, then the Owner, upon certification by the Engineer that sufficient cause exists to justify such action, may without prejudice to any right or remedy and after giving the Contractor and his surety, if any, seven days written notice, terminate the employment of the Contractor and take possession of the site and of all material, tools, construction equipment and machinery thereon owned by the Contractor and may finish the work by whatever method he may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment until the work is finished.
- 14.2.2 If the unpaid balance of the Contract Sum exceed the costs of finishing the work, including compensation for the Engineer's additional services made necessary thereby, and any damages sustained by the Owner as a result of the Contractor's breach, such excess shall be paid to the

Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or to the Owner, as the case may be, shall be certified by the Engineer upon application, in the manner provided in paragraph 9.4 and this obligation or to the Owner, as the case may be, shall be certified by the Engineer upon application, in the manner provided in Paragraph 9.4 and this obligation for payment shall survive the termination of the Contract.

14.2.3 In the event that the Project is abandoned by the Owner, the Owner may terminate this contract at any time by giving at least seven (7) days notice to the Contractor. In the event of termination, all work completed shall become the property of the Owner. The Contractor shall be entitled to receive compensation for actual work satisfactorily completed hereunder, including reimbursable expense authorized by the Owner which are then due.

14.2.4 In the event the Contractor fails to perform the work in accordance with the Contract Documents, the Owner may terminate the Contract after giving the Contractor five (5) working days notice.

### **ARTICLE 15**

#### **EQUAL OPPORTUNITY**

#### **15.1 The Contractor shall maintain policies of employment as follows:**

15.1.1 The Contractor, all Subcontractors, and all Sub-subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin. The Contractor shall take affirmative action to ensure that applicants are employed and that employees are treated during employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous place, available to employees and applicants for employment, notices setting forth the policies of non-discrimination.

15.1.2 The Contract, all Subcontractors, and all Sub-subcontractors shall, in all solicitation or advertisements for employees placed by them or on their behalf, state that all qualified applicant will receive consideration for employment without regard to race, religion, color, sex, or national origin.

### **ARTICLE 16**

#### **MINIMUM WAGE RATES / REGISTRATION**

16.1 The Contractor warrants and agrees that he and all Subcontractors and Sub-subcontractors shall comply with all applicable provisions of the New Mexico Public Works Minimum Wage Act as outlined in the Contract Documents. Wage rates are not applicable to projects costing less than \$60,000.00.

16.2 A General Contractor or subcontractor that submits a bid valued at more than fifty thousand dollars (\$50,000) is subject to the Public Works Minimum Wage Act (13-4-10 NMSA 1978) and shall be required to be registered with the Labor and Industrial Division of the NM Labor Department. The Registration Number shall be provided in the spaces provided in the Bid Form and on the Subcontractor's Listing for subcontracts valued at \$50,000 or more. After the Bid Opening, the registration numbers will be verified and the bid will be considered unresponsive and disqualified if the registration numbers are not valid and if the contractor or subcontractor cannot provide proof of the required registration. It is the responsibility of the contractor and subcontractors to ensure that the registration is completed prior to the Bid Opening.

## **Section 12 Supplementary Conditions**

## **SUPPLEMENTARY CONDITIONS (Section 00800)**

Document is intended to be used in conjunction with the General Conditions of the Contract.

### **ADDITIONAL CONDITIONS**

**1.0 DEFINITIONS** - The following definitions shall apply through the Bidding Documents or Contract Documents unless otherwise specified.

- 1.1 **ADDENDUM:** Written or graphic instrument issued prior to the execution of the Contract which modifies or interpret the Bidding Documents, including Construction Plans and Specifications, by additions, deletions, clarifications, or corrections. Addenda will become part of the Contract Documents when the Construction Contract is executed. Plural: ADDENDA
- 1.2 **ADDITIVE OR DEDUCTIVE ALTERNATE BID:** Amount stated in the Bid to be added or deducted from the amount of the Base Bid if the corresponding change in project scope or alternate materials and/or methods of construction is accepted.
- 1.3 **BASE BID:** Amount of money stated in the Bid as the sum for which the Bidder offers to perform the work, not including that work for which Alternate Bids are also submitted.
- 1.4 **BID:** A complete and properly signed proposal to do the work or designated portion thereof for the sums stipulated therein, supported by data called for by the Bidding Documents.
- 1.5 **BID LOT:** A major item of work for which a separate quotation or proposal is requested.
- 1.6 **BIDDER:** One who submits a Bid for a Prime contract with the Owner, as distinct from a Subcontractor, who submits a Bid to a Bidder. Technically, a Bidder is not a Contractor on a specific project until a contract exists between him and the Owner.
- 1.7 **BIDDING DOCUMENT:** Documents that include the Invitation for Bid, Instructions to Bidders, the Bid Form, other sample bidding and contract forms, and the proposed Contract Documents, including any Addenda issued prior to receipt of Bids. The Contract Documents proposed for the work consist of the Owner-Contractor Agreement, the Conditions of the Construction Contract (General, Supplementary, and Other Conditions), the Construction Plans, the Specifications, and all Addenda issued prior to and all Modifications issued after execution of the Contract.

- 1.8 DAY: Calendar day, which is every day shown on the calendar, beginning and ending at midnight. However, due to the Work being performed at an active landfill, the Contractor will be limited to a workday starting no earlier than 6:30 a.m. and ending no later than 7:00 p.m. (i.e., daylight hours only).
- 1.9 CENTRAL PURCHASING OFFICE: The Central Purchasing Office is the City of Santa Fe Purchasing Department.
- 1.10 GOVERNING AUTHORITY: The Joint Powers Board of the execution of construction contracts is the Chairperson or Executive Director.
- 1.11 INVITATION FOR BID: The Bidding Documents utilized for soliciting sealed Bids. "Invitation to Bid" shall have the same meaning as "Invitation for Bid".
- 1.12 OWNER: Santa Fe Solid Waste Management Authority, Santa Fe, New Mexico.
- 1.13 PROCUREMENT OFFICER: The Director of the Purchasing Division, or a designee authorized to enter into or administer contracts and make written determination with respect thereto.
- 1.14 RESPONSIBLE BIDDER: A Bidder who submits a responsive Bid and who has furnished, when required, information and data to prove that his financial resources, production or service facilities, personnel, service reputation, and experience are adequate to make satisfactory delivery of the services, construction, or items of tangible personal property described in the Bidding Documents (13-1-82, NMSA 1978).
- 1.15 SUCCESSFUL BIDDER: The lowest qualified and responsible Bidder to whom the Owner, on the basis of the Owner's evaluation, makes an award.
- 1.16 UNIT PRICES: Amounts stated in the Contract as prices per unit of measurement for materials or services as described in the Contract Documents.
- 1.17 USER: The Santa Fe Solid Waste Management Authority, agencies, or designated entity for whose use the Project is being constructed.

## **2.0 CONTRACT AUDIT**

The Owner shall be entitled to audit the books and records of a Contractor or any Subcontractor under any negotiated contract or subcontract other than a firm fixed-price contract to the extent that such books and records relate to the performance of such contract or subcontract. Such books and records shall be maintained by the Contractor for a period of three years from the date of final payment under the prime contract and by the Subcontractor for a period of three years from the date of final payment under the subcontract unless a shorter period is otherwise authorized in writing.

### **3.0 DEBARRED OR SUSPENDED CONTRACTORS**

A business (Contractor, Subcontractor, or Supplier) that has either been debarred or suspended pursuant to the requirements of the City of Santa Fe Purchasing Manual shall not be permitted to do business with the Owner and shall not be considered for award of contract during the period for which it is debarred or suspended.

### **4.0 BRIBES, GRATUITIES, AND KICK-BACKS**

- 4.1 It is illegal in the State of New Mexico for any public employee to solicit or accept anything of value in connection with award of this Bid and for any person to offer or pay anything of value to any such public employee (30-24-1 through 30-24-2, NMSA 1978).
- 4.2 Pursuant to Section 13-1-191, NMSA 1978, reference is hereby made to the Criminal Laws of New Mexico (including 30-24-1, 30-23-2, and 30-41-1 through 3-41-3, NMSA 1978), which prohibit bribes, kick-backs, and gratuities and violation of which constitutes a felon. Further, the Procurement Code (13-1-28 through 13-1-199, NMSA 1978), imposes civil and criminal penalties for its violation

### **5.0 PROTESTS (CITY OF SANTA FE PURCHASING MANUAL)**

- 5.1 Any Contractor who is aggrieved in connection with a procurement may protest to the City of Santa Fe Purchasing Agent and the Owner. The protest should be made in writing within twenty-four (24) hours after the facts or occurrences; giving rise thereto, but in no case, less than fifteen (15) calendar days after the facts or occurrences giving rise thereto.
- 5.2 In the event of a timely protest under Section 5.1 the City of Santa Fe Purchasing Agent and the Owner shall not proceed further with the procurement unless the Owner makes a determination that the award of contract is necessary to protect substantial interests of the Owner.
- 5.3 The City of Santa Fe Purchasing Agent or his designee shall have the authority to take any action reasonably necessary to resolve a protest of an aggrieved Contractor concerning a procurement.
- 5.4 This authority shall be exercised in accordance with adopted regulations, but shall not include the authority to award money damages or attorneys' fees.
- 5.5 The City of Santa Fe Purchasing Agent or his designee shall promptly issue a determination relating to the protest. The determination shall:
  - A State the reasons for the action taken; and,

B Inform the protestant of the right to judicial review of the determination.

5.6 A copy of the determination issued shall be mailed immediately to the protestant.

## **6.0 CONTRACT BOND REQUIREMENTS**

6.1 The Successful Bidder, where the Contract Price exceeds five hundred dollars (\$500), shall post a one hundred percent (100%) Performance Bond and a one hundred percent (100%) Labor and Material Payment Bond. Bonds shall be executed on Performance Bond and Labor and Material Payment Bond forms attached hereto, with amount payable conforming to the terms of the contract. Surety shall be a company licensed to do business in the State of New Mexico and acceptable to the Owner.

6.2 Personal sureties may be accepted if the Owner so determines in advance, but in such case the amount of the Bond shall be the full Contract Price, and the sureties shall justify under oath in amounts above liabilities and exemptions aggregating double the amount of the Bond.

6.3 Special attention of Bidders is called to the requirements of Section 13-4-18 through 13-4-20, NMSA 1978 regarding a Contractor who does not have his principal place of business in the State of New Mexico for all taxes due arising out of construction services rendered under the Contract.

6.3.1 The right to sue on this Bond accrues only to the Owner and the parties to whom Sections 13-4-18 through 13-4-20, NMSA 1978 grant such right; and any such right shall be exercised only in accordance with the provisions and limitations of said statutes.

## **7.0 NON-RESIDENT CONTRACTOR'S REQUIREMENTS REGARDING GROSS RECEIPTS TAX SURETY BOND**

7.1 Section 7-1-55A, NMSA 1978 provides that any person (as defined in Section 7-1-3, NMSA 1978) engaged in the construction business who does not have his principal place of business in New Mexico and enters into a prime construction contract to be performed in this State shall, at the time such contract is entered into, furnish the Director of the Revenue Division, Taxation and Revenue Department, or his delegate with a surety bond or other acceptable security in a sum equivalent to the gross receipts to be paid under the contract multiplied by the applicable rate of the gross receipts tax imposed by Section 7-9-4, NMSA 1978 to secure payment of the tax imposed on the gross receipts from the contract, and shall obtain a certificate from the Director of the Revenue Division, Taxation and Revenue Department, or his delegate that the requirements of this paragraph have been met.

7.2 If the total sum to be paid under the contract is changed by ten percent or more

after the date the surety bond or other acceptable security is furnished, to the Director or his delegate, such person shall increase or decrease, as the case may be, the amount of the bond or security within fourteen days after the change (7-1-55B, NMSA 1978).

- 7.3 In addition to the above requirements, the Contractor will be subject to all the requirements of the City Procurement Code.

## **8.0 CONTRACTOR'S GROSS RECEIPTS TAX REGISTRATION**

8.1 Section 7-10-4, NMSA 1978 provides that any person (as defined in Section 7-10-3, NMSA 1978) performing services for the Owner, as those terms are used in the Gross Receipts and Compensating Tax Act (Section 7-10-1 to 7-10-5, NMSA 1978), must be registered and be issued an identification number with the Revenue Division of the Taxation and Revenue Department to pay the gross receipts tax.

8.2 The identification number is needed to properly complete the approval process of the contract; therefor, so as to cause no delay in the processing, the Contractor must register with the State of New Mexico, Taxation and Revenue Department. For information contact:

Revenue Division  
Taxation and Revenue Department  
Manual Lujan Building  
1200 St. Francis Drive  
Santa Fe, New Mexico 87503  
(505)988-2290

8.3 If any person who performs services for the Owner is not registered to pay the gross receipts tax, the Owner shall withhold payment of the amount due until the person has presented evidence of registration with the Revenue Department to pay the gross receipts tax.

## **9.0 CONTRACT WITH NONRESIDENT PERSON OR PARTNERSHIPS OR UNADMITTED FOREIGN CORPORATIONS; AGENT FOR SERVICE OF PROCESS**

9.1 Special attention of Bidders is called to requirements of Sections 13-4-21 through 13-4-24, NMSA 1978, whereby a public works contract with a nonresident person or partnership or foreign corporation not authorized to do business in the State shall contain a specific provision designating an agent resident within the State, and his address, upon whom process and writs in any action or proceeding against such business may be served in any action arising out of such contract.

## **10.0 STATE ALLOWANCES**

- 10.1 The Contractor shall purchase the “Allowed Materials” as directed by the Owner through the Engineer on the basis of the lowest and the best Bid of at least three competitive Bids. If the actual price for purchasing the “Allowed materials” is more or less than the “Cash Allowance”, the Contract Price shall be adjusted accordingly. The adjustment in Contract Price made on the basis of the purchase price without additional charges for overhead, profit, insurance, or any other incidental expenses. The cost of installation of the “Allowed Materials” shall be included in the applicable section of the Specifications covering the work.

## **11.0 MINIMUM WAGE RATES**

- 11.1 This project is subject to the Minimum Wage Rates as determined by the New Mexico State Labor & Industrial Commission pursuant to Chapter 13, Section 13-14-11, NMSA 1978. The Minimum Wage Rates to be paid by the Contractor and any Subcontractors to their employees on this project are as listed in the New Mexico State Labor and Industrial Commission Minimum Wage Rate Decision. A copy of this decision is bound in these documents immediately following this page.
- 11.2 All Contractors and Subcontractors shall submit one (1) certified copy of the project weekly payroll to the Santa Fe Solid Waste Management Agency, 149 Wildlife Way, Santa Fe, NM 87506, c/o Mr. Randall Kippenbrock, Executive Director and one (1) copy also certified directly to the New Mexico State Labor Commission – Public Works Division, Aspen Building, 1596 Pacheco Street, Santa Fe, New Mexico 87501, not later than five (5) working days after the close of each payroll period. The prime Contractor shall be responsible for the submission of copies of payrolls of all subcontractors.
- 11.3 Before using apprentices on this project, the Contractor shall present to the Contracting Officer written evidence of registration of such employees with the U.S. Department of Labor, Bureau of Apprenticeship and Training, Western Bank Building (Room 1414), 505 Marquette Avenue, N.W., Albuquerque, New Mexico 87102, Telephone 766-2398. If the apprenticeship is not registered in a bona fide apprenticeship program as mentioned above, the journeyman’s wage rate for that particular classification in which he or she is working is applicable.

## **12.0 FORM OF CHANGE ORDER AND CHANGE ORDER NOTICE TO PROCEED**

- 12.1 The following forms issued by the Owner are to be utilized by the Contractor, Engineer, and the Owner pursuant to the requirements of the General Conditions.

## **13.0 STATE OF NEW MEXICO STATE CONSTRUCTION INDUSTRIES DIVISION**

- 13.1 The Contractor, at his own expense, shall secure any required construction permits from the State CID for this Project. The Contractor shall adhere to the

requirements established for inspections.

**14.0 SANTA FE SOLID WASTE MANAGEMENT AGENCY REQUIREMENTS**

- 14.1 The General Contractor shall be responsible that all rubble, excess materials, etc., are disposed of at an approved disposal facility.

**Section 13**  
**State of New Mexico Wage Rates Determination**

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# **Section 14 Technical Specifications**

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SECTION 01010  
SUMMARY OF WORK

PART 1 GENERAL

1.01 LOCATION OF WORK

- A. The work of this Contract is located at the Caja del Rio Landfill in Santa Fe, New Mexico.

1.02 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and construct the Caja del Rio Landfill Cell No. 5B in their entirety as shown on the Drawings and as specified herein.
- B. The Work includes, but is not necessarily limited to, the following:
1. Mobilization and Demobilization
  2. Construction of Cell No. 5B including earthwork, berms, subgrade, geosynthetic clay liner, geomembrane, geotextile, in-cell piping, drainage layer, and solar powered leachate level sensors.

1.03 WORK SEQUENCE

- A. Perform Work in sequence listed below to accommodate Owner's occupancy during the construction period and to ensure completion of the Work in the Contract Time. Completion dates of the various stages shall be in accordance with the approved construction schedule submitted by the Contractor.
1. Caja del Rio Landfill Cell No. 5B – 75 Calendar Days

1.04 SUBSTANTIAL COMPLETION

- A. The following items are required to be completed to achieve Substantial Completion:
1. Complete construction of landfill cell ready for Certification of Construction Completion to be submitted by ENGINEER and OWNER to NMED.
  2. Submit all field conformance testing.
  3. Submit liner electronic as-built survey.
  4. Submit final, certified site survey (refer to Section 01050).
  5. Submit Project Record Drawings (refer to Section 01720).

1.05 FINAL ACCEPTANCE

- A. The following items are required to be completed to achieve Final Acceptance:
1. Completion and ENGINEER's approval of punch list items.

2. ENGINEER's recommendation of CONTRACTOR's proposal for a final change order, if applicable.
3. ENGINEER's recommendation of CONTRACTOR's request for final payment and OWNER's acceptance of final invoice.

#### 1.06 CONTRACTOR'S USE OF PREMISES

- A. Contractor shall have complete and exclusive use of the premises for the performance of the Work.
- B. Contractor shall limit the use of the premises for his/her Work and for storage to allow for:
  1. Work by other contractors.
  2. Owner occupancy
  3. Public use.
- C. Coordinate use of premises with other contractors, Owner, and Engineer.
- D. Contractor shall assume full responsibility for security of all his/her and his/her subcontractors materials and equipment stored on the site.
- E. If directed by the Owner, move any stored items which interfere with operations of Owner or other contractors.
- F. Obtain and pay for use of additional storage or work areas if needed to perform the Work.

#### 1.07 OWNER OCCUPANCY

- A. Owner will occupy premises during performance of the work for the conduct of his/her normal operations. Coordinate all construction operations with Owner to minimize conflict and to facilitate Owner usage.

#### 1.08 PARTIAL OWNER OCCUPANCY

- A. The Contractor shall schedule his/her operations so as to complete certain areas of the Work, as designated below, to enable Owner's occupancy prior to Substantial Completion of the entire Work. Owner shall notify Contractor 30 days prior to partial occupancy and shall coordinate with the Contractor.
- B. Execute Certificate of Substantial Completion for each area listed above prior to Owner's occupancy.
  1. After Owner occupancy, Contractor shall allow:
    - a. Access for Owner's personnel.
    - b. Access for the public.
  2. After occupancy, Owner will provide:
    - a. Contractor access to finish punch list items.

1.09 DEFINITIONS AND RESPONSIBILITIES

- A. The following definitions and responsibilities shall apply to all work performed under this contract.
1. Owner: The Owner shall be as defined per Section 00700.
  2. Engineer: The Engineer shall be as defined per Section 00700.
  3. Contractor: The Contractor is defined per Section 00700, and is the firm or corporation with whom the Owner has entered into agreement to construct the project. The Contractor is responsible for all submittals by the Manufacturer and the Installer as required by the Specifications. The Contractor is also responsible for scheduling and coordination of the required work with the Manufacturer and the Installer to complete the project.
  4. Manufacturer: A Manufacturer is a firm or corporation responsible for production of materials to be used in the project. The Manufacturer shall produce a consistent product(s) meeting the project specifications and shall provide quality control documentation for the product(s) as required in the Specifications.
  5. The Installer is the firm or corporation responsible for installation of the products to be used in the project. The Installer shall be the manufacturer or an approved installer trained and certified to install the product(s). The Installer shall be responsible for field handling, storing, placing, and all other aspects of the installation of product(s) as required by the Manufacturer and the Specifications.
  6. Quality Control/Quality Assurance (CQA) Manager: The CQA Manager is the person or persons performing QCA responsibilities and is selected by the Engineer and/or Owner.
  7. Quality Assurance Laboratory (QAL): The QAL shall be defined as the independent, certified testing laboratory.
  8. Quality Assurance Technician (QAT): The QAT shall be defined as the independent, certified technician from the QAL that shall obtain samples.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01020  
ALLOWANCES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Costs in Contract Price other than in Allowances.
- B. Procedure for administration of Allowances.
- C. Payment of field conformance testing laboratory services completed by Owner.

1.02 RELATED WORK

- A. Submittals are included in Section 01300.
- B. Testing and Testing Laboratory Services are included in Section 01410.
- C. High Density Polyethylene (HDPE) Geomembrane is included in Section 02776.

1.03 CONTRACTOR'S USE OF PREMISES

- A. Contractor shall include in Contract Price all allowances named in Contract Documents and shall cause Work so covered to be done by such Subcontractors, manufacturers, fabricators, suppliers, or distributors and for such sums within limit of allowances as may be acceptable to Owner. Upon final payment, the Contract Price shall be adjusted as required to reflect actual costs of the items for which allowances are specified, and appropriate Change Order issued. Contractor agrees that original Contract Price includes all costs and profit on account of cash allowances. No demand for additional cost or profit in connection therewith will be valid.

1.04 SCHEDULE OF ALLOWANCES

- A. Allow the lump sum of twenty-five thousand dollars (\$15,000) for payment of field conformance testing laboratory services. Geosynthetic Clay Liner, HDPE geomembrane, and granular fill material Quality Control and Quality Assurance testing services to be performed under this allowance.

1.05 CONTRACTOR COSTS INCLUDED IN ALLOWANCES

- A. Cost of product or service to Contractor or Subcontractor, less applicable trade discounts.
- B. Labor required under allowance, only when labor is specified to be included.

1.06 CONTRACTOR COSTS INCLUDED IN CONTRACT SUM, BUT NOT INCLUDED IN ALLOWANCES

- A. For conformance testing, costs of testing laboratory services for all materials obtained from off-site services as required by the Contract Documents. Incidental labor and facilities required for testing services shall be included in the Contract sum, but not included in the allowance.

- B. Costs of testing laboratory services required by Contractor beyond Contract Document requirement.
- C. Contractor's markups, overhead, and profits.

1.07 CONTRACTOR RESPONSIBILITIES

- A. On notification of selection, execute purchase agreement with owner-approved testing laboratory.

1.08 PAYMENT PROCEDURES

- A. List amount of each allowance invoice, purchased or rented equipment costs, and costs at hourly rates with other items on each application for payment, and submit one copy of invoice with each copy of application.
- B. Payment for testing will only be made for passing tests.**
- C. Pay invoice on approval of City.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01025  
MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Measurement and payment shall be as specified in this Section.
- B. Work to be performed under this contract will be paid for on a Unit Price or Lump Sum basis under the appropriate Bid Items in the Bid Schedule. All costs for Work shown on Drawings or described in Specifications shall be incidental to the Contract and shall be included in the Contract Price. A claim by the Contractor for extra compensation for an item shown on the Drawings or described in the Specifications will not be considered for any reason including but not limited to the claim that it does not fall within the scope of one of the Bid Items. All work covered under the Standard Specifications shall be paid as outlined in this Section, NOT as indicated in the Standard Specifications.
- C. Contractor shall, within 15 days of receipt of Notice to Proceed, submit a schedule of values in accordance with Section 01370 for all lump sum bid items.
- D. General scope of work under each bid item includes all labor and materials required for construction of completely functional and operational facilities as shown on the Drawings and in these Specifications.
- E. GENERAL. The total base bid price shall cover all work required by the contract documents for construction of a completely functional and operational facility. All costs in connection with the proper and successful completion of the work, including furnishing all materials, equipment, supplies, and appurtenances; providing all construction plans, equipment, and tools; and performing all necessary labor and supervision to fully complete the work in accordance with these contract documents, shall be included in the unit and lump sum prices bid. All work not specifically set forth as a pay item in the bid proposal shall be considered a subsidiary obligation of Contractor and as such, all costs in connection therewith shall be included in the bid prices.
- F. ESTIMATED QUANTITIES. All estimated quantities for unit price bid items stipulated in the bid proposal are approximate and are to be used only (a) as a basis for estimating the probable cost of the work and (b) for the purpose of comparing the bids submitted for the work. The actual amounts of work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment for work and materials will be the actual amount of work done and materials furnished.
- G. MEASUREMENT AND PAYMENT. All measurements and payments will be based on completed work performed in strict accordance with the Drawings and Specifications and in accordance with contract-unit prices and schedule of values. Incidental work and items not listed in the contract-unit price schedule will not be paid for separately, but will be included in the payment for the listed item or items to which such incidental work applies. Measurement and payment for lump sum items shall be full compensation for all labor, equipment, materials, testing and incidentals necessary to perform the work in accordance with these contract

documents, and shall include all else incidental thereto for which separate payment is not provided under other items.

Item No. 1 - Mobilization/Demobilization

Shall include all costs for Contractor's mobilization and demobilization, insurance and bond, construction permits and fees, job trailers, site administration expenses, and utilities for the entire project. Shall include all costs for contract closeout, site cleanup, and all costs associated with Contractor's demobilization from the site. Payment for mobilization and demobilization shall be on a Lump Sum basis as noted in the Bid Schedule.

Item No. 2 - Quality Control/Quality Assurance Testing Allowance

Shall include all labor, materials, equipment and incidentals required and performing of all testing of materials and equipment before and/or after installation as required by the specifications for the entire project. Payment for Quality Control/Quality Assurance Testing will be in accordance with Section 01020 – Allowances.

Item No. 3 – Subgrade Preparation

Shall include all labor, equipment and incidentals required for clearing and grubbing, excavation, borrow, embankment, and installation of subgrade over the Cell No. 5B landfill area as shown on the Drawings. The drainage material shall be a minimum of six (6) inches thick layer of in-situ soil or select fill compacted to 90 percent standard Proctor density. The Cell No. 5B subgrade shall include all labor, materials, equipment and incidentals for excavation, haul, placement and grading of material, water haul and placement if required, and compaction of materials excavated from an borrow site that is approved by the Engineer. Payment for the Subgrade Preparation shall be on a Lump Sum basis as noted in the Bid Schedule.

Item No. 4 - Geosynthetic Clay Liner

Shall include all labor, materials, equipment and incidentals required for the installation of the geosynthetic clay liner (GCL) system for the landfill cell including subgrade preparation, liner installation, anchor trench construction and backfill, seams installation, and quality control testing complete-in-place as shown on the Drawings and specified herein. Estimated quantities stipulated in the Bid Schedule are approximate and are to be used only (a) as a basis for estimating the probable cost of the work and (b) for the purpose of comparing the bids submitted for the work. The actual amounts of work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment of work and materials will be the actual surface area of GCL installed and shall not include the area of GCL overlaps for the seam construction, but shall include a maximum of 8 feet for permanent anchor trenches. Payment shall be on a Square Foot basis as noted in the Bid Schedule.

Item No. 5 – 60 mil Textured HDPE Liner

Shall include all labor, materials, equipment and incidentals required for the installation of the 60 mil textured HDPE liner system for the landfill cell, including 60 mil textured HDPE liner installation, anchor trench construction and backfill, seam installation, and quality control testing complete-in-place as shown on the Drawings and specified herein. Work shall include excavation of anchor trenches with trencher and backfill of all anchor trenches, plywood, polylam and stake installation. Estimated quantities stipulated in the Bid Schedule are approximate and are to be used only (a) as a basis for estimating the probable cost of the work and (b) for the purpose of comparing the bids submitted for the work. The actual amounts of work done and materials furnished under unit price items may differ (within 10 percent) from

the estimated quantities. The basis of payment of work and materials will be the actual amount of work done and materials furnished. The measurement of payment shall be determined by the actual surface area of 60 mil textured HDPE Liner installed as shown on the Drawings, and shall not include the area of the 60 mil textured HDPE Liner overlaps for the seam construction, but shall include a maximum of 8 feet for permanent anchor trenches. Payment shall be on a Square Foot basis as noted in the Bid Schedule.

Item No. 6 – 10 oz/yd<sup>2</sup> Non-Woven Geotextile

Shall include all labor, materials, equipment, and incidentals required for the installation of the 10 oz/yd<sup>2</sup> non-woven geotextile over the textured HDPE liner complete-in-place as shown on the Drawings and specified herein. Payment for the installation of the geotextile shall be on a per Square Foot basis as noted in the Unit Price Bid Proposal.

Item No. 7 - Drainage Material - Basalt

Shall include all labor, materials testing, equipment, and incidentals required for the installation of high permeability material over the Cell No. 5B landfill area complete-in-place as shown on the Drawings and specified herein. The drainage material shall be a minimum of two-feet thick. The Cell No. 5B Drainage Material shall include all labor, equipment and incidentals for excavation, haul, placement and grading of material, water haul and placement if required, and compaction of materials excavated from on-site stockpile area as shown in the Drawings. Payment shall be on a Cubic Yard basis as noted in the Bid Schedule.

Item No. 8 - Drainage Material – Crushed Glass

Shall include all labor, materials testing, equipment, and incidentals required for the installation of high permeability material over the Cell No. 5B landfill area complete-in-place as shown on the Drawings and specified herein. The drainage material shall be a minimum of two-feet thick. The Cell No. 5B Drainage Material shall include all labor, equipment and incidentals for excavation, haul, placement and grading of material, water haul and placement if required, and compaction of materials excavated from on-site stockpile area as shown in the Drawings. Payment shall be on a Cubic Yard basis as noted in the Bid Schedule.

Item No. 9 – Leachate Collection System - Piping

Shall include all labor, materials, equipment, and incidentals required to supply, install and test the leachate collection pipe, including HDPE SDR 11 perforated pipe; HDPE SDR 11 solid pipe; fittings; washed gravel material; geotextile; cleanout; concrete collar; and bollards; complete-in-place as shown on the Drawings and specified herein. Payment for the Leachate Collection System - Pipe shall be on a Lump Sum basis as noted in the Bid Schedule.

Item No. 10 – Leachate Collection System – Level Sensors and Solar Panels

Shall include all labor, materials, equipment, and incidentals required to supply, install and test the leachate collection system level sensors and solar panels to be installed in Cells 1, 2, 3, 4, and 5 complete-in-place as mentioned in the Drawings and specified herein. Payment for the leachate collection system level sensors and solar panels shall be on a Lump Sum basis as noted in the Bid Schedule.

Item No. 11 – Leachate Collection System - Pumps

Shall include all labor, materials, equipment, and incidentals required to supply, install and test the leachate collection system pumps to be installed in Cells 1, 2, 3, 4, and 5 complete-in-place as mentioned in the Drawings and specified herein. Payment for the leachate collection system pumps shall be on a Lump Sum basis as noted in the Bid Schedule.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01026  
APPLICATION FOR PAYMENT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Submit Applications for Payment to the Engineer in accordance with the schedule established by Conditions of the Contract and Agreement between Owner and Contractor.
- B. The accepted Schedule of Values, Section 01370, shall be used as the basis for the Contractor's Application for Payment.

1.02 RELATED WORK

- A. Agreement between Owner and Contractor is included in Section 00500.
- B. Standard General Conditions of the Construction Contract are included in Section 00700.
- C. Field Engineering is included in Section 01050.
- D. Schedule of Values are included in Section 01370.
- E. Contract Closeout is included in Section 01700.

1.03 SUBMITTALS

- A. Submit, in accordance with Section 01300, applications typed on forms provided by the Owner, Application for Payment, with itemized data typed on 8-1/2-in by 11-in or 8-1/2-in by 14-in white paper continuation sheets.
- B. Provide itemized data on continuation sheet.
  - 1. Format, schedules, line items and values: Those of the Schedule of Values accepted by the Engineer.
- C. Provide construction photographs.

1.04 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 Contract firm.

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.
  - a. Round off values to nearest dollar, or as specified for Schedule of Values.
3. List each Change Order executed prior to date of submission, at the end of the continuation sheets.
  - a. List by Change Order Number and description, as for 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.

1.05 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

- A. When the Owner or the Engineer requires substantiating data, 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. As a prerequisite for payment, submit a "Surety Acknowledgement of Payment Request" letter showing amount of progress payment which the Contractor is requesting.
- D. Maintain an updated set of drawings to be used as record drawings in accordance with Section 01720. As a prerequisite for monthly progress payments, exhibit the updated record drawings for review by the Owner and the Engineer.

1.06 PREPARATION OF APPLICATION FOR FINAL PAYMENT

- A. Fill in Application form as specified for progress payments.
- B. Use continuation sheet for presenting the final statement of accounting as specified in Section 01700 - Contract Closeout.
- C. Submit all Project Record Documents in accordance with Sections 01050 and 01720, and as indicated elsewhere in the specifications.

1.07 SUBMITTAL PROCEDURE

- A. Submit Applications for Payment to the Engineer at the times stipulated in the Agreement.
- B. Number: Five copies of each Application.
- C. When the Engineer finds Application properly completed and correct, he/she will transmit certificate for payment to Owner, with copy to Contractor.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01040  
PROJECT COORDINATION

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This section specifies requirements for project coordination including:

1. Coordination.
2. Administrative and supervisory personnel.
3. General installation provisions.
4. Cleaning and protection.

1.02 COORDINATION

A. Coordinate activities included in various Sections to assure efficient and orderly installation of each component. Coordinate operations included under different Sections that are dependent on each other for proper installation and operation.

1. Where installation of one component depends on installation of other components before or after its own installation, schedule activities in the sequence required to obtain the best results.
2. Where space is limited, coordinate installation of different components to assure maximum accessibility for maintenance, service and repair.
3. Make provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to each party involved outlining required coordination procedures. Include required notices, reports and attendance at meeting.

1. Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.

1.03 ADMINISTRATIVE PROCEDURES

A. Coordinate scheduling and timing of administrative procedures with other activities to avoid conflicts and ensure orderly progress. Such activities include:

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Project closeout activities.

#### 1.04 STAFF NAMES

- A. Within 15 days of Notice to Proceed, submit a list of Contractor's staff assignments, including Superintendent and personnel at the site; identify individuals, their duties and responsibilities and telephone numbers.

#### 1.05 INSPECTION OF CONDITIONS

- A. The Installer of each component shall inspect the substrate and conditions under which Work is performed. Do not proceed until unsatisfactory conditions have been corrected.

#### 1.06 MANUFACTURER'S INSTRUCTIONS

- A. Comply with manufacturer's installation instructions and recommendations, to the extent that they are more stringent than requirements in Contract Documents.
- B. Inspect material immediately upon delivery and again prior to installation. Reject damaged and defective items.

#### 1.07 VISUAL EFFECTS

- A. Provide uniform joint widths in exposed Work. Arrange joints to obtain the best effect. Refer questionable choices to the Engineer for decision.
- B. Recheck measurements and dimensions, before starting installation.
- C. Install each component during weather conditions and project status that will ensure the best results. Isolate each part from incompatible material as necessary to prevent deterioration.

#### 1.08 CLEANING AND PROTECTION

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
  - 1. Clean and maintain completed construction as often as necessary through the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
  - 2. Limiting Exposure: Supervise operations to ensure that no part of construction, completed or in progress, is subject to harmful or deleterious exposure. Such exposures include:
    - a. Excessive static or dynamic loading.
    - b. Excessive internal or external pressures.
    - c. Excessive weathering.
    - d. Excessively high or low temperatures or humidity.
    - e. Air contamination or pollution.
    - f. Water or ice.
    - g. Chemicals or solvents.
    - h. Heavy traffic, soiling, staining and corrosion.
    - i. Rodent and insect infestation.

- j. Unusual wear or other misuse.
- k. Contact between incompatible materials.
- l. Theft or vandalism.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01046  
CONTROL OF WORK

PART 1 GENERAL

1.01 SITE

- A. Furnish materials and equipment which will be efficient, appropriate and large enough to secure a satisfactory quality of work and a rate of progress which will ensure the completion of the work within the Contract Time. If at any time such operations appear to the Engineer to be inefficient, inappropriate or insufficient for securing the quality of work required or for producing the rate of progress aforesaid, Engineer may order the Contractor to increase the efficiency, change the character or increase the equipment and/or materials, the Contractor shall conform to such order. Failure of the Engineer to give such order shall in no way relieve the Contractor of his/her obligations to secure the quality of the work and rate of progress required.

1.02 PRIVATE LAND

- A. Do not enter or occupy private land outside of easements, except by permission of the land owner.

1.03 PIPE LOCATIONS

- A. Locate pipelines substantially as indicated on the Drawings. The Engineer reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different or additional items where required.

1.04 OPEN EXCAVATIONS

- A. Adequately safeguard all open excavations by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons and damage to property. The Contractor shall, at his/her own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Bridges provided for access during construction shall be removed when no longer required. The length or size of excavation will be controlled by the particular surrounding conditions, but shall always be confined to the limits prescribed by the Engineer. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the Engineer may require special construction procedures such as limiting the length of the open trench, prohibiting stacking excavated material in the street and requiring that the trench shall not remain open overnight.
- B. Take precautions to prevent injury to the public due to open trenches. Provide adequate light at all trenches, excavated material, equipment, or other obstacles which could be dangerous to the public at night.

1.05 TEST PITS

- A. Excavate test pits, at the direction of the Engineer, to locate underground pipelines or structures in advance of the construction. Backfill test pits immediately after their purpose has been satisfied and restore and maintain the surface in a manner satisfactory to the Engineer.

1.06 MAINTENANCE OF TRAFFIC

- A. Unless permission to close a street is received in writing from the proper authority, place all excavated material so that vehicular and pedestrian traffic may be maintained at all times. If the construction operations cause traffic hazards, repair the road surface, provide temporary ways, erect wheel guards or fences, or take other measures for safety satisfactory to the Engineer.
- B. Detours around construction will be subject to the approval of the Owner and the Engineer. Where detours are permitted, provide all necessary barricades and signs as required to divert the flow of traffic. Expedite construction operations while traffic is detoured. Periods when traffic is being detoured will be strictly controlled by the Owner.
- C. Take precautions to prevent injury to the public due to open trenches. Night watchmen may be required where special hazards exist, or police protection provided for traffic while work is in progress. Be fully responsible for damage or injuries whether or not police protection has been provided.

1.07 CARE AND PROTECTION OF PROPERTY

- A. The Contractor shall be responsible for the preservation of all public and private property and use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at his/her expense, to a condition similar or equal to that existing before the damage was done, or he/she shall make good the damage in other manner acceptable to the Engineer.

1.08 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

- A. The Contractor shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains and electric and telephone cables, whether or not they are shown on the Drawings. Carefully support and protect all such structures and utilities from injury of any kind. Any damage resulting from the Contractor's operations shall be repaired by him/her at his/her expense.
- B. Assistance will be given the Contractor in determining the location of existing services. The Contractor, however, shall bear full responsibility for obtaining all locations of underground structures and utilities (including existing water services, drain lines and sewers). Maintain services to buildings and pay costs or charges resulting from damage thereto.
- C. Protection of existing utilities and structures as described in this Section shall be a part of the work under the Contract and all costs in connection therewith shall be included in the Total Price Bid in the Bid Form.
- D. If, in the opinion of the Engineer, permanent relocation of an existing utility is required, he/she may direct the Contractor, in writing, to perform the work. Work so ordered will be paid for at the Contract unit prices, if applicable, or as extra work. If relocation of a privately owned utility is required, the Owner will notify the Utility to perform the work as expeditiously as possible. The Contractor shall cooperate with the Owner and Utility. Notify all utility companies in writing at least 48 hours (excluding Saturdays, Sundays and Legal holidays) before excavating

in any public way. Also notify New Mexico One Call, telephone 811 or 1-800-321-2537 at least 48 hours prior to start of work.

1.09 WATER FOR CONSTRUCTION PURPOSES

- A. Water for construction purposes is available to the Contractor via the water storage tank located at the Santa Fe Solid Waste Management Agency. Maintenance and filling of Contractor's water trucks shall be the sole responsibility of the Contractor and at no expense to the Owner. Contractor shall coordinate access requirements to the existing storage tank with the Owner.

1.10 MAINTENANCE OF FLOW

- A. Provide for the flow of sewers, drains and water courses interrupted during the progress of the work, and immediately cart away and remove all offensive matter. Discuss the entire procedure of maintaining existing flow with the Engineer well in advance of the interruption of any flow.

1.11 COOPERATION WITHIN THIS CONTRACT

- A. All firms or persons authorized to perform any work under this Contract shall cooperate with the Contractor and his/her Subcontractors or trades and shall assist in incorporating the work of other trades where necessary or required.
- B. Cutting and patching, drilling and fitting shall be carried out where required by the trade or subcontractor having jurisdiction, unless otherwise indicated herein or directed by the Engineer.

1.12 CLEANUP AND DISPOSAL OF EXCESS MATERIAL

- A. During the course of the work, keep the site of operations as clean and neat as possible. Contractor may dispose of construction materials at the Caja del Rio Landfill at the current disposal rates. Dispose of all residue resulting from the construction work and, at the conclusion of the work, remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures and any other refuse remaining from the construction operations and leave the entire site of the work in a neat and orderly condition.
- B. In order to prevent environmental pollution arising from the construction activities related to the performance of this Contract, the Contractor and his/her subcontractors shall comply with all applicable Federal, State and local laws and regulations concerning waste material disposal, as well as the specific requirements stated in this Section and in other related sections.
- C. Disposal of excess excavated material in wetlands, stream corridors and plains is strictly prohibited even if the permission of the property owner is obtained. Any violation of this restriction by the Contractor or any person employed by him will be brought to the immediate attention of the responsible regulatory agencies, with a request that appropriate action be taken against the offending parties. The Contractor will be required to remove the fill and restore the area impacted at no increase in the Contract Price.

END OF SECTION

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SECTION 01050  
PROJECT CONTROLS (SURVEYING)

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The CONTRACTOR shall provide and pay for field engineering services required for project; including but not limited to:
  - 1. Survey work required for project controls and layout.
  - 2. Certified as-built surveys specified herein.
  - 3. Civil, structural or other professional engineering services specified, or required to execute CONTRACTOR's construction methods.
- B. Retain the services of a registered land surveyor licensed in the state of the project location to:
  - 1. Identify existing control points and property line corners indicated on the Drawings, as required.
  - 2. Verify and record all existing structure locations in the vicinity of, or adjacent to, the proposed Work; and, the locations of all pro-posed structures and facilities.
  - 3. Maintain an accurate record of locations of all new buried piping and existing buried piping and other buried existing facilities (piping, conduits, and structures) encountered and/or relocated during construction of the new Work.

1.02 RELATED WORK

- A. Summary of Work is included in Section 01010.
- B. Contract Closeout Section 01700.
- C. Record Drawings Section 01720.

1.03 SUBMITTALS

- A. Submit, to the Engineer, the name, address and state registration and license number of proposed registered land surveyor.
- B. On request of the Engineer, submit documentation to verify accuracy of field engineering work.
- C. Submit certificate signed by registered engineer or land surveyor certifying that elevations and locations of improvements are in conformance, or non-conformance, with Contract Documents.
- D. At substantial completion, submit certified as-built survey drawings (signed and sealed by registered land Surveyor with with the Surveyor's title block) of the items listed below. All surveys shall be tied to the applicable Grid System and shall indicate all pre-existing and new

project benchmarks. Vertical Control shall conform to the project elevation datum designated on the plans.

1. Certified site survey of items noted in 01050 1.06.
2. Certified site survey, drawn to the same scale as the Engineer's drawings and submitted on 24-inch by 36-inch sized sheets and in digital format, showing the location of all above ground structures, drainage control structures, ditches, and ponds within the project site.
3. Certified site survey, drawn to the same scale as the Engineer's drawings and submitted on 24-inch by 36-inch sized sheets and in digital format, showing the locations, lines and grades in plan and profile views of all below-grade lines (piping and concrete-encased electrical ducts) and other buried facilities (e.g., valves, tanks, etc). This requirement includes all utilities installed as a part of the scope of this project, as well as existing lines encountered during the installation of the new work.
4. Certified site survey, drawn to the same scale as the Engineer's drawings and submitted on 24-inch by 36-inch sized sheets and in digital format, indicating lines, grades, elevations and stationing at 100-ft increments, changes in alignment or grade. Provide elevations of structure inverts, pipe invert(s) and rim elevations on all flow structures.
5. Certified site topographic survey for the constructed areas. Spot elevations shall be shown at a minimum 50-foot rectangular grid sufficient to show all important topographic features with a minimum 1-foot contour at a scale of 1 inch equals 100 feet by a registered land surveyor. The above surveys shall also be delivered in AutoCAD Release 2012 to the ENGINEER with topographic information in xml format and points in AutoCAD Civil 3D or a format that is easily converted to AutoCAD Civil 3D (i.e. Excel csv file, Land Desktop).

#### 1.04 QUALIFICATIONS OF SURVEYOR

- A. Registered land surveyor, licensed in the state of the project location.

#### 1.05 SURVEY REFERENCE POINTS

- A. Existing basic horizontal and vertical control points for the project are those designated on Drawings.
- B. Locate and protect control points prior to starting site work and preserve all permanent reference points during construction.
  1. Make no changes or relocations without prior written notice to and approval by the Engineer.
  2. Report to the Engineer when any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
  3. Require the surveyor to correctly replace project control points which may be lost or destroyed. Establish replacements based on original survey control.

## 1.06 PROJECT SURVEY REQUIREMENTS

- A. Establish a minimum of two permanent bench marks on site, referenced to data established by survey control points.
  - 1. Record locations, with horizontal and vertical data, on the as-built Survey.
  - 2. Permanent benchmarks shall be installed and spaced for convenient reference and use at locations along the pipeline route and/or on the plant site.
  - 3. Benchmarks shall be installed to National Geodetic Survey standards and shall include horizontal and vertical data, as well as the installation date.
- B. Establish lines and levels; locate and lay out:
  - 1. Site improvements.
    - a. Stakes for grading, fill and topsoil placement at the following minimum elevations and frequency:
      - 1) Elevations
        - a) Top of "subgrade".
        - b) Leachate collection top of pipe.
        - c) Top of drainage sand material.
      - 2) Frequency
        - a) Every 50 ft along low points and high points of cells "saw tooth" configuration.
        - b) Every 50 ft and any changes in grade along sump areas.
        - c) Every 50 ft along piping.
        - d) Every 50 ft along all other breaks of grade interior or exterior to cell.
    - b. Utility slopes and invert elevations.
    - c. Sidewalks, pavement, fencing, storm drainage facilities, and other finish surface work.
- C. If lines, levels or layouts are lost or destroyed, or if required by the Owner or Engineer, verify layouts by same methods.

## PART 2 PRODUCTS (NOT USED)

## PART 3 EXECUTION

### 3.01 RECORDS

- A. Maintain a complete, accurate log of all control and survey work as it progresses.
- B. Update the project as-built survey on a monthly basis, based on the work performed during the month. Submit one copy of up to date as-built documentation with Contractor's monthly applications for payment.
- C. Maintain an accurate record of new and existing piping, conduit and structure changes, revisions, relocations, and modifications.

END OF SECTION

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SECTION 01110  
ENVIRONMENTAL PROTECTION PROCEDURES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials and equipment and perform all work required for the prevention of environmental pollution in conformance with applicable laws and regulations, during and as the result of construction operations under this Contract. For the purpose of this Section, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and/or recreational purposes.
- B. The control of environmental pollution requires consideration of air, water and land, and involves management of noise and solid waste, as well as other pollutants.
- C. Schedule and conduct all work in a manner that will minimize the erosion of soils in the area of the work. Provide erosion control measures such as diversion channels, sedimentation or filtration systems, berms, staked hay bales, seeding, mulching or other special surface treatments as are required to prevent silting and muddying of streams, rivers, impoundments, lakes, etc. All erosion control measures shall be in place in an area prior to any construction activity in that area.
- D. This Section is intended to ensure that construction is achieved with a minimum of disturbance to the existing ecological balance between a water resource and its surroundings. These are general guidelines. It is the Contractor's responsibility to determine the specific construction techniques to meet these guidelines.
- E. All phases of sedimentation and erosion control shall comply with and be subject to the approval of the New Mexico Environmental Department. Prepare sedimentation and erosion control drawings meeting the requirements for approval by that agency. Upon approval, furnish two copies of the approved Drawing to the Engineer.

1.02 APPLICABLE REGULATIONS

- A. Comply with all applicable Federal, State and local laws and regulations concerning environmental pollution control and abatement.

1.03 NOTIFICATIONS

- A. The Engineer will notify the Contractor in writing of any non-compliance with the foregoing provisions or of any environmentally objectionable acts and corrective action to be taken. State or local agencies responsible for verification of certain aspects of the environmental protection requirements shall notify the Contractor in writing, through the Engineer, of any non-compliance with State or local requirements. After receipt of such notice from the Engineer or from the regulatory agency through the Engineer, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails or refuses to comply promptly, the Owner may issue an order stopping all or part of the work until satisfactory corrective action

has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor unless it is later determined that the Contractor was in compliance.

#### 1.04 IMPLEMENTATION

- A. Prior to commencement of the work, meet with the Engineer and Owner to develop mutual understandings relative to compliance with these provisions and administration of the environmental pollution control program.
- B. Remove temporary environmental control features, when approved by the Engineer and incorporate permanent control features into the project at the earliest practicable time.

#### PART 2 PRODUCTS (NOT USED)

#### PART 3 EXECUTION

##### 3.01 EROSION CONTROL

- A. Provide positive means of erosion control such as shallow ditches around construction to carry off surface water. Erosion control measures, such as siltation basins, hay check dams, mulching, jute netting and other equivalent techniques, shall be used as appropriate. Flow of surface water into excavated areas shall be prevented. Ditches around construction area shall also be used to carry away water resulting from dewatering of excavated areas. At the completion of the work, ditches shall be backfilled and the ground surface restored to original condition.

##### 3.02 PROTECTION OF STREAMS AND SURFACE WATERS

- A. Take all precautions to prevent, or reduce to a minimum, any damage to any stream or surface water from pollution by debris, sediment or other material, or from the manipulation of equipment and/or materials in or near such streams. Water that has been used for washing or processing, that contains oils or sediments that will reduce the quality of the water in the stream, shall not be directly returned to the stream. Divert such waters through a settling basin or filter before being directed into streams or surface waters.
- B. Do not discharge water from dewatering operations directly into any live or intermittent stream, channel, wetlands, surface water or any storm sewer. Water from dewatering operations shall be treated by filtration, settling basins, or other approved method to reduce the amount of sediment contained in the water to allowable levels.
- C. Take all preventative measures to avoid spillage of leachate, petroleum products, and other pollutants. In the event of any spillage, prompt remedial action shall be taken in accordance with a contingency action plan approved by the New Mexico Environmental Department. Submit two copies of approved contingency plans to the Engineer.

##### 3.03 PROTECTION OF LAND RESOURCES

- A. Restore land resources within the project boundaries and outside the limits of permanent work to a condition, after completion of construction that will appear to be natural and not detract from the appearance of the project. Confine all construction activities to areas shown on the Drawings.

- B. Outside of areas requiring earthwork for the construction of the new facilities, do not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorage unless specifically authorized by the Engineer. Where such special emergency use is permitted, first wrap the trunk with a sufficient thickness of burlap or rags over which softwood cleats shall be tied before any rope, cable, or wire is placed. The Contractor shall in any event be responsible for any damage resulting from such use.
- C. Before beginning operations near them, protect trees that may possibly be defaced, bruised, injured, or otherwise damaged by the construction equipment, dumping or other operations, by placing boards, planks, or poles around them. Monuments and markers shall be protected similarly.
- D. Any trees or other landscape features scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to their original condition. The Engineer will decide the method of restoration to be used and whether damaged trees shall be treated and healed or removed and disposed of.
  - 1. All scars made on trees by equipment, construction operations, or by the removal of limbs larger than 1-in in diameter shall be coated as soon as possible with an approved tree wound dressing. All trimming or pruning shall be performed in an approved manner by experienced workmen with saws or pruning shears. Tree trimming with axes will not be permitted.
  - 2. Climbing ropes shall be used where necessary for safety. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the Contractor and are beyond saving in the opinion of the Engineer, shall be immediately removed and replaced.
- E. The locations of the Contractor's storage and other construction buildings required temporarily in the performance of the work, shall be cleared portions of the job site or areas to be cleared as shown on the Drawings and approved by the Engineer and shall not be within wetlands or floodplains. The preservation of the landscape shall be an imperative consideration in the selection of all sites and in the construction of buildings. Drawings showing storage facilities shall be submitted for approval of the Engineer.
- F. If the Contractor proposes to construct temporary roads or embankments and excavations for plant and/or work areas, he shall submit the following for approval at least ten days prior to scheduled start of such temporary work.
  - 1. A layout of all temporary roads, excavations, embankments and drainage to be constructed within the work area.
  - 2. Details of temporary road construction.
  - 3. Drawings and cross sections of proposed embankments and their foundations, including a description of proposed materials.
  - 4. A landscaping drawing showing the proposed restoration of the area. Indicate the proposed removal of any trees and shrubs outside the limits of existing clearing area. Indicate locations of guard posts or barriers required to control vehicular traffic and protect trees

and shrubs to be maintained undamaged. The Drawing shall provide for the obliteration of construction scars as such and shall provide for a natural appearing final condition of the area. Modification of the Contractor's approved drawings shall be made only with the written approval of the Engineer. No unauthorized road construction, excavation or embankment construction including disposal areas will be permitted.

- G. Remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess of waste materials, or any other vestiges of construction as directed by the Engineer. It is anticipated that excavation, filling and plowing of roadways will be required to restore the area to near natural conditions which will permit the growth of vegetation thereon.
- H. All debris and excess material will be disposed of outside wetland or floodplain areas in an environmentally sound manner.

### 3.04 PROTECTION OF AIR QUALITY

- A. Burning - The use of burning at the project site for the disposal of refuse and debris will not be permitted.
- B. Dust Control - Maintain all excavations, embankment, stockpiles, access roads, plant sites, waste areas, borrow areas and all other work areas within or without the project boundaries free from dust which could cause the standards for air pollution to be exceeded and which would cause a hazard or nuisance to others.
- C. An approved method of stabilization consisting of sprinkling or other similar methods will be permitted to control dust. The use of petroleum products is prohibited. The use of chlorides may be permitted with approval from the Engineer.
- D. Sprinkling, to be approved, must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the Contractor shall have sufficient competent equipment on the job to accomplish this. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs, as determined by the Engineer.

### 3.05 NOISE CONTROL

- A. Make every effort to minimize noises caused by the construction operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with Federal and State regulations.

### 3.06 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

- A. Maintain all facilities constructed for pollution control as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created.

END OF SECTION

SECTION 01200  
PROJECT MEETINGS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The Engineer shall schedule and administer pre-construction meeting, periodic progress meetings and specially called meetings throughout progress of the work.
  - 1. Prepare agenda for meetings.
  - 2. Make physical arrangements for meetings.
  - 3. Preside at meetings.
  - 4. Record the minutes; include significant proceedings and decisions.
  - 5. Reproduce and distribute copies of minutes within 15 working days after each meeting.
    - a. To participants in the meeting.
    - b. To parties affected by decisions made at the meeting.
- B. Representatives of Contractors, subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.
- C. Attend meetings to ascertain that work is expedited consistent with Contract Documents and construction schedules.

1.02 RELATED REQUIREMENTS

- A. Instructions to Bidders are included in Section 00100.
- B. Construction Schedules are included in Section 01310.
- C. Shop Drawings, Working Drawings and Samples are included in Section 01300.
- D. Project Record Documents are included in Section 01720.

1.03 PRE-CONSTRUCTION MEETING

- A. Schedule a preconstruction meeting no later than 15 days after date of Notice to Proceed.
- B. Location: A central site, convenient for all parties, designated by the Owner.
- C. Attendance
  - 1. Owner's Representative.
  - 2. Engineer and his/her 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 Construction Schedules.
2. Critical work sequencing.
3. Major equipment deliveries and priorities.
4. Project Coordination.
  - a. Designation of responsible personnel.
5. Procedures and processing of:
  - a. Field decisions.
  - b. Proposal requests.
  - c. Submittals.
  - d. Change Orders.
  - e. Applications for Payment.
6. Adequacy of distribution of Contract Documents.
7. Procedures for maintaining Record Documents.
8. Use of premises:
  - a. Office, work and storage areas.
  - b. Owner's requirements.
9. Construction facilities, controls and construction aids.
10. Temporary utilities.
11. Housekeeping procedures.

1.04 PROGRESS MEETINGS

- A. Schedule regular periodic meetings. The progress meetings will be held every 30 days with the first meeting 30 days after the pre-construction meeting or 30 days 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 or Engineer.
- D. Attendance
  - 1. Engineer and his/her professional consultants as needed.
  - 2. Subcontractors as appropriate to the agenda.
  - 3. Suppliers as appropriate to the agenda.
  - 4. 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 and 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.
  - 11. Maintenance of quality standards.
  - 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. Attend progress meetings and is to study previous meeting minutes and current agenda items, in order to be prepared to discuss pertinent topics such as deliveries of materials and equipment, progress of the work, etc.
- G. Provide a current submittal log at each progress meeting in accordance with Section 01300.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01300  
SUBMITTALS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section includes the requirements for compiling, processing and transmitting submittals required for execution of the project.
- B. Submittals are categorized into two types: Action Submittals and Informational Submittals, as follows:
  - 1. Action Submittal: Written and graphic information submitted by the Contractor that requires the Engineer's approval. The following are examples of action submittals:
    - a. Shop drawings (including working drawing and product data)
    - b. Samples
    - c. Operation & maintenance manuals
    - d. Site Usage Plan (Contractor's staging - including trailer siting and material laydown area)
    - e. Schedule of values
    - f. Payment application format
  - 2. Informational Submittal: Information submitted by the Contractor that does not require the Engineer's approval. The following are examples of informational submittals:
    - a. Shop Drawing Schedule
    - b. Construction Schedule
    - c. Statements of Qualifications
    - d. Health and Safety Plans
    - e. Construction Photography and Videography
    - f. Work Plans
    - g. Maintenance of Traffic Plans
    - h. Outage Requests
    - i. Proposed Testing Procedures
    - j. Test Records and Reports
    - k. Vendor Training Outlines/Plans
    - l. Test and Start-Up Reports
    - m. Certifications
    - n. Record Drawings
    - o. Record Shop Drawings
    - p. Submittals required by laws, regulations and governing agencies
    - q. Submittals required by funding agencies
    - r. Other requirements found within the technical specifications
    - s. Warranties and Bonds
    - t. As-Built Surveys
    - u. Contract Close-out Documents

1.02 RELATED WORK

- A. Additional requirements may be specified in the General Conditions for the Contract.

- B. Additional submittal requirements may be specified in the respective technical Specification Sections.
- C. Contract closeout submittals are included in Section 01700.
- D. Warranties and Bonds are included in Section 01740.
- E. Applications for Payment are included in Section 01026.
- F. Construction Schedules are included in Section 01310.
- G. Project Controls (Surveying) 01050.
- H. Project Record Documents are included in Section 01720.

### 1.03 CONTRACTOR'S RESPONSIBILITIES

- A. All submittals shall be clearly identified as follows:
  - 1. Date of Submission.
  - 2. Project Number.
  - 3. Project Name.
  - 4. Contractor Identification.
    - a. Contractor.
    - b. Supplier.
    - c. Manufacturer.
    - d. Manufacturer or supplier representative.
  - 5. Identification of the Product.
  - 6. Reference to Contract Drawing.
  - 7. Reference to specification section number, page and paragraph(s).
  - 8. Reference to applicable standards, such as ASTM or Federal Standards numbers.
  - 9. Indication of Contractor's approval.
  - 10. Contractor's Certification statement.
  - 11. Identification of deviations from the Contract Documents, if any.
  - 12. Reference to previous submittal (for resubmittals).
  - 13. Made in America (when required by the Contract).
- B. Submittals shall be clear and legible, and of sufficient size for legibility and clarity of the presented data.

- C. Submittal Log. Maintain a log of all submittals. The submittal log shall be kept accurate and up to date. This log should include the following items (as applicable):
1. Description.
  2. Submittal Number.
  3. Date transmitted to the Engineer.
  4. Date returned to Contractor (from Engineer).
  5. Status of Submittal (Approved/Not Approved/etc.).
  6. Date of Resubmittal to Engineer and Return from Engineer (if applicable and repeat as necessary).
  7. Date material released for fabrication.
  8. Projected (or actual) delivery date.
- D. Numbering System. Utilize the following submittal identification numbering system:
1. The first character shall be a D, S, M or I which represents Shop Drawing (including working drawings and product data), Sample, Manual (Operating & Maintenance) or Informational, respectively.
  2. The next five digits shall be the applicable Section Number.
  3. The next three digits shall be the sequential number of each separate item or drawing submitted under each Specification Section, in the chronological order submitted, starting at 001.
  4. The last character shall be a letter, A to Z, indicating the submission (or resubmission) of the same submittal, i.e., "A" = 1st submission, "B" = 2nd submission, "C" = 3rd submission, etc. A typical submittal number would be as follows:  
  
D-03300-008-B.  
D = Shop Drawing  
03300 = Section for Concrete.  
008 = the eighth different submittal under this Section.  
B = the second submission (first resubmission) of that particular shop drawing.
- E. Variances
1. Notify the Engineer in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Contract Documents.
  2. Notify the Engineer in writing, at the time of re-submittal (resubmission), of all deviations from previous submissions of that particular shop drawing, except those deviations which are the specific result of prior comments from the Engineer.

F. Action Submittals

1. Shop Drawings, Working Drawings, Product Data and Samples.
  - a. Shop Drawings.
    - 1) Shop drawings as defined in the General Conditions, and as specified in individual Sections may include, but are not necessarily limited to, custom prepared data such as fabrication and erection/installation (working) drawings, scheduled information, setting diagrams, actual shop work manufacturing instructions, custom templates, valve schedules, wiring diagrams, coordination drawings, equipment inspection and test reports, and performance curves and certifications, as applicable to the work.
    - 2) Contractor shall verify all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and coordinate each item with other related shop drawings and the Contract requirements.
    - 3) All details on shop drawings shall clearly show the relation of the various parts to the main members and lines of the structure and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the drawings before being submitted.
    - 4) All shop drawings submitted by subcontractors and vendors shall be reviewed by the Contractor. Contractor shall confirm, materials, dimensions, catalog numbers, technical data and performance criteria; and shall coordinate with other related shop drawings and the Contract requirements. In addition, Contractor shall confirm existing field conditions and dimensions and assure that the submittal is coordinated and compatible with existing conditions. Submittals directly from subcontractors or vendors will not be accepted by the Engineer.
    - 5) The Contractor shall be responsible the accuracy of the subcontractor's or vendor's submittal; and, for their submission in a timely manner to support the requirements of the Contractor's construction schedule. Shop drawings found to be inaccurate or otherwise in error shall be returned to the subcontractor or vendor to correct, before submission to the Engineer. All shop Drawings shall be approved by the Contractor.
    - 6) Delays to construction due to the untimely submission of submittals will constitute inexcusable delays, for which Contractor shall not be eligible for additional cost nor additional contract time. Inexcusable delays consist of any delay within the Contractor's control.
    - 7) Submittals for equipment specified under Divisions 11, 13, 14, 15 and 16 shall include a listing of installations where identical or similar equipment manufactured by that manufacturer has been installed and in operation for a period of at least five years.
  - b. Working Drawings
    - 1) Detailed installation drawings (sewers, equipment, piping, electrical conduits and controls, HVAC work, and plumbing, etc.) shall be prepared and submitted for review and approval by the Engineer prior to installing such work. Installation drawings shall be to-scale and shall be fully dimensioned.
    - 2) Piping working drawings shall show the laying dimensions of all pipes, fittings, valves, as well as the equipment to which it is being connected. In addition, all pipe supports shall be shown.
    - 3) Equipment working drawings shall show all equipment dimensions, anchor bolts, support pads, piping connections and electrical connections. In addition, show clearances required around such equipment for maintenance of the equipment.

- 4) Electrical working drawings shall show conduits, junction boxes, disconnects, control devices, lighting fixtures, support details, control panels, lighting and power panels, and Motor Control Centers. Coordinate all locations with the Contract Documents and the Contractor's other working drawings.
  - c. Product Data
    - 1) Product data, as specified in individual Specification Sections, include, but are not limited to, the manufacturer's standard prepared data for manufactured products (catalog data), such as the product specifications, installation instructions, availability of colors and patterns, rough-in diagrams and templates, product photographs (or diagrams), wiring diagrams, performance curves, quality control inspection and reports, certifications of compliance (as specified or otherwise required), mill reports, product operating and maintenance instructions, recommended spare parts and product warranties, as applicable.
  - d. Samples
    - 1) Furnish, samples required by the Contract Documents for the Engineer's approval. Samples shall be delivered to the Engineer as specified or directed. Unless specified otherwise, provide at least two samples of each required item. Materials or equipment for which samples are required shall not be used in the work unless and until approved by the Engineer.
    - 2) Samples specified in individual Specification Sections, include, but are not limited to: physical examples of the work (such as sections of manufactured or fabricated work), small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens for coordination of visual effect, graphic symbols, and other specified units of work.
    - 3) Approval of a sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify and Contract Requirements.
    - 4) Approved samples not destroyed in testing shall be sent to the Engineer or stored at the site of the work. Approved 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 approved samples. Samples which fail testing or are not approved will be returned to the Contractor at his expense, if so requested at time of submission.
  - e. Professional Engineer (P.E.) Certification Form
    - 1) If specifically required in any of the technical Specification Sections, submit a Professional Engineer (P.E.) Certification for each item required, using the form appended to this Section, signed and sealed by the P.E. licensed or registered in the state wherein the work is located.
2. Contractor's Certification
    - a. Each shop drawing, working drawings, product data, and sample shall have affixed to it the following Certification Statement:
      - 1) "Certification Statement: by this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements."
    - b. Shop drawings, working drawings, and product data sheets 11-in x 17-in and smaller shall be bound together in an orderly fashion and bear the above Certification Statement on the cover sheet. The transmittal cover sheet for each identified shop

drawing shall fully describe the packaged data and include a listing of all items within the package.

3. The review and approval of shop drawings, working drawings, product data, or samples by the Engineer shall not relieve the Contractor from the responsibility for the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor and the Engineer will have no responsibility therefor.
4. Project work, materials, fabrication, and installation shall conform to approved shop drawings (including working drawings and product data) and applicable samples.
5. No portion of the work requiring a shop drawing (including working drawings and product data) or sample shall be started, nor shall any materials be fabricated or installed before approval of such item. Procurement, fabrication, delivery or installation of products or materials that do not conform to approved shop drawings shall be at the Contractor's risk. Furthermore, such products or materials delivered or installed without approved shop drawings, or in non-conformance with the approved shop drawings will not be eligible for progress payment until such time as the product or material is approved or brought into compliance with approved shop drawings. Neither the Owner nor Engineer will be liable for any expense or delay due to corrections or remedies required to accomplish conformity.
6. Operation and Maintenance Data
  - a. Operation and maintenance data shall be submitted in assembled manuals as specified. Such manuals shall include detailed instructions for Owner personnel on safe operation procedures, controls, start-up, shut-down, emergency procedures, storage, protection, lubrication, testing, trouble-shooting, adjustments, repair procedures, and other maintenance requirements.
  - b. Schedule of Values
    - 1) On projects consisting of lump sums (in whole or in part) submit a proposed schedule of values providing a breakdown of lump sum items into reasonably small components – generally disaggregated by building, area, and/or discipline. The purpose of the schedule of values is for processing partial payment applications. If requested by the Engineer, provide sufficient substantiation for all or some items as necessary to determine the proposed schedule of values is a reasonable representation of the true cost breakdown of the Work. The schedule of values shall not be unbalanced to achieve early payment or over-payment in excess of the value of work or any other mis-distribution of the costs. If, in the opinion of the Engineer, the schedule of values is unbalanced, Contractor shall reallocate components to achieve a balanced schedule acceptable to Engineer.
  - c. Payment Application Format
    - 1) If an application form is included in the Contract Documents, use that form unless otherwise approved by the Engineer and Owner. If an application form is not included in the Contract Documents, Contractor may propose a form for approval.
7. Site Usage
  - a. Submit a proposed site staging plan, including but not limited to the location of office trailers, storage trailers and material laydown. Such plan shall be a graphic presentation (drawing) of the proposed locations; and, shall include on-site traffic modifications, and temporary utilities, as may be applicable.

G. Informational Submittals

1. Shop Drawing Schedule
  - a. Prepare and submit a schedule indicating when shop drawings are required to be submitted to support the as-planned construction schedule. The submittal schedule shall allow sufficient time for preparation and submittal, review and approval, and fabrication and delivery to support the construction schedule.
2. Construction Schedule
  - a. Prepare and submit construction schedules and monthly status reports as specified.
3. Statements of Qualifications
  - a. Provide evidence of qualification, certification, or registration, as required in the Contract Documents, to verify qualifications of licensed land surveyor, professional engineer, materials testing laboratory, specialty subcontractor, technical specialist, consultant, specialty installer, and other professionals.
  - b. Health and Safety Plans
    - 1) When specified, prepare and submit a general company Health and Safety Plan (HSP), modified or supplemented to include job-specific considerations.
4. Construction Photography and Videography
  - a. Provide periodic construction photographs and videography as specified – including but not limited to preconstruction photographs and/or video, monthly progress photos and/or video and post-construction photographs and/or video.
5. Work Plans
  - a. Prepare and submit copies of all work plans needed to demonstrate to the Owner that Contractor has adequately thought-out the means and methods of construction and their interface with existing facilities.
6. Maintenance of Traffic Plans
  - a. Prepare maintenance of traffic plans where and when required by the Contract Documents and by local ordinances or regulations. If Contractor is not already knowledgeable about local ordinances and regulations regarding maintenance of traffic requirements, become familiar with such requirements and include all costs for preparation and submittal of traffic management plans and all associated costs for permits and fees to implement the traffic management plan, in the bid amount. In addition, unless a supplemental payment provision is provided in the bid form, include the cost of police attendance, when required.
7. Outage Requests
  - a. Provide sufficient notification of any outages required (electrical, flow processes, etc.) as may be required to tie-in new work into existing facilities. Unless specified otherwise elsewhere, a minimum of seven calendar days' notice shall be provided.
8. Proposed Testing Procedures
  - a. Prepare and submit testing procedures it proposes to use to perform testing required by the various technical specifications.

9. Test Records and Reports
  - a. Provide copies of all test records and reports as specified in the various technical specifications.
10. Vendor Training Outlines/Plans
  - a. At least two weeks before scheduled training of Owner's personnel, provide lesson plans for vendor training in accordance with the specification for O&M manuals.
11. Test and Start-up Reports
  - a. Manufacture shall perform all pre-start-up installation inspection, calibrations, alignments, and performance testing as specified in the respective Specification Section. Provide copies of all such test and start-up reports.
12. Certifications
  - a. Provide various certifications as required by the technical specifications. Such certifications shall be signed by an officer (of the firm) or other individual authorized to sign documents on behalf of that entity.
  - b. Certifications may include, but are not limited to:
    - 1) Welding certifications and welders qualifications
    - 2) Certifications of Installation, Testing and Training for all equipment
    - 3) Material Testing reports furnished by an independent testing firm
    - 4) Certifications from manufacturer(s) for specified factory testing
    - 5) Certifications required to indicate compliance with any sustainability or LEEDS accreditation requirements indicated in the Contract Documents
13. Record Drawings
  - a. No later than Substantial Completion, submit a record of all changes during construction not already incorporated into drawings – in accordance with specification on Project Record Documents.
14. Record Shop Drawings
  - a. Before final payment is made, furnish one set of record shop drawings to the Engineer. These record shop drawings shall be in conformance with the approved documents and should show any field conditions which may affect their accuracy.
  - b. Submittals required by laws, regulations and governing agencies
    - 1) Prepare and submit all documentation required by state or local law, regulation or government agency directly to the applicable agency. This includes, but is not limited to, notifications, reports, certifications, certified payroll (for projects subject to wage requirements) and other documentation required to satisfy all requirements. Provide to Engineer one copy of each submittal made in accordance with this paragraph.
  - c. Submittals required by funding agencies
    - 1) Prepare and submit all documentation required by funding agencies. This includes, but is not limited to segregated pay applications and change orders when required to properly allocate funds to different funding sources; and certified payrolls for projects subject to wage requirements. Provide one copy of each submittal made in accordance with this paragraph to the Engineer.
15. Other requirements of the technical Specification Sections
  - a. Comply with all other requirements of the technical specifications.

16. Warranties and Bonds
  - a. Assemble a booklet or binder of all warranties and bonds as specified in the various technical specifications and in accordance with the specification on Warranties and Bonds; and provide two originals to the Engineer.
17. As-Built Surveys
  - a. Engage the services of a licensed land surveyor in accordance with the Project Controls (Surveying) specification. Prior to Final Completion, provide an as-built survey of the constructed facility, as specified.
18. Contract Close-Out Documents
  - a. Submit Contract documentation as indicated in the specification for Contract Close-out.

## PART 2 PRODUCTS (NOT USED)

## PART 3 EXECUTION

### 3.01 SUBMITTAL SCHEDULE

- A. Provide an initial submittal schedule at the pre-construction meeting for review by Owner and Engineer. Incorporate comments from Owner or Engineer into a revised submittal schedule.
- B. Maintain the submittal schedule and provide sufficient copies for review by Owner and Engineer. An up-to-date submittal schedule shall be provided at each project progress meeting.

### 3.02 TRANSMITTALS

- A. Prepare separate transmittal sheets for each submittal. Each transmittal sheet shall include at least the following: the Contractor's name and address, Owner's name, project name, project number, submittal number, description of submittal and number of copies submitted.
- B. Submittals shall be transmitted or delivered directly to the office of the Engineer, as indicated in the Contract Documents or as otherwise directed by the Engineer.
- C. Provide copies of transmittals forms or cover letters (without attachments) directly to the Resident Project Representative.

### 3.03 PROCEDURES

- A. Action Submittals
  1. Contractor's Responsibilities
    - a. Coordination of Submittal Times: Prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual work of other related Sections, so that the installation will not be delayed by processing times including disapproval and resubmittal (if required). Coordinate with other submittals, testing, purchasing, fabrication, delivery and similar sequenced activities. Extensions to the Contract Time will not be approved for the Contractor's failure to transmit submittals sufficiently in advance of the Work.

- b. The submittals of all shop drawings (including working drawings and product data) shall be sufficiently in advance of construction requirements to allow for possible need of re-submittals, including the specified review time for the Engineer.
  - c. No less than 30 calendar days will be required for Engineer's review time for shop drawings and O&M manuals involving only one engineering discipline. No less than 45 calendar days will be required for Engineer's review time for shop drawings and O&M manuals that require review by more than one engineering discipline. Resubmittals will be subject to the same review time.
  - d. Submittals of operation and maintenance data shall be provided within 30 days of approval of the related shop drawing(s).
  - e. Before submission to the Engineer, review shop drawings as follows:
    - 1) Make corrections and add field measurements, as required
    - 2) Use any color for its notations except red (reserved for the Engineer's notations) and black (to be able to distinguish notations on black and white documents)
    - 3) Identify and describe each and every deviation or variation from Contract documents or from previous submissions, except those specifically resulting from a comment from the Engineer on a previous submission
    - 4) Include the required Contractor's Certification statement
    - 5) Provide field measurements (as needed)
    - 6) Coordinate with other submittals
    - 7) Indicate relationships to other features of the Work
    - 8) Highlight information applicable to the Work and/or delete information not applicable to the Work
  - f. Submit the following number of copies:
    - 1) Shop drawings (including working drawings and product data) – Submit no fewer than four, three of which will be retained by the Engineer and/or Owner.
    - 2) Samples – three
    - 3) Site Usage Plan – three copies
    - 4) Schedule of values – three copies
    - 5) Payment application format – three copies
  - g. If Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, provide written notice thereof to the Engineer immediately; and do not release for manufacture before such notice has been received by the Engineer.
  - h. When the shop drawings have been completed to the satisfaction of the Engineer, carry out the construction in accordance therewith; and make no further changes therein except upon written instructions from the Engineer.
2. Engineer's Responsibilities
- a. Engineer will not review shop drawings (including working drawings and product data) that do not include the Contractor's approval stamp and required certification statement. Such submittals will be returned to the Contractor, without action, for correction.
  - b. Partial shop drawings (including working drawings and product data) will not be reviewed. If, in the opinion of the Engineer, a submittal is incomplete, that submittal will be returned to the Contractor for completion. Such submittals may be returned with comments from Engineer indicating the deficiencies requiring correction.
  - c. If shop drawings (including working drawings and product data) meet the submittal requirements, Engineer will forward copies to appropriate reviewer(s). Otherwise, noncompliant submittals will be returned to the Contractor without action - with the Engineer retaining one copy.

- d. Submittals which are transmitted in accordance with the specified requirements will be reviewed by the Engineer within the time specified herein. The time for review will commence upon receipt of submittal by Engineer.
3. Review of Shop Drawings (Including Working Drawings and Product Data) and Samples
    - a. The review of shop drawings, working drawings, data and samples will be for general conformance with the design concept and Contract Documents. They 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
    - b. The Contractor remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.
    - c. If the shop drawings (including working drawings and product data) or samples as submitted describe variations and indicate a deviation from the Contract requirements that, in the opinion of the Engineer are in the interest of the Owner and are so minor as not to involve a change in Contract Price or Contract Time, the Engineer may return the reviewed drawings without noting an exception.
    - d. Only the Engineer will utilize the color "RED" in marking submittals.
    - e. Shop drawings will be returned to the Contractor with one of the following codes.
      - 1) Code 1 - "APPROVED" - This code is assigned when there are no notations or comments on the submittal. When returned under this code the Contractor may release the equipment and/or material for manufacture.
      - 2) Code 2 - "APPROVED AS NOTED" - This code is assigned when a confirmation of the notations and comments IS NOT required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.
      - 3) Code 3 - "APPROVED AS NOTED/CONFIRM" - This combination of codes is assigned when a confirmation of the notations and comments is required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. This confirmation shall specifically address each omission and nonconforming item that was noted. Confirmation is to be received by the Engineer within 15 calendar days of the date of the Engineer's transmittal requiring the confirmation.
      - 4) Code 4 - "APPROVED AS NOTED/RESUBMIT" - This combination of codes is assigned when notations and comments are extensive enough to require a resubmittal of the entire package. This resubmittal is to address all comments, omissions and non-conforming items that were noted. Resubmittal is to be received by the Engineer within 30 calendar days of the date of the Engineer's transmittal requiring the resubmittal.
      - 5) Code 5 - "NOT APPROVED" - This code is assigned when the submittal does not meet the intent of the contract documents. The Contractor must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the requirements of the contract documents.

- 6) Code 6 – "COMMENTS ATTACHED" – This code is assigned where there are comments attached to the returned submittal, which provide additional data to aid the Contractor.
- 7) Code 7 – "RECEIPT ACKNOWLEDGED (Not subject to Engineer's Review or Approval)" – This code is assigned to acknowledge receipt of a submittal that is not subject to the Engineer's review and approval, and is being filed for informational purposes only. This code is generally used in acknowledging receipt of means and methods of construction work plans, field conformance test reports, and health and safety plans.

Codes 1 through 5 designate the status of the reviewed submittal. Code 6 indicates that some or all of the Engineer's comments are included in an attachment.

4. Repetitive Reviews:
  - a. Shop drawings, O&M manuals and other submittals will be reviewed no more than twice at the Owner's expense. All subsequent reviews will be performed at times convenient to the Engineer and at the Contractor's expense, based on the Engineer's then prevailing rates. The Contractor shall reimburse the Owner for all costs invoiced by Engineer for the third and subsequent reviews. Submittals are required until approved.
  - b. Any need for more than one resubmission, or any other delay in obtaining Engineer's review of submittals, will not entitle Contractor to extension of the Contract time.
5. Electronic Transmission
  - a. Action Submittals may be transmitted by electronic means provided the following conditions are met:
    - 1) The above-specified transmittal form is included.
    - 2) All other requirements specified above have been met including, but not limited to, coordination by the Contractor, review and approval by the Contractor, and the Contractor's Certification.
    - 3) The submittal contains no pages or sheets large than 11 x 17 inches.
    - 4) With the exception of the transmittal sheet, the entire submittal is included in a single file.
    - 5) The electronic files are PDF format (with printing enabled).
    - 6) The Engineer's review time will commence upon receipt of the hard copies of the submittal.
    - 7) For Submittals that require certification, corporate seal, or professional embossment (i.e., P.E.s, Surveyors, etc.) transmit at least three hard-copy originals to the Engineer. In addition, provide additional photocopied or scanned copies, as specified above, showing the required certification, corporate seal, or professional seal.

#### B. Informational Submittals

1. Contractor's Responsibilities
  - a. Number of copies: Submit three copies, unless otherwise indicated in individual Specification sections
  - b. Refer to individual technical Specification Sections for specific submittal requirements.

2. Engineer's Responsibilities
  - a. The Engineer will review each informational submittal within 15 days. If the informational submittal complies with the Contract requirements, Engineer will file for the project record and transmit a copy to the Owner. Engineer may elect not to respond to Contractor regarding informational submittals meeting the Contract requirements.
  - b. If an informational submittal does not comply with the Contract requirements, Engineer will respond accordingly to the Contractor within 15 days. Thereafter, the Contractor shall perform the required corrective action, including retesting, if needed, until the submittal, in the opinion of the Engineer, is in conformance with the Contract Documents.
  
3. Electronic Transmission
  - a. Informational submittals may be transmitted by electronic means providing all of the following conditions are met:
    - 1) The above-specified transmittal form is included.
    - 2) The submittal contains no pages or sheets large than 11 x 17 inches.
    - 3) With the exception of the transmittal sheet, the entire submittal is included in a single file.
    - 4) The electronic files are PDF format (with printing enabled).
    - 5) For Submittals that require certification, corporate seal, or professional embossment (i.e., P.E.s, Surveyors, etc.)) transmit two hard-copy originals to the Engineer.

END OF SECTION

P.E. CERTIFICATION FORM

The undersigned hereby certifies that he/she is a professional engineer registered in the State of New Mexico and that he/she has been employed by

\_\_\_\_\_ to design  
(Company Name)

\_\_\_\_\_  
(Insert P.E. Responsibilities)

In accordance with Specification Section \_\_\_\_\_ for the

Caja del Rio Landfill, Cell 5B Construction Project Phase 2.  
(Name of Project)

The undersigned further certifies that he/she has performed the said design in conformance with all applicable local, state and federal codes, rules and regulations; and, that his/her signature and P.E. stamp have been affixed to all calculations and drawings used in, and resulting from, the design.

The undersigned hereby agrees to make all original design drawings and calculations available to the City of Sante Fe or Owner's representative within seven days following written request therefor by the Owner.

\_\_\_\_\_  
P.E. Name

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
P.E. Registration Number

\_\_\_\_\_  
Title

\_\_\_\_\_  
Address

SECTION 01310  
CONSTRUCTION SCHEDULING

PART 1 GENERAL

1.01 PROGRAM DESCRIPTION

- A. A Critical Path Method (CPM) construction schedule shall be used to control the Work and to provide a basis for determining job progress. The construction schedule shall be prepared and maintained by the Contractor. All work shall be done in accordance with the established CPM schedule. The Contractor and all subcontractors shall cooperate fully in developing the construction schedule and in executing the work in accordance with the CPM schedule.
- B. The construction schedule shall consist of a computerized CPM network (diagram of activities) presented in a time-scaled graphic (print-out) with reports, as specified herein.

1.02 QUALIFICATIONS

- A. The Contractor shall have the capability of preparing and utilizing the specified CPM schedule, or engage the services of a specialized scheduling professional to do so. Within seven days of the award of contract, provide a résumé or qualifications statement for the individual within the Contractor's organization, or the outside consultant, who is being proposed as the responsible party for development and maintenance of the CPM schedule. The résumé or qualifications statement shall demonstrate that the proposed responsible party has successfully developed and maintained CPM schedules for at least three construction projects of the same size or greater than this project. The proposed responsible party for the CPM schedule is subject to approval by the Engineer and Owner. If the proposed responsible party for the CPM schedule is not approved by the Engineer and/or Owner, Contractor shall resubmit a more-appropriate candidate for approval.

1.03 SUBMITTALS

- A. Contractor shall submit Interim, Preliminary, Baseline (also known as "as-planned") CPM schedules, revisions, and Monthly Status Reports, all including graphics, reports, and narratives, and an as-built schedule, as specified herein.

PART 2 PRODUCTS

2.01 SOFTWARE

- A. Unless otherwise approved by the Engineer, the computer-based schedule shall be generated using Oracle-Primavera Contractor, or P6 Professional Project Management Software.

2.02 NETWORK REQUIREMENTS

- A. Each schedule submittal shall contain the following identifying information:
  - 1. Project Title, Owner's Contract Number, and the Engineer's Project Number
  - 2. Contractor's name

3. All Contract milestones, as specified
  4. The project calendar(s) (including work week and holidays)
  5. Type of submittal (e.g., Interim, Preliminary, Baseline or Monthly Status Report)
  6. A summary contract milestones
  7. Data date and run (print) date
- B. The network of activities shall show the order and inter-dependence of activities; and, show the sequence in which the work is to be accomplished, as planned by the Contractor. The basic concept of a network analysis diagram shall be followed to show how each activity is dependent on preceding activities (predecessors) and following activities (successors).
- C. Detailed network activities shall include, but are not limited to,:
1. mobilization activities,
  2. procurement activities (submittals, review and approval, fabrication, and delivery),
  3. permitting and regulatory activities,
  4. right-of-way activities (including utility agreements that require others to relocate existing utilities that affect the project),
  5. construction activities (including demolition, rehabilitation, new construction and testing),
  6. maintenance of existing facilities,
  7. test and start-up activities (including testing, start-up, training, performance testing, and commissioning),
  8. contract milestones (fixed and floating),
  9. specified sequences, outages and coordination activities, and
  10. any other activities needed to properly identify the scope of work and contract requirements.
- D. All activities shall be sufficiently identified and/or described so that the scope of work of each activity is clear. All work tasks shall be broken down into appropriate scopes and durations to facilitate monitoring progress. Unless otherwise approved by the Engineer, no activities shall have durations of more than one month; except for off-site activities such as procurement and delivery of materials and equipment - or administrative or management activities that span the project duration that do not reflect earned progress.
- E. Network activities shall be organized (grouped) by phases (or stages), physical areas, buildings, elevations, or other portions of the project.

- F. Separate network activities shall be provided for each significant identifiable function in each trade area in each facility. Separate network activities shall be provided for subcontractors.
- G. The number of network activities, sufficiency of description, and level of breakdown shall be subject to the Engineer's review and approval to confirm conformance with the specified requirements.
- H. The format of the schedule network graphic shall be a time-scaled logic diagram - with a list of network activities and the specified data fields presented adjacent to the graphic display.
- I. The following general requirements also apply to the network diagram.
  - 1. The Critical Path (the sequence of project network activities that add up to the longest overall duration and thereby determines the shortest time possible to complete the project) shall be identified - preferably in 'red'.
  - 2. Unless otherwise approved by the Engineer the Contractor's work schedule shall be based on 'normal work week' as defined in the Contract Documents – (typically 40 hours per week, consisting of five 8-hour days).
  - 3. The graphics shall indicate the calendar(s) on which activity durations are based (i.e., 5-day workweek or 7 calendar day week). When multiple calendars or work weeks are used, the graphics shall clearly indicate which calendars are used where.
  - 4. The project calendar shall include exclusions for holidays observed by the Contractor and those indicated in the Contract Documents.
- J. Each network activity shall have the following information (fields) listed alongside the activity on the graphic display.
  - 1. Activity ID – a manually assigned designation (numeric or alphanumeric). The Contractor should use a logical approach to assigning identification to network activities to facilitate grouping (sorting) of activities.
  - 2. Activity Description
  - 3. Original Duration – including allowances for adverse weather interruptions – normal for the project location. Normal weather shall mean seasonally average weather conditions, as recorded by NOAA.
  - 4. Percent complete – the Contractor's estimated percent complete for each network activity as of the data date for the respective report.
  - 5. Remaining Duration - a calculated value based on Original Duration of each network activity and the estimated percent of completion for each activity.
  - 6. Early Start Date
  - 7. Early Finish Date
  - 8. Late Start Date

9. Latest Finish Date

10. Total Float

## 2.03 SUBMITTAL REQUIREMENTS

A. Each schedule submittal shall include the following elements:

1. Graphics – unless otherwise approved by the Engineer, the network graphics shall be printed on 24-inch by 36-inch sheets; including a list of activities and the specified data fields.
2. Narrative
  - a. The Narrative shall consist of a written report by the Contractor providing an overview of the schedule – specific to each submittal.
  - b. The Narratives for developmental submittals, i.e., Interim and Preliminary, shall describe the Contractor's approach to executing the project Work.
  - c. The Narrative for the Baseline Schedule shall:
    - 1) Explain key activities and assumptions on which the schedule is based;
    - 2) Describe the Critical Path;
    - 3) Discuss key deliveries that might adversely affect the project schedule; and,
    - 4) Explain the Contractor's approach to adverse weather interruptions – normal for the project location. Normal weather shall mean seasonally average weather conditions, as recorded by NOAA.
  - d. The Narratives provided with Monthly Status Reports (updates) shall also identify:
    - 1) Any changes the Contractor has made to the CPM logic (including any added, modified or deleted activities,
    - 2) Any delays that have been encountered, and
    - 3) Remedial actions or recovery steps the Contractor will employ to arrest and/or recover from such delays.

B. Reports

1. The following reports are required to be submitted with Baseline Schedule, when a major revision is made to the schedule, and when requested by the Engineer.
  - a. Activity – a report listing all network activities, sorted by activity ID
  - b. Early Start – a report listing all network activities, sorted by Early Start date
  - c. Total Float – a report listing all network activities, sorted by Total Float (ascending from low to high).
  - d. Predecessor/Successor – a report of all activities, sorted by Activity ID that lists all predecessor and successor activities for each network activity.

## 2.04 ACCEPTABILITY

- A. The Contractor shall submit the CPM schedule submittals, as specified, and resubmit as needed, until they are in compliance with Contract requirements.
- B. The Engineer's review of the Contractor's construction schedule submittals will only be for conformance with the Contract requirements – including but not limited to contract time and work sequences specified in the contract documents. The Engineer's review of the schedule shall not include the Contractor's means and methods of construction or safety. The Engineer's

concurrence, acceptance, or approval of the Contractor's schedule submittals will not relieve the Contractor from responsibility for complying with the Contract Scope, Contract Time or any other contract requirement. Any indication of concurrence, acceptance, or approval of the Contractor's schedule will only indicate a general conformance with the Contract Requirements.

- C. Engineer's review of the Contractor's construction schedule submittals shall not relieve the Contractor from responsibility for any deviations from the Contract Documents unless the Contractor has in writing called Engineer's attention to such deviations at the time of submission and Engineer has given written concurrence to the specific deviations, nor shall any concurrence by the Engineer relieve Contractor from responsibility for errors and omissions in the submittals. Concurrence of the CPM Activity Network by the Engineer is advisory only and shall not relieve the Contractor of responsibility for accomplishing the Work within the Contract completion date(s).
- D. Concurrence, acceptance, or approval of the Contractor's CPM schedule by the Engineer in no way makes the Engineer an insurer of the CPM schedule's success, nor liable for time or cost overruns resulting therefrom.
- E. Failure to include any element of work required for the performance of this Contract will not excuse the Contractor from completing all Work required within the Contract completion date(s), notwithstanding the review of the network by the Engineer.
- F. CPM schedules that contain activities with negative float, or which extend beyond the contract completion date, will not be acceptable.
- G. Except where earlier completions are specified, CPM schedules which show completion of all work prior to the contract completion date may be indicated; however, in no event shall they constitute a basis for claim for delay by the Contractor.

## PART 3 EXECUTION

### 3.01 IMPLEMENTATION SCHEDULE

#### A. Interim Schedule

- 1. Within 15 days following the receipt of the Notice to Proceed, submit an Interim Schedule indicating the planned operations during the first 60 calendar days after Notice to Proceed. In addition, the Contractor shall indicate its general approach for the balance of the project.
- 2. While the Preliminary schedule is being developed, the Contractor shall update the Interim schedule on a monthly basis – indicating actual progress - until the Preliminary schedule is submitted.

#### B. Preliminary Schedule

- 1. Within 45 days following the receipt of Notice to Proceed, submit a proposed Preliminary Schedule to the Engineer. The Preliminary Schedule shall consist of a draft computer-generated CPM-schedule showing the entire Scope of Work. The Preliminary Schedule shall not include any actual progress earned during development of the schedule (i.e., stashed as of the Notice to Proceed).

2. Within 15 days of submittal of the Preliminary Schedule (i.e., within 60 days of receipt of the Notice to Proceed), meet with the Engineer to discuss the review comments.
3. Once the Preliminary Schedule is submitted, Contractor shall discontinue updating the Interim Schedule. Provide monthly updates of the Preliminary Schedule until concurrence, acceptance, or approval of the Baseline Schedule.

C. Baseline (as-planned) Schedule

1. With 10 days of the review meeting on the Preliminary Schedule submittal, the Contractor shall incorporate the Engineer's comments into the network and submit a Baseline Schedule. Resubmit the Baseline Schedule, as required until it is deemed acceptable as stated in paragraph 2.04, above.
2. Upon concurrence, acceptance, or approval of the Contractor's initial Baseline Schedule, stuated as of the Notice to Proceed date, it shall be recognized as the basis against which the Contractor's progress shall be measured.

D. Monthly Status Reports

1. Monthly Status Reports shall include updated graphics and a narrative. In addition, if requested by the Engineer, Contractor shall provide copies of one or more of the standard reports listed in 2.03.B.
2. The Contractor shall provide Monthly Status Reports (schedule updates) commencing approximately 30 days after submission of the Interim Schedule. Unless approved otherwise by the Engineer, the Monthly Status Reports shall be stuated as of the end of each calendar month.
3. While the Preliminary Schedule is being developed, the Contractor shall update the Interim schedule on a monthly basis – indicating actual progress - until the Preliminary Schedule is submitted.
4. While the Baseline Schedule is being developed, the Contractor shall update the Preliminary Schedule on a monthly basis – indicating actual progress - until concurrence, acceptance, or approval of the Baseline Schedule.
5. Once the initial Baseline Schedule is complete, Monthly Status Reports shall be based on the Baseline Schedule.

E. As-Built Schedule

1. Upon achieving Substantial Completion, the Contractor shall submit an as-built schedule, showing all activities from the Notice to Proceed through Substantial Completion. In addition, provide the reports listed in 2.03.B. A Narrative is not required.

3.02 DELIVERABLES

- A. Unless approved otherwise by the Engineer, all schedule submittals shall be printed in color on sheets 11-in by 17-in and may be divided into as many separate sheets as required.

- B. Interim Schedule: Submit three copies to the Engineer.
- C. Preliminary Schedule: Submit three hard (paper) copies to the Engineer.
- D. Baseline Schedule: Submit three hard (paper) copies, one electronic copy (PDF), and a copy of the program files to the Engineer.
- E. Monthly Status Reports: Submit three copies and one electronic copy on CD to the Engineer; and if requested, an electronic copy of the program files for the respective update.
- F. As-Built Schedule: Submit one hard copy; one electronic (PDF), and, if requested, an electronic copy of the program files.

### 3.03 PROGRESS REPORTING

- A. Progress under the approved CPM schedule shall be reported monthly by the Contractor by submitting a Monthly Status Report. Unless otherwise approved by the Engineer, not less than seven days prior to the due date of the Monthly Status Report, the Contractor shall meet with the Engineer's representative to jointly evaluate the status of each network activity. Each activity shall be updated to reflect the actual progress (percent complete) and the actual dates activities were started and completed, as applicable.
- B. The Monthly Status Report shall include an update of the computer-generated network graphics and a Narrative report. The Narrative shall include:
  - 1. A description of the progress during the reporting period in terms of completed activities
  - 2. A summary of the Critical Path
  - 3. An description or explanation of each delays to network activities
  - 4. A description of problem areas, current and anticipated delaying factors and their anticipated effect on the performance of other activities and completion dates
  - 5. An explanation of corrective action taken or proposed.
  - 6. This report, as well as the CPM Status Report, will be discussed at each progress meeting.

### 3.04 RESPONSIBILITY FOR SCHEDULE COMPLIANCE

- A. Whenever it becomes apparent from the current CPM schedule and CPM Status Report that delays to the critical path have resulted and the contract completion date will not be met, or when so directed by the Engineer take some or all of the following actions at no additional cost to the Owner. Submit to the Engineer for approval, a written statement of the steps intended to take to remove or arrest the delay to the critical path in the approved schedule.
  - 1. Increase construction manpower in such quantities and crafts,
  - 2. Increase the number of working hours per shift, shifts per day, working days per week,
  - 3. Increase the amount of construction equipment, and/or

4. Reschedule activities to maximize the concurrence of activities and comply with the revised schedule.

B. If when so requested by the Engineer, failure to submit a written statement of the steps intended to take or should fail to take such steps as approved by the Engineer, the Engineer may direct the Contractor to increase the level of effort in man-power (trades), equipment and work schedule (overtime, weekend and holiday work, etc) to be employed by the Contractor in order to remove or arrest the delay to the critical path in the approved schedule and the Contractor shall promptly provide such level of effort at no additional cost to the Owner.

### 3.05 ADJUSTMENT OF CONTRACT SCHEDULE AND COMPLETION TIME

A. If the Contractor wants or needs to make changes in his/her execution of the construction schedule that would affect the approved CPM schedule, he/she shall notify the Engineer in writing stating what changes are proposed and the reasons for the changes. If the Engineer approves such changes, the Contractor shall revise and submit a revised schedule for approval - without additional cost to the Owner. The CPM schedule shall be adjusted by the Contractor only after prior approval of his/her proposed changes. Adjustments may consist of changing portions of the activity sequence, activity durations, division of approved activities, or other adjustments as may be approved by the Engineer; however, the addition of extraneous, non-working activities and activities that add unapproved restraints to the CPM schedule will not be allowed.

B. Shop drawings that are not approved on the first submittal will require the addition of network activities for the resubmittals.

C. Equipment that does not pass the specified tests will require the addition of network activities for the retesting.

D. The contract completion time will be adjusted only for causes specified in this Contract. In the event the Contractor requests an extension of any contract completion date, he/she shall furnish such justification and supporting evidence as the Engineer may deem necessary to determine whether the Contractor is entitled to an extension of time under the provisions of this Contract. After receipt of such justification and supporting evidence, the Engineer shall perform an assessment or evaluation of the appropriate change in contract time based upon the currently approved CPM schedule and on all data relevant to the extension. Inexcusable delays (attributable to the Contractor) and non-critical delays (delays to activities which, according to the CPM schedule, do not affect any contract completion date shown by the Critical Path) shall not be the basis for a change in contract time. The Engineer will provide a written recommendation to the Owner based on its assessment, with a copy to the Contractor. The Contractor shall not change any fixed contract milestones or required completion dates without the approval of the Owner, evidenced by the execution of a contract change order. However, the Contractor should make note of such requests for changes in contract time in the narrative of monthly schedule status reports.

E. Each request for change in any contract completion date shall be submitted by the Contractor to the Engineer in accordance with the notification requirements stipulated in the form of contract or general conditions. No time extension will be granted for requests that are not submitted in accordance with the Contract requirements.

- F. Total float in the approved CPM network belongs to the project; i.e., either the Owner or Contractor may take advantage of available total float on a first-come, first-served basis. Therefore, without obligation to extend either the overall completion date, or any intermediate completion dates set out in the CPM network, the Owner may initiate changes to the work or delay work that absorb available total float existing at the time of the change or delay. Owner initiated changes or delays that affect the Critical Path on the approved CPM network shall be the sole grounds for extending (or contracting) contract completion dates or fixed milestones.

END OF SECTION

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SECTION 01370  
SCHEDULE OF VALUES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Submit a Schedule of Values (a breakdown of the bid) allocated to the various portions of the work, within 15 days of receipt of the Notice to Proceed.
- B. Upon request of the Engineer, support the values with data which will substantiate their correctness.
- C. The accepted Schedule of Values shall be used only as the basis for the Contractor's Applications for Payment.

1.02 RELATED REQUIREMENTS

- A. Standard General Conditions of the Construction Contract are included in Section 00700.
  - 1. Application for Payment is included in Section 01026.

1.03 FORM AND CONTENT OF SCHEDULE OF VALUES

- A. Type schedule on an 8-1/2-in by 11-in or 8-1/2-in by 14-in white paper furnished by the Owner; Contractor's standard forms and automated printout will be considered for approval by the Engineer upon Contractor's request. Identify schedule with:
  - 1. Title of Project and location.
  - 2. Engineer and Project number.
  - 3. Name and Address of Contractor.
  - 4. Contract designation.
  - 5. 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 values for progress payments during construction.
- C. Identify each line item with the number and title of the respective Section.
- D. For each major line item list sub-values of major products or operations under the 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. For items on which progress payments will be requested for stored materials, break down the value into:
  - a. The cost of the materials, delivered and unloaded, with taxes paid. Paid invoices are required for materials upon request by the Engineer.
  - b. The total installed value.

F. The sum of all values listed in the schedule shall equal the total Contract Sum.

#### 1.04 SUBSCHEDULE OF UNIT MATERIAL VALUES

- A. Submit a sub-schedule of unit costs and quantities for:
  1. Products on which progress payments will be requested for stored products.
- B. The 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. The unit quantity for bulk materials shall include an allowance for normal waste.
- D. The unit values for the materials shall be broken down into:
  1. Cost of the material, delivered and unloaded at the site, with taxes paid.
  2. Copies of invoices for component material shall be included with the payment request in which the material first appears.
  3. Paid invoices shall be provided with the second payment request in which the material appears or no payment shall be allowed and/or may be deleted from the request.
- E. The installed unit value multiplied by the quantity listed shall equal the cost of that item in the Schedule of Values.

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 REQUIREMENTS INCLUDED

- A. Contractor shall be responsible for quality control/quality assurance (QA/QC) testing of materials prior to and during installation as required by the specifications. Payment for QA/QC testing is incidental to the Contractor. Contractor is responsible for all costs relating to submission to Engineer of Certificates of Compliance for all materials provided in this Contract.
- B. If requested by the Owner, the Engineer and/or Owner shall have an inspector on-site to sample and/or perform field conformance testing for drainage material.
- C. If requested by the Owner, field quality assurance testing, including permeabilities and proctors, may be performed by the Owner and/or Engineer at an approved laboratory. Payment for these services shall be in accordance with Section 01020 - Allowances.
- D. HDPE, and GCL Quality Assurance Testing shall be performed by the Contractor at an independent, certified testing laboratory. Payment for these services will be in accordance with Section 01020 – Allowances.

1.02 RELATED REQUIREMENTS

- A. Conditions of the Contract: Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities.
- B. Respective Sections: Certification of products.
- C. Each Section listed: Laboratory tests required and standards for testing.
- D. Allowances are included in Section 01020.
- E. Testing Laboratory inspection, sampling and testing is required for but not limited to the following:
  - 1. Earthwork is included in Section 02200.
  - 2. Granular Fill Materials are included in Section 02230.
  - 3. Geotextile Fabric is included in Section 02272.
  - 4. Geosynthetic Clay Liner is included in Section 02275.
  - 5. HDPE Pipe is included in Section 02623.
  - 6. HDPE Geomembrane is included in Section 02776.

1.03 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

- A. Laboratory is not authorized to:
  - 1. Release, revoke, alter or enlarge on requirements of Contract Documents.
  - 2. Approve or accept any portion of the work.
  - 3. Perform any duties of the Contractor.

1.04 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel, provide access to work, to manufacturer's operations.
- B. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.
- C. Provide to the laboratory the preliminary design mix proposed to be used for concrete and other materials mixes which require control by the testing laboratory.
- D. Materials and equipment used in the performance of work under this Contract are subject to inspection and testing at the point of manufacture or fabrication. Standard requirements for quality and workmanship are indicated in the Contract Documents. The Engineer may require the Contractor to provide statements or certificates from the manufacturers and fabricators that the materials and equipment provided by them are manufactured or fabricated in full accordance with the standard specifications for quality and workmanship indicated in the Contract Documents. All costs of this testing and providing statements and certificates shall be a subsidiary obligation of the Contractor, and no extra charge to the Owner shall be allowed on account of such testing and certification.
- E. Furnish incidental labor and facilities:
  - 1. To provide access to work to be tested.
  - 2. To obtain and handle samples at the project site or at the source of the product to be tested.
  - 3. To facilitate inspections and tests.
  - 4. For storage and curing of test samples.
- F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
  - 1. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to Contractor's negligence.
- G. Employ and pay for the services of the same or a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing required for the Contractor's convenience.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01700  
CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section specifies administrative, verification and procedural requirements for project closeout, including but not limited to:
  - 1. Final cleaning Section 01710.
  - 2. Project Record Documents Section 01720.
  - 3. Warranties and Bonds Section 01740 and applicable Sections in Technical Division 2.
  - 4. Reconciliation of final accounting, final change order, final payment application (Section 01026 and General Conditions) and Contractor's releases.
  - 5. Permit close-outs including Certificate of Occupancy or Certificate of Completion.

1.02 RELATED WORK

- A. Certified Surveyor documentation submittals Section 01050.

1.03 CLOSEOUT PROCEDURES

- A. Provide all deliverables as specified, prior to submitting the final payment application.
- B. Provide submittals to Engineer that are required by governing or other authorities having applicable jurisdiction including but not limited to permit close out information, certificates of occupancy, etc.
- C. Submit Application for Final Payment identifying total adjusted Contract Sum, previous payments and sum remaining due, following submittal and approval of Record Documents and Record Drawings.
- D. Submit Contractor's Final Release and Release of Liens with final payment application.

1.04 FINAL CLEANING

- A. Contractor to complete final cleaning prior to submittal of the final application for payment.
- B. Contractor to comply with requirements as specified in Section 01710.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01710  
CLEANING

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. CONTRACTOR shall execute cleaning, during progress of the Work, and at completion of the Work.

1.02 DISPOSAL REQUIREMENTS

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 DURING CONSTRUCTION

- A. Execute daily cleaning to keep the Work, the site and adjacent properties free from accumulations of waste materials, rubbish and windblown debris, resulting from construction operations.
- B. Provide onsite containers for the collection of waste materials, debris and rubbish. All waste materials including containers, food debris and other miscellaneous materials must be disposed of daily in onsite containers.
- C. Waste materials, debris and rubbish from the construction site shall be separated and stored on site in an approved area.

3.02 FINAL CLEANING

- A. Employ skilled workmen for final cleaning.
- B. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.
- C. Prior to substantial completion, or OWNER acceptance, CONTRACTOR shall conduct an inspection of sight-exposed interior and exterior surfaces, and all work areas, to verify that the entire Work is clean.

END OF SECTION

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SECTION 01720  
PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 SCOPE

- A. The Contractor shall keep and maintain, at the job site, a copy of contract documents, marked up to indicate all changes made during the course of a project, as specified herein.

1.02 RELATED REQUIREMENTS

- A. Contract close-out submittals are included in Section 01700.
- B. Warranties and bonds are included in Section 01740.
- C. As-built construction schedules are included in Section 01310.
- D. As-built surveys are included in Section 01050.

1.03 REQUIREMENTS INCLUDED

- A. Contractor shall maintain a record copy of the following documents, marked up to indicate all changes made during the course of a project:
  - 1. Contract Drawings
  - 2. Specifications
- B. Contractor shall assemble copies of the following documents for turnover to the Engineer at the end of the project, as specified.
  - 1. Field Orders, Change Orders, Design Modifications, and RFIs
  - 2. Field Test records
  - 3. Permits and permit close-outs (final approvals)
  - 4. Certificate of Occupancy or Certificate of Completion, as applicable
  - 5. Laboratory test reports (e.g., bacteriological and primary & secondary water quality)
  - 6. Certificates of Compliance for materials and equipment
- C. RECORD DRAWINGS
  - 1. The Contractor shall annotate (mark-up) the Contract Drawings to indicate all project conditions, locations, configurations, and any other changes or deviations that vary from the original Contract Drawings. This requirement includes, but is not limited to, buried or concealed construction, and utility features that are revealed during the course of construction. Special attention shall be given to recording the locations (horizontal and vertical) and material of all buried utilities that are encountered during construction –

whether or not they were indicated on the Contract Drawings. The record information added to the drawings may be supplemented by detailed sketches, if necessary, clearly indicating, the WORK, as constructed.

2. These annotated Contract Drawings constitute The Contractor's Record Drawings and are actual representations of as-built conditions, including all revisions made necessary by change orders, design modifications, requests for information and field orders.
3. Record drawings shall be accessible to the Owner and Engineer at all times during the construction period.

## PART 2 – PRODUCTS (NOT USED)

## PART 3 – EXECUTION

### 3.01 MAINTENANCE OF RECORD 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 the record documents.
  2. Provide locked cabinet(s) or secure storage space for storage of samples.
- B. File documents and samples in accordance with Construction Specifications Institute (CSI) format.
- 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 sample available for inspection by the Engineer or Owner at all times.

### 3.02 MARKING METHOD

- A. Use the color Red (indelible ink) to record information on the Drawings and Specifications,
- B. Label each document "PROJECT RECORD" in neat large printed letters.
- C. Unless otherwise specified elsewhere, notations shall be affixed to hardcopies of documents.
- D. Record information contemporaneously with construction progress.
- E. Legibly mark drawings with as-built information:
  1. Elevations and dimensions of structures and structural elements.
  2. All underground utilities (piping and electrical), structures, and appurtenances
    - a. Changes to existing structure, piping and appurtenance locations.
    - b. Record horizontal and vertical locations of underground structures, piping, utilities and appurtenances, referenced to permanent surface improvements.
    - c. Record actual installed pipe material, class, size, joint type, etc

### 3.03 RECORD INFORMATION COMPILATION

- A. Do not conceal any work until the required information is acquired.
- B. Items to be recorded include, but are not limited to:
  - 1. Location of internal utilities and appurtenances concealed in the construction – referenced to visible and accessible features.
  - 2. Field changes of dimensions and/or details
    - a. Interior equipment and piping relocations.
    - b. Architectural and structural changes, including relocation of doors, windows, etc.
    - c. Architectural schedule changes.
- C. Changes made by Field Order, Change Order, design modification, and RFI.
- D. Details not indicated on the original Contract Drawings.

### 3.04 SUBMITTAL

- A. If specified under the section for progress payments, monthly applications for payment will be contingent upon up-to-date Record Drawings. If requested by the Engineer or Owner, Contractor shall provide a copy of the Record Drawings, or present them for review prior to processing monthly applications for payment.
- B. Upon substantial completion of the WORK and prior to final acceptance, the Contractor shall finalize and deliver a complete set of Record Drawings to the ENGINEER conforming to the construction records of the Contractor. The set of drawings shall consist of corrected and annotated drawings showing the recorded location(s) of the WORK. Unless specified otherwise elsewhere, Record Drawings shall be in the form of a set of prints with annotations carefully and neatly superimposed on the drawings in red.
- C. Upon substantial completion of the WORK and prior to final acceptance, the Contractor shall finalize and deliver a complete set of Record Documents to the ENGINEER conforming to the construction records of the Contractor. The set of documents shall consist of corrected and annotated documents showing the as-installed equipment and all other as-built conditions not indicated on the Record Drawings.
- D. The information submitted by the Contractor into the Record Drawings and Record Documents will be assumed to be correct, and the Contractor shall be responsible for the accuracy of such information, and shall bear the costs resulting from the correction of incorrect data.
- E. Delivery of Record Drawings and Record Documents to the ENGINEER will be a prerequisite to Final payment.
- F. The Contractor shall maintain a copy of all books, records, and documents pertinent to the performance under this Agreement for a period of five years following completion of the contract.

END OF SECTION

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SECTION 01730  
OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section includes procedural requirements for compiling and submitting operation and maintenance data required to complete the project.

1.02 RELATED WORK

- A. Submittals are included in Section 01300.
- B. Contract closeout is included in Section 01700.
- C. Warranties and Bonds are included in Section 01740.

1.03 OPERATING MANUALS

- A. Provide specific operation and maintenance instructions for all electrical, mechanical, and instrumentation & controls equipment furnished under various technical specifications Sections.
- B. Separate manuals shall be provided for each type of equipment, or each Section number. Each manual shall contain the following:

1. Format and Materials

a. Binders:

- 1) Commercial quality three ring binders with durable and cleanable plastic covers
- 2) Maximum ring width capacity: 3 inches
- 3) When multiple binders are used, correlate the data into related consistent groupings/volumes.

b. Identification: Identify each volume on the cover and spine with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". Include the following:

- 1) Title of Project.
- 2) Identify the general subject matter covered in the manual.
- 3) Identify structure(s) and/or location(s), of the equipment provided.
- 4) Specification Section number.

c. 20 lb loose leaf paper, with hole reinforcement

d. Page size: 8-1/2 inch by 11 inch

e. Provide heavy-duty fly leaves (section separators), matching the table of contents, for each separate product, each piece of operating equipment, and organizational sections of the manual.

f. Provide reinforced punched binder tab; bind in with text.

g. Reduce larger drawings and fold to the size of text pages - but not larger than 11 inches x 17 inches - or provide a suitable clear plastic pocket (with drawing identification) for such folded drawings/diagrams.

2. Contents:

- a. A table of contents/Index, divided into section reflective of the major components provided.

- b. Specific description of each system and components
  - c. Name, address, telephone number(s) and e-mail address(es) of vendor(s) and local service representative(s)
  - d. Specific on-site operating instructions (including starting and stopping procedures)
  - e. Safety considerations
  - f. Project specific operational procedures and recommended log sheet(s).
  - g. Project specific maintenance procedures
  - h. Manufacturer's operating and maintenance instructions – specific to the project
  - i. Copy of each wiring diagram
  - j. Copy of approved shop drawing(s) and Contractor's coordination/layout drawing(s)
  - k. List of spare parts and recommended quantities
  - l. Product Data: Mark each sheet to clearly identify specific products and component parts and data applicable to installation. Delete inapplicable information.
  - m. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams
  - n. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified.
  - o. Warranties and Bonds, as specified in the General Conditions
3. Transmittals
- a. Prepare separate transmittal sheets for each manual. Each transmittal sheet shall include at least the following: the Contractor's name and address, Owner's name, project name, project number, submittal number, description of submittal and number of copies submitted.
  - b. Submittals shall be transmitted or delivered directly to the office of the Engineer, as indicated in the Contact Documents or as otherwise directed by the Engineer.
  - c. Provide copies of transmittals (only, i.e., without copies of the respective submittal) directly to the Resident Project Representative.
- C. Manuals for Equipment and Systems - In addition to the requirements listed above, for each System, provide the following:
1. Overview of system and description of unit or system and component parts. Identify function, normal operating characteristics and limiting conditions. Include legible performance curves, with engineering data and tests and complete nomenclature and commercial number of replaceable parts.
  2. Panelboard circuit directories including electrical service characteristics, controls and communications and color-coded wiring diagrams as installed.
  3. Operating procedures: include start-up, break-in and routine normal operating instructions and sequences; regulation, control, stopping, shut-down and emergency instructions; and summer, winter and any special operating instructions.
  4. Maintenance Requirements
    - a. Procedures and guides for trouble-shooting; disassembly, repair, and reassembly instructions
    - b. Alignment, adjusting, balancing and checking instructions
    - c. Servicing and lubrication schedule and list of recommended lubricants
    - d. Manufacturer's printed operation and maintenance instructions

- e. Sequence of operation by instrumentation and controls manufacturer
  - f. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance
5. Control diagrams by controls manufacturer as installed (as-built)
  6. Contractor's coordination drawings, with color coded piping diagrams, as installed (as-built)
  7. Charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams. Include equipment and instrument tag numbers on diagrams.
  8. List of original manufacturer's spare parts and recommended quantities to be maintained in storage
  9. Test and balancing reports, as required
  10. Additional Requirements as specified in individual product specification
  11. Design data for systems engineered by the Contractor or its Suppliers
- D. Electronic Transmission of O&M Manuals
1. Unless otherwise approved by the Engineer, O&M manuals may not be transmitted by electronic means other than by CD-ROM or USB flash drive. Electronic O&M manuals shall meet the following conditions:
    - a. The above-specified transmittal form is included.
    - b. All other requirements specified above have been met, including, but not limited to, coordination by the Contractor, review and approval by the Contractor.
    - c. The submittal contains no pages or sheets large than 11 x 17 inches.
    - d. With the exception of the transmittal sheet, the entire submittal is included in a single file.
    - e. Files are Portable Document Format (PDF) – with the printing function enabled.
    - f. All scanned manufacturer's O&M manuals must be quality checked after scanning to ensure the page are not crooked and all information is legible.
  2. When electronic copies are provided, transmit two hard copy (paper) originals to the Engineer with an electronic copy on CD-ROM.
  3. The electronic copy of the O&M manual must be identical in organization, format and content to the hard copies of the manual.
  4. The electronic O&M Manual must be bookmarked identically to the paper manual table of contents to allow quick access to information. Electronic submittals that require extensive scrolling will not be accepted. The document must be indexed and searchable.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 SUBMITTAL SCHEDULE

- A. Operation and maintenance manuals shall be delivered directly to the office of the Engineer, as follows:
  - 1. Provide preliminary copies of each manual to the office of the Engineer, no later than 30 days following approval of the respective shop drawings.
  - 2. Provide final copies of each completed manual prior to testing.
  - 3. Provide a letter that grants the Engineer and Owner to the limited right to use and reproduce each manual (in its entirety or any portion thereof) from the respective equipment manufacturer(s). Such limited right shall allow the Engineer and Owner to use each manual or any portion thereof for:
    - a. The potential assembly of a comprehensive facility operation and maintenance manual for the sole benefit of the Owner; and,
    - b. supplemental training of the Owner's personnel and operators, over and above the required vendor's training, regarding operation of the facility as a system.
- B. The ENGINEER will review Operation and Maintenance manuals submittals for operating equipment for conformance with the requirements of the applicable specification Section. The review will generally be based on the O&M Manual Review Checklist appended to this Section.
- C. If during test and start-up of equipment, any changes were made to the equipment, provide two hard copies of as-built drawings or any other amendments for insertion, by the contractor, in the previously transmitted final manuals. In addition, provide one revised electronic version including the as-built drawings and any other amendments. The manuals shall be completed, including updates, if any, within 30 days of start-up and testing of the facility.

3.02 VENDOR TRAINING/INSTRUCTIONS (TO OWNER'S PERSONNEL)

- A. Before final initiation of operation, Contractor's vendors shall train/instruct Owner's designated personnel in the operation, adjustment, and maintenance of products, equipment and systems at times convenient to the Owner.
- B. Unless specified otherwise under the respective equipment specification section, vendor training/instruction shall consist of eight hours of training for each type of equipment. Such training/instruction shall be scheduled and held at times to accommodate the work schedules of Owner's personnel, including splitting the required training/instruction time into separate sessions and/or presented at reasonable times other than the Contractor's "normal working hours" or the Owner's normal day shift.
- C. Use operation and maintenance manuals as basis for instruction. Train/instruct the Owner's personnel, in detail, based on the contents of manual explaining all aspects of operation and maintenance of the equipment. If the respective equipment is inter-related to the operation of other equipment, all interlock, constraints, and permissives shall be explained.

- D. At least two weeks prior to the schedule for vendor training, a detailed lesson plan, representative of the material to be covered during instruction, shall be submitted to the Engineer for approval. Lesson plans shall consist of in-depth outlines of the training material, including a table of contents, resume of the instructor, materials to be covered, start-up procedures, maintenance requirements, safety considerations, and shut-down procedures.
- E. Prepare and insert additional data in each Operation and Maintenance Manual when the need for such data becomes apparent during training/instruction.
- F. Vendor's training/instruction will be considered acceptable based on the completed Owner's Acknowledgement of Manufacturer's Instruction as indicated on the Equipment Manufacturer's Certification of Installation, Testing, and Instruction appended to this Section.

### 3.03 VIDEOGRAPHY OF VENDOR TRAINING/INSTRUCTION

- A. Audio/video (A/V) record (in DVD format) training/instructions as they are being provided to the Owner's personnel. Such recording shall include the entire training/instruction session(s) as well as all questions and answers. A/V recording shall be performed by a professional organization experienced in the production of such recordings. Self-recording by the Contractor may be considered, provided that Contractor can demonstrate, in advance, proficient examples of such recordings.
- B. To avoid audio problems, training/instruction shall be held in a location sufficiently removed from construction activity, insulated from the noise of construction activity, or during a time when construction activity is not occurring in the vicinity.
- C. The audio portion of the A/V recording should be done with a microphone (wired or wireless) attached to the trainer/instructor to maximize the quality of speech.
- D. Each A/V recording should have "chapters" to segregate the distinct portions of the training/instruction, or have visual cues at the start of a change in subject.
- E. Two copies of the A/V recordings shall be submitted to the Engineer on DVD disk(s). The DVDs will become the property of the Owner.

END OF SECTION

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## O&M Manual Review Checklist

Submittal No.: \_\_\_\_\_  
 Project No.: \_\_\_\_\_  
 Manufacturer: \_\_\_\_\_  
 Equipment Submitted: \_\_\_\_\_  
 Specification Section: \_\_\_\_\_  
 Date of Submittal: \_\_\_\_\_

<b>General Data</b>		
1.	Are the area representative's name, address, e-mail address and telephone number included?	
2.	Is the nameplate data for each component included?	
3.	Are all associated components related to the specific equipment included?	
4.	Is non-pertinent data crossed out or deleted?	
5.	Are drawings neatly folded and/or inserted into packets?	
6.	Are all pages properly aligned and scanned legibly?	
7.	Is the .PDF document bookmarked according to the table of contents?	
<b>Operations and Maintenance Data</b>		
8.	Is an overview description of the equipment and/or process included?	
9.	Does the description include the practical theory of operation?	
10.	Does each equipment component include specific details (design characteristics, operating parameters, control descriptions, and selector switch positions and functions)?	
11.	Are alarm and shutdown conditions specific to the equipment provided on this project clearly identified? Does it describe possible causes and recommended remedies?	
12.	Are step procedures for starting, stopping, and troubleshooting specific to the equipment provided included?	
13.	Is a list of operational parameters to monitor and record specific to the equipment provided included?	
14.	Is a proposed operating log sheet specific to the equipment provided included?	
15.	Is a spare parts inventory list included for each component?	
16.	Is a lubrication schedule for each component specific to the equipment provided included - or does it clearly state "No Lubrication Required"?	
17.	Is a maintenance schedule for each component specific to the equipment provided included?	
18..	Is a copy of the warranty information included?	

**Review Comments**

Is the submittal fully approved (yes/no)? \_\_\_\_\_

If not, the following points of rejection must be addressed and require resubmittal by the Contractor:

Item No.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
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13. \_\_\_\_\_
14. \_\_\_\_\_
15. \_\_\_\_\_

Reviewed By: \_\_\_\_\_ Date: \_\_\_\_\_

**Legend**

- 1 = OK
- 2 = Not Adequate
- 3 = Not Included

Note: This submittal has been reviewed for compliance with the Contract Documents.

SECTION 01740  
WARRANTIES AND BONDS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.

1.02 RELATED WORK

- A. Refer to Conditions of Contract for the general requirements relating to warranties and bonds.
- B. General closeout requirements are included in Section 01700 Project Closeout.
- C. Specific requirements for warranties for the work and products and installations that are specified to be warranted are included in the individual Sections.

1.03 SUBMITTALS

- A. Submit written warranties to the Owner prior to the date fixed by the Engineer for Substantial Completion. If the Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the work, or a designated portion of the work, submit written warranties upon request of the Owner.
- B. When a designated portion of the work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Owner within 15 days of completion of that designated portion of the Work.
- C. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner for approval prior to final execution.
- D. Refer to individual Sections for specific content requirements, and particular requirements for submittal of special warranties.
- E. At Final Completion compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- F. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents and sized to receive 8-1/2-in by 11-in paper.

- G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the Section in which specified and the name of the product or work item.
- H. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address and telephone number of the installer, supplier and manufacturer.
- I. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS", the project title or name and the name, address and telephone number of the equipment supplier.

#### 1.04 WARRANTY REQUIREMENT

- A. Related Damages and Losses: When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.
- B. Reinstatement of Warranty: When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that work covered by a warranty has failed, replace or rebuild the work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective work regardless of whether the Owner has benefited from use of the work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
- E. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the contract Documents.
- F. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the work that incorporates the products, nor does it relieve suppliers, manufacturers and subcontractors required to countersign special warranties with the Contractor.

#### 1.05 MANUFACTURERS CERTIFICATIONS

- A. Where required, the Contractor shall supply evidence, satisfactory to the Engineer, that the Contractor can obtain manufacturers' certifications as to the Contractor's installation of equipment.

1.06 DEFINITIONS

- A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 02200  
EARTHWORK

PART 1 GENERAL

1.01 STATUTORY REQUIREMENTS

- A. All excavation, trenching, sheeting, bracing, etc. shall comply with the requirements of OSHA excavation safety standards (29 CFR Part 1926.650 Subpart P). Where conflicts between OSHA, State and local regulations exist, the most stringent requirements shall apply.
- B. The CONTRACTOR shall notify New Mexico One Call (811 or 1-800-321-2537) at least two business days in advance of any excavation or any work which would otherwise interfere with above-ground or underground utilities. The locations of existing underground utilities obtained from the OWNER and respective utility companies are shown without express or implied representation, assurance, or guarantee that they are complete or correct or that they represent a true picture of underground piping to be encountered.

1.02 SCOPE OF WORK

- A. Furnish all labor, equipment, supervision, and incidentals necessary and perform all earthwork, which includes clearing and stripping, procurement of fill material (on-site and imported), excavation, placing and compacting fill and backfill, transportation and storage of excess earthwork materials; disposal of unsuitable soils, waste and surplus materials; and all supplemental work necessary to complete grading of the developed areas to conform with the lines, grades, and slopes shown on the Drawings and specified herein.
- B. The work shall include, but not necessarily be limited to: excavation; all backfilling and fill for landfill cell subbase; embankment and grading; disposal of waste and surplus materials; and all related work such as sheeting, bracing and dewatering.
- C. Provide the services of a licensed professional Engineer, registered in the State of New Mexico, to prepare temporary excavation support system, and dewatering system designs and submittals.
- D. Furnish and install temporary excavation support systems, including sheeting, shoring and bracing, to insure the safety of personnel and protect adjacent structures, piping, etc., in accordance with Federal, State and local laws, regulations and requirements.
- E. The CONTRACTOR shall examine the site and review the available geotechnical report prior to submitting their proposal, taking into consideration all conditions that may affect work. The OWNER and ENGINEER do not assume responsibility for variations of subsurface conditions at locations other than places shown and at the time the investigations was made.
- F. No extra work shall be initiated without notification to the ENGINEER and OWNER in writing and the written approval of the OWNER in response.
- G. Protection of existing structures and utilities to remain.
- H. Rock and clay, if any, excavated under this Section shall be stockpiled at an approved area on site by the CONTRACTOR and shall belong to the OWNER, or be used for construction as directed by ENGINEER.

- I. Refer to Section 01110 for Environmental Protection for precautions to be observed and conducted by CONTRACTOR.

#### 1.03 RELATED REQUIREMENTS

- A. The Contract Documents include, but are not limited to, the following related sections:
  1. Submittals are included in Section 01300.
  2. Testing and Testing Laboratory Services are included in Section 01410.
  3. Granular Fill Materials is included in Section 02230.
  4. Geosynthetic Clay Liner is included in Section 02275.
  5. High Density Polyethylene (HDPE) Geomembrane Liner is included in Section 02776.

#### 1.04 SUBMITTALS

- A. Submit, in accordance with Section 01300, and within 30 calendar days following the Effective Date of the Agreement and as elsewhere specified in this Section, a Construction Work Plan that includes the proposed methods of construction, including, earthwork operations, excavation limits, fill material moisture conditioning and handling, compaction equipment, and material sources for the various portions of the work.
- B. Site Characterization of all Off-Site Borrow Sources: The following information shall be submitted to the ENGINEER for review at least three weeks prior to use as an off-site borrow source. No soil or crushed stone shall be brought to the site without approval by the ENGINEER.
  1. Site Data: Information regarding the off-site source and material, as follows:
    - a. Location of site; and
    - b. Present and past usage of the source site and material.
- C. It is not anticipated that chemical testing would be required for customarily utilized commercial borrow sources. However, if the site characterization data or materials are suspected of being contaminated, chemical testing will be required as directed by the ENGINEER. The chemical testing shall be performed by the CONTRACTOR at no additional cost to the OWNER.
- D. Furnish the ENGINEER a representative sample weighing approximately 50 pounds of each fill material, filter sand and crushed stone contained in sealed 5-gallon containers, at least 30 calendar days prior to the date of anticipated use of such material for approval.
- E. Submit laboratory test results for all fill materials at least 72 hours prior to importing or placing any fill. Each submittal shall include the name of the material and the intended use and location of placement.
- F. Submit copies of field daily reports by the soil technician at the end of each work day while earthwork and grading operations are underway. Daily field reports shall report the test results of each field density test, the specified compaction density to be achieved, the actual density achieved, and shall include a drawing showing the designation and location of each test performed.
- G. Upon completion of earthwork and grading operations, submit an as-graded map showing the density test numbers and locations, a table of all density test results and depths, and a certification of compliance by the geotechnical ENGINEER in charge.

## 1.05 REFERENCE STANDARDS

### A. American Society for Testing and Materials (ASTM)

1. ASTM D422 - Standard Test Method for Particle-Size Analysis of Soils
2. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>))
3. ASTM D2487 - Standard Practice Test Method for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
4. ASTM D2488 - Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)
5. ASTM D2974 - Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils (Method C)
6. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
7. ASTM D6938 – Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

- B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

## 1.06 DEFINITIONS

- A. Percent Compaction is the required in-place dry density of the material, expressed as a percentage of the maximum dry density of the same material, as determined in the laboratory by ASTM Test Method D698 (Standard Proctor).
- B. Optimum Moisture Content is the moisture content (percent by dry weight) corresponding to the maximum dry density of the same material as determined by ASTM Test Method D698.
- C. Moisture-Sensitive Soil is on-site soil containing more than five percent fines (silt- or clay-sized particles) based on the fraction passing the 3/4-inch sieve.
- D. In-the-Dry is defined as an excavation subgrade where the groundwater level has been lowered to at least two feet below the lowest level of the excavation, is stable with no ponded water, mud, or muck and shall be able to support construction equipment without rutting or disturbance and shall be suitable for the placement and compaction of fill material, pipe or concrete foundations.
- E. Structures are all buildings, wet wells, manholes and below grade vaults, pipelines and utilities, pavements, and slabs-on-grade both above and below ground.
- F. Unsuitable Soil includes existing fill materials, organic soils, weak native soils, or clays with a plasticity index of greater than 10.

- G. Objectionable Material includes topsoil, organic matter, contaminated soil, construction debris, perishable materials, snow, ice, frozen earth, and rocks or lumps of cemented soils over 6 inches in maximum dimension.
- H. Over excavation is removal of Unsuitable Soil or Objectionable Material at or below the normal grade of the excavation or subgrade as indicated on the Drawings.
- I. Subgrade is the required surface of subsoil, borrow fill or compacted fill. This surface is immediately beneath site improvements, especially dimensioned fill, paving, or other surfacing material.
- J. Finished grade shall mean the required final grade elevation indicated on the Drawings. Spot elevations shall be precedent over proposed contours.
- K. Coverage shall mean the pass of compaction equipment over the complete surface area of exposed lift or subgrade to receive compaction.

#### 1.07 PROTECTION

##### A. Sheeting and Bracing

1. Furnish, put in place, and maintain such sheeting and bracing as may be required: by Federal, State and local safety requirements 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 from undermining or other damage. If the ENGINEER is of the opinion that at any points sufficient or proper supports have not been provided, they may order that additional supports be put in, and compliance with such order shall not relieve or release the CONTRACTOR from the 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.
2. Construct the sheeting outside the neat lines of the foundation, unless indicated otherwise, to the extent deemed desirable for the method of operation. Sheeting shall be plumb and securely braced and tied in position. Sheeting and bracing shall be adequate to withstand all pressures to which the structure or trench will be subjected. Any movement or bulging which may occur shall be corrected 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 Engineer, registered in the State of New Mexico, 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. CONTRACTOR shall submit P.E. Certification Form contained in Section 01300 to show compliance with this requirement.
4. Leave in place to be embedded in the backfill all sheeting and bracing not shown on the Drawings but which the ENGINEER may direct 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 ENGINEER may require that timber used for sheeting and bracing be cut off at any specified elevation. Payment for sheeting to be left

in place shall be included in the Base Bid. All timber sheeting to be left in place adjacent to any structures shall be completely pressure-treated.

5. 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 sand by ramming with tools especially adapted to that purpose, or otherwise as may be directed.
6. The right of the ENGINEER to require that sheeting and bracing be left in place shall not be construed as creating any obligation on his/her part to issue such orders and his/her failure to exercise his/her 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.
7. No sheeting is to be withdrawn if driven below mid-diameter of any pipe and under no circumstances shall any sheeting be cut off at a level lower than one-ft above the top of any pipe.

#### 1.08 QUALITY ASSURANCE

- A. Regulations: Perform all work in accordance with current applicable regulations and codes of all Federal, State, and local agencies. The Quality Control and Quality Assurance consists of laboratory conformance testing of samples supplied from each granular fill source and quality control during installation.
- B. The purpose of quality assurance testing is to assure that the supplied granular fill materials from each source conform to the Specifications. Field quality control procedures assure that the materials have been installed in accordance with the Specifications.
- C. At all structures, prior to the placement of bedding material, liner materials, concrete work mats, structural fill or structural concrete, coordinate with the Soils Testing Laboratory to verify the suitability of the existing subgrade soil.
- D. Prior to and during the placement of backfill and fill, coordinate with the Soils Testing Laboratory to perform in-place soil density tests to verify that the backfill/fill material has been placed and compacted in accordance with the requirements specified herein. At least 48 hours' notice shall be provided prior to placement of backfill and fill.
- E. Subgrades shall not be covered with fill nor fill placed without the observation or testing, and approval by ENGINEER. Earthwork activities performed without properly scheduled inspection are subject to removal and replacement or additional testing as directed by the ENGINEER at no expense to the OWNER.
- F. In open areas (no roads, berms or pipe trenches), particle size analyses shall be conducted on samples taken from each 5,000 cubic yards of installed material, and/or when a change in the fill is observed, to determine the particle size distribution. Tests shall be conducted in accordance with ASTM D422.

- G. Field density and moisture content shall be determined on each 20,000 square feet of each lift of installed material. The use of nuclear density testing (ASTM D6938) shall be correlated with the Standard Proctor. At least one Standard Proctor (ASTM D698) laboratory compaction test shall be performed per 15,000 cubic yards of uncompacted material and/or when a change in the fill is observed. Note that extreme care must be taken when measuring above a geomembrane system to avoid damage.
- H. For road bases, berms, and pipe trenches; field density and moisture content shall be determined for at least every 250 linear feet of each lift of compacted backfill.
- I. At a minimum, all materials listed under Part 2 of this section that are from onsite or offsite sources shall be tested, as required, for each 5,000 cubic yards of material delivered (one test minimum) to verify conformance with the specifications.

#### 1.09 QUALIFICATIONS

- A. The work shall be performed by a qualified earthwork crew that has experience in processing and installation of granular fill materials below AND on top of geosynthetic materials. The earthwork crew shall demonstrate proven experience by providing a minimum of five similar completed projects with the following information:
  - 1. Type and thickness of installed material and permeability;
  - 2. Name and purpose of facility, its location and date of installation; and.
  - 3. Name of OWNER and design ENGINEER. Name and telephone number of contact at the facility who can discuss the project.
- B. The CONTRACTOR's design engineer shall be licensed in the State of New Mexico and have a minimum of five years of professional experience in earthwork design and construction, and shall have completed not less than five successful projects of equal type, size, and complexity to that required for the work.
- C. The CONTRACTOR's surveyor shall be a Professional Land Surveyor, registered in the State of New Mexico and shall have at least five years' experience in construction survey of the type required under this Contract and acceptable to the ENGINEER and OWNER.

#### 1.10 SOIL TESTING

- A. Testing and testing laboratory services are covered in Section 01410.
- B. Prior to the general placement of the fill and during such placement, the ENGINEER may select areas within the limits of the fill for testing the degree of compaction obtained as stated in this specification. The CONTRACTOR shall cooperate fully in obtaining the information desired.

### PART 2 PRODUCTS

#### 2.01 MATERIALS

- A. General
  - 1. Materials for use as fill shall be as described below.

2. The supplier shall show evidence of an adequate supply of material which is relatively homogenous within a designated mine area which is properly permitted by the appropriate Federal, State and local agencies.
3. Disposal of unsuitable material is specified in this section, Paragraph 3.10.

B. Soil Fill

1. Common Fill: Common fill for rough grading of landfill cells, embankments and other general fill requirements specified other than those listed below shall consist of mineral soils substantially free of clay, organic material, loam, wood, trash, and other objectionable material that may be compressible, degradable or which cannot be compacted properly. Common fill shall not contain stones or chunks larger than 6-inches in any dimension, broken concrete, masonry, rubble, or similar materials. It shall not contain fines (passing the No. 200 sieve) greater than 20%. It shall have physical properties such that it can be readily spread and compacted during filling. In general, common fill shall consist of sand, sand with gravel, sand with silt, sand with clay, silty sand, or clayey sand, classified as SP, SW, SP-SM, SP-SC, SW-SM, SW-SC, SM, or SC in accordance with the United Soil Classification System, ASTM D2487. Soils containing more than five percent by weight of organic materials (ASTM D2974), a Plasticity Index (ASTM D4318) greater than 10%, or a Liquid Limit (ASTM D4318) greater than 40% shall not be used. Common fill shall have a particle size gradation (ASTM D422) within the following limits:

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
6-in	100
No. 4	70-100
No. 40	5-100
No. 200	0-20

2. Processed Sand Layer (Landfill Subgrade)
  - a. Processed sand (Landfill subgrade) is a granular material and is specified in Section 02230.
  - b. Processed sand (Landfill subgrade) as specified in Section 02230 is used under the liner during the construction of a landfill cell.
3. Protective Sand Layer (Drainage Layer)
  - a. Protective sand (drainage layer) is a granular material and is specified in Section 02230.
  - b. Protective sand (drainage layer) as specified in 02230 is used over the liner during the construction of the leachate collection system of a landfill cell.

PART 3 EXECUTION

3.01 EXCAVATION

- A. Excavation shall include material of every description and of whatever substance encountered. Pavement shall be cut with a saw, wheel or pneumatic chisel along straight lines before excavating.

- B. In general, the on-site soils can be excavated using standard earthmoving equipment. In no case shall the earth be ploughed, scraped, or dug with machinery so near to the finished subgrade as to result in excavation of, or disturbance of material below grade.
- C. Excavations shall be made to the grade indicated on the Drawings and in widths sufficient for laying pipe, construction of the structure, bracing, for dewatering and drainage facilities, and for placement and compaction of backfill.
- D. Excavation shall be performed in-the-dry and shall be accomplished by methods which preserve the natural undisturbed condition of the subgrade soils.
- E. Moisture Sensitive Soils are particularly susceptible to disturbance due to construction operations. When excavation is to end in such soils, use a smooth-edge bucket to excavate the last one foot of depth.
- F. If the bottom of any excavation is taken out below the limits shown on the Drawings, specified, or directed by the ENGINEER, it shall be refilled at no additional cost to the OWNER with compacted structural fill or other material satisfactory to the ENGINEER.
- G. When excavation has reached prescribed depths, the ENGINEER shall be notified and will observe the conditions. If materials and conditions are not satisfactory to the ENGINEER, the ENGINEER will issue instructions as to the procedures. The ENGINEER will be the sole judge as to whether the work has been accomplished satisfactorily.
- H. Subgrade soils that have become soft, loose, "quick", or otherwise unsatisfactory as a result of inadequate excavation, dewatering or other construction methods in the opinion of the ENGINEER shall be removed and replaced with structural fill as acceptable to the ENGINEER at the CONTRACTOR's expense.
- I. Exposed subgrades shall be proof rolled with at least two overlapping coverages of a vibratory drum roller with a minimum of a ten-ton static drum weight. Proofrolling in confined areas may be accomplished with hand operated vibratory equipment approved by the ENGINEER. Proofrolling shall be conducted in the presence of the ENGINEER. Subgrade soils which become soft, loose, "quick", or otherwise unsatisfactory for support of structures as a result of inadequate excavation, dewatering, proofrolling, or other construction methods shall be removed and replaced by structural fill as required by the ENGINEER at the CONTRACTOR's expense. The ENGINEER shall waive this requirement if, in his/her opinion, the subgrade will be rendered unsuitable by such proofrolling.
- J. Over-excavation beyond the limits and depths required by the Contract Documents shall be replaced by structural fill or other approved material subject to the prior approval of the ENGINEER at no additional cost to the OWNER.
- K. Over-excavation shall be performed at the request of the ENGINEER to remove Unsuitable Soil, Objectionable Material, or other materials as determined by the ENGINEER to such depth and width as the ENGINEER may direct and shall be replaced with suitable material as directed by the ENGINEER.
- L. During wet or freezing weather, or in areas where the exposed subgrade consists of Moisture-Sensitive Soils, the CONTRACTOR shall take measures to protect foundation excavations once they have been approved by the ENGINEER. These measures may include, but are not limited

to, placing insulation blankets, placing a layer of pea gravel, crushed rock, or lean concrete on the exposed subgrade, or covering the exposed subgrade with a plastic tent. If additional overexcavation is required because the subgrade was not protected against wet or freezing weather, the cost of such additional work shall be borne by the CONTRACTOR.

- M. Excavation for all pipe lines beneath structures and excavation for all footings shall be carried out "in-the-dry" and in a manner which will preserve the undisturbed state of the subgrade soils.
- N. Where excavation is required below, the overlying fill soils shall be excavated and stockpiled separately. The excavated fill shall be tested to determine its suitability for reuse as Common Fill. All deleterious or unsuitable materials in the overlying fill shall be segregated from the remainder of the excavated fill prior to reuse.

### 3.02 ROCK AND BOULDER EXCAVATION

- A. Rock excavation shall be understood to mean ledge rock which in the opinion of the ENGINEER requires for its removal, drilling, wedging, sledging or barring. Rock excavation shall be made to the widths and depths determined by the ENGINEER in the field.
- B. Boulder excavation shall be understood to mean only boulders in any kind of excavation exceeding one cubic yard in volume which can be excavated without resorting to blasting.
- C. Where rock is encountered, it shall be uncovered but not excavated until measurements have been made by the ENGINEER.
- D. Payment for rock and boulder excavation shall be negotiated between OWNER and CONTRACTOR.

### 3.03 STRUCTURE EXCAVATION

- A. Excavation shall be made to the grades shown on the Drawings and to such widths as will give suitable room for construction of the structures, for bracing and supporting, pumping and draining. The bottom of the excavations shall be rendered firm and dry and in all respects acceptable to the ENGINEER.
- B. Excavation and dewatering shall be accomplished by methods which preserve the undisturbed state of subgrade soils. Exposed subgrades shall be proofrolled as specified above.
- C. Dewatering shall be such as to prevent boiling or detrimental underseepage at the base of the excavation as specified herein before.
- D. Excavation equipment shall be satisfactory for carrying out the work in accordance with the Specifications. In no case shall the earth be ploughed, scraped, or dug with machinery so near to the finished subgrade as to result in excavation of, or disturbance of material below grade, the last of the excavated material being removed with pick and shovel just before placing of concrete or working mat thereon.
- E. When excavation for foundations has reached prescribed depths, the ENGINEER shall be notified and will inspect conditions. If materials and conditions are not satisfactory to the ENGINEER, the ENGINEER shall issue instructions as to the procedures; however no additional costs shall be allowed.

- F. During final excavation to subgrade level, the CONTRACTOR shall take whatever precautions are required to prevent disturbance and remolding. Material which has become softened and disturbed shall be removed. Hand excavation of the final three to six inches will be required as necessary to obtain a satisfactory undisturbed bottom. The ENGINEER shall be the sole judge as to whether the work has been accomplished satisfactorily.

### 3.04 EXCAVATION AND BACKFILLING FOR FOOTINGS AND UNDERSLAB TRENCHES

- A. Excavation for all pipe lines beneath structures and excavation for all footings shall be carried out with the excavating equipment operating from the subgrade for the structure. The excavation shall be carried out "in-the-dry" and in a manner which will preserve the undisturbed state of the subgrade soils. The excavations may be completed with shoring and bracing of open cuts.
- B. All excavation beneath structures shall be backfilled with structural fill. Where it is impractical to use large equipment for compaction or when such methods, in the opinion of the ENGINEER, are disturbing the surrounding natural subgrade, the fill shall be compacted using hand-operated mechanical compactors. The lift thickness shall not exceed six inches measured before compaction when hand-operated equipment is used.

### 3.05 TRENCH EXCAVATION AND BACKFILLING

- A. Excavation for all trenches required for the installation of pipes shall be made to the depths indicated on the Drawings and in such a manner and to such widths as will give suitable room for laying the pipe or installing the ducts within the trenches, for bracing and supporting, and for pumping and drainage facilities. All soils with organic contents in excess of five percent shall be removed within a horizontal distance below the pipe invert determined by a 45 degree angle from the invert to the bottom of the organic layer. CONTRACTOR shall render the bottom of the excavations firm and dry and in all respects acceptable to the ENGINEER.

### 3.06 MISCELLANEOUS EXCAVATION

- A. The CONTRACTOR shall perform all the remaining miscellaneous excavation. The CONTRACTOR shall make all excavations necessary to permit the placing of signage and bollards for constructing roadways and any other miscellaneous earth excavation required under this Contract.
- B. The CONTRACTOR shall hand excavate and locate the existing berm and the edge of the existing geocomposite/liner, where the proposed liner will be attached, at 100 foot intervals before proceeding with power equipment. Power equipment shall not be used within ten inches of the existing geocomposite/liner. Remaining ten inches of fill shall be removed with hand tools. Damaged liner shall be repaired and vacuum tested by the CONTRACTOR at the CONTRACTOR's expense.

### 3.07 CUT AND FILL

- A. After all clearing and grubbing is complete, the site shall be cut and filled to the lines and grades shown on the Drawings. Fill shall be placed only on properly prepared surfaces which have been inspected and approved by the ENGINEER.

1. Exposed subgrades shall be proof rolled with at least two overlapping coverages of a vibratory drum roller with a minimum of a ten-ton static drum weight. Proofrolling in confined areas may be accomplished with hand operated vibratory equipment approved by the ENGINEER. Proofrolling shall be conducted in the presence of the ENGINEER. Subgrade soils which become soft, loose, "quick", or otherwise unsatisfactory for support of structures as a result of inadequate excavation, dewatering, proofrolling, or other construction methods shall be removed and replaced by structural fill as required by the ENGINEER at the CONTRACTOR's expense. The ENGINEER shall waive this requirement if, in his/her opinion, the subgrade will be rendered unsuitable by such proofrolling.
  2. Fill shall be brought up in substantially level lifts throughout the site, starting in the deepest portion of the fill. The entire surface of the work shall be maintained free from ruts, and in such condition that construction equipment can readily travel over any section.
  3. Fill shall be dumped and spread in layers by a bulldozer or other approved method. During the process of dumping and spreading all roots, debris, and stones greater in size than specified for common fill, shall be removed from the fill areas, and the CONTRACTOR shall assign a sufficient number of men to this work to ensure satisfactory compliance with these requirements.
  4. All fill materials shall be placed and compacted "in-the-dry" unless otherwise noted herein or on the Drawings. The CONTRACTOR shall dewater excavated areas as required to perform the work and in such manner as to preserve the undisturbed state of the natural inorganic soils.
  5. Each specified lift of fill material shall be compacted with a minimum of four complete coverages of approved compaction equipment and shall meet the specified density and moisture content requirements.
- B. Stones or rock fragments larger than two inches in their greatest dimensions will not be permitted in the top 12 inches of the finished grade of all fills or embankments.
- C. In cuts, all loose or protruding rocks on the back slopes shall be barred loose or otherwise removed to line or finished grade of slope. All cut and fill slopes shall be to the slope, cross section, and alignment shown on the Drawings or as approved by the ENGINEER.

### 3.08 COMPACTION

- A. Common fill shall be placed in layers not to exceed 12 inches in depth and each lift compacted to at least 95% of Standard Proctor maximum dry density as determined by ASTM D698, unless otherwise specified.
- B. Select Common Fill shall be placed in maximum 12 inch thick loose lifts and each lift compacted to a minimum of 95% of the Standard Proctor maximum dry density as determined by ASTM D698. In the areas designated for future structures, the minimum density shall be 98% of the Standard Proctor maximum dry density (ASTM D698).
- C. Material used for the landfill berms and roads shall be placed in maximum 8 inch thick loose lifts and each lift compacted to a minimum of 98% of the Standard Proctor maximum dry

density as determined by ASTM D698. The series of compacted lifts shall be done until matching the elevations shown on the Drawings.

- D. Areas adjacent to structures, and other confined areas inaccessible to self-propelled compaction equipment, shall be compacted with approved hand-guided mechanical compaction equipment. The fill compacted by hand-guided compactors shall be placed in 6-inch layers and thoroughly tamped over the entire surface to specified compaction. Compaction equipment is subject to approval by the ENGINEER. Heavy equipment shall not be operated within 5 feet of any structure.
- E. Fill materials shall have moisture content within three percent of optimum moisture content as determined by ASTM D698. Material which is too wet shall be spread on the fill area and permitted to dry, assisted by harrowing if necessary, until the moisture content is reduced to allowable limits.
- F. If the ENGINEER shall determine that added moisture is required, water shall be applied by sprinkler tanks or other sprinkler systems, which shall ensure uniform distribution of the water over the area to be treated, and give complete and accurate control of the amount of water to be used. If too much water is added, the area shall be permitted to dry before compaction is continued.
- G. The CONTRACTOR shall supply all hose, piping, valves, sprinklers, pumps, sprinkler tanks, hauling equipment, and all other materials and equipment necessary to place the water in the fill in the manner specified.

### 3.09 COMPACTION - COMMON FILL

- A. Common fill may be used as trench backfill; fill against exterior walls of structures (except water retention structures) as indicated on the Drawings; as embankment fill; or in other areas as designated by the ENGINEER. Material conforming to the requirements of common fill shall be placed in layers having a maximum thickness of 12 inches measured before compaction.
- B. Each layer of common fill shall be compacted to at least 95% of Standard Proctor maximum dry density as determined by ASTM D698.
- C. Materials placed in fill areas shall be deposited to the lines and grades shown on the Drawings making due allowance for settlement of the material and for the placing of sod thereon.
- D. The surfaces of filled areas shall be graded to smooth true lines, strictly conforming to grades indicated on the grading plan and no soft spots or uncompacted areas shall be allowed in the work.
- E. No compaction shall be done when the material is too wet either from rain or from excess application of water. At such times, work shall be suspended until the previously placed and new materials have dried sufficiently to permit proper compaction.

### 3.10 GRADING

- A. Grading in preparation for placing of liner, sod, planting areas, and appurtenances shall be performed to the lines, grades and elevations shown on the Drawings and otherwise as directed by the ENGINEER and shall be performed in such a manner that the requirements for formation

of embankments can be followed. All material encountered, of whatever nature, within the limits indicated, shall be removed and disposed of as directed. During the process of grading, the area to be graded shall be maintained in such condition that it shall be well drained at all times. When directed, temporary drains and drainage ditches shall be installed to intercept or divert surface water that may affect the prosecution or condition of the work.

- B. If at the time of grading it is not possible to place any material in its final location, it shall be stockpiled in approved areas for later use. No extra payment will be made for the stockpiling or double handling of excavated material.
- C. The right is reserved to make minor adjustments or revisions in lines or grades if found necessary as the work progresses, in order to obtain satisfactory construction.
- D. In cuts, all loose or protruding rocks on the back slopes shall be barred loose or otherwise removed to line or finished grade of slope. All cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the Drawings, or as directed by the ENGINEER.

### 3.11 DISPOSAL OF SURPLUS MATERIAL

- A. No excavated materials shall be removed from the site of the work or disposed of by the CONTRACTOR except as specified by the ENGINEER. Materials shall be neatly piled so as to inconvenience, as little as possible, the OWNER until used or otherwise disposed of as specified below.
- B. Suitable excavated material shall be used for fill embankments or backfill on the different parts of the work as required.
- C. Topsoil or loam, if any, excavated under this Section may be salvaged by the CONTRACTOR for his/her own convenience for use as approved by the ENGINEER.
- D. Surplus fill shall become the property of the OWNER and shall be disposed on site by CONTRACTOR in an approved location. The organic materials shall be stockpiled for OWNER's use.

### 3.12 DISPOSAL AND REPLACING OF ROCK

- A. The CONTRACTOR shall remove and dispose of all pieces of ledge and boulders which are not suitable for use in other parts of the work. Rock disposed of by hauling away to spoil areas is to be replaced by approved surplus excavation obtained elsewhere on the work, insofar as it is available. Any deficiency in the backfill material shall be made up with acceptable material approved by the ENGINEER.
- B. Rock may be used in embankment fill only with the approval of the ENGINEER.

END OF SECTION

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SECTION 02230  
GRANULAR FILL MATERIALS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. General: Work under this Section is subject to the requirements of the Contract Documents, including the General Conditions.
- B. Furnish and Install: Furnish and install all labor, materials, equipment, and incidentals necessary to install the granular fill materials for the perforated leachate and gas collection piping in the lined area as shown on the Drawings and as specified herein. See Section 02221 Trenching, Backfilling, and Compaction for granular fill material for leachate conveyance and discharge pipe. Associated Work includes testing, sample collection, loading, shipping, delivering, stockpiling, grading, placement, and installation of granular fill materials for cell construction.
- C. Related Work Specified Elsewhere:
  - 1. Section 02623 – High Density Polyethylene (HDPE) Pipe
  - 2. Section 02625 - Geotextile Fabrics
  - 3. Section 02662 - High Density Polyethylene (HDPE) Geomembrane Liner

1.02 QUALITY ASSURANCE

- A. Qualifications:
  - 1. The Work shall be performed by a firm that has experience in processing and installation of lateral drainage layers on top of synthetic liners.
  - 2. The supplier shall show evidence of an adequate supply of material which is relatively homogenous within a designated area which is properly permitted by the appropriate local, state, and federal agencies.
- B. Requirements of Regulatory Agencies:
  - 1. The installation of the granular fill materials is to be performed in conformance with the guidelines stipulated in the Site's Permit, Project-Specific Construction Quality Assurance Manual, and the approved landfill construction plans.
- C. Reference Standards:
  - 1. American Society for Testing and Materials (ASTM)
  - 2. ASTM C136 - Standard Method for Sieve Analysis of Fine and Select Aggregates.
  - 3. ASTM C289 - Standard Test Method for Potential Reactivity of Aggregates (Chemical Method).

4. ASTM D75 - Standard Practice for Sampling Aggregates.
5. ASTM D422 - Standard Test Method for Particle-Size Analysis of Soils.
6. ASTM D698 - Standard Test Methods for Moisture-Density Relations of Soil and Soil-Aggregate Mixtures Using 5.5-lb. (2.49 kg) Rammer and 12-inch (305 mm) Drop.
7. ASTM D854 - Standard Test Method for Specific Gravity of Soils.
8. ASTM D1140 - Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75 $\mu$ m) Sieve.
9. ASTM D2488 - Standard Practice for Description and Identification of Soils (Visual-Manual Procedures).
10. ASTM D3042 - Standard Test Method for Insoluble Residue in Carbonate Aggregates.
11. ASTM D4254 - Standard Test Methods for Minimum Index Density of Soils and Calculation of Relative Density.
12. ASTM D4373 - Standard Test Method for Calcium Carbonate Content of Soils.
13. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

D. Conformance Testing:

1. Conformance testing shall be performed by a Quality Assurance Laboratory (QAL) that has specific soils testing equipment required to provide test results in a timely manner in accordance with the Specifications. The Contractor shall obtain samples, coordinate, and schedule all conformance tests as required by the Specifications. The purpose of conformance testing is to assure that the supplied soil samples from each source conform to the Specifications and specified permeability.
2. Select Aggregate:
  - a. Gradation analysis, carbonate content, and particle shape shall be performed by the select aggregate supplier by a QAL on samples from each source of the select aggregate to be used in the leachate collection system to assure compliance with the Specifications. Gradation analysis results shall be reviewed by the Engineer's Field Representative prior to placement of select aggregate in the leachate collection system.

E. Field Quality Control:

1. Field quality control requirements are specified in Article 3.02. The purpose of field quality control procedures is to assure that the lateral drainage layer has been installed in accordance with the Specifications meeting the specified hydraulic conductivity.

### 1.03 SUBMITTALS

- A. Within fifteen (15) calendar days following the effective date of the Agreement, and before furnishing and installing the granular fill material, the Contractor shall submit the following information:
1. Construction Schedule:
    - a. Submit initial construction schedule in duplicate for Owner's review.
    - b. Revise and resubmit as required.
  2. Samples:
    - a. The Contractor will submit three (3), ten (10)-pound samples of select aggregate from the source to be used on this Project. Submittal shall include gradation results completed by the select aggregate supplier.
  3. Granular Fill Supplier's Information:
    - a. Identification of the granular fill supplier.
    - b. A signed certification from the supplier, with permit numbers and type, that the granular fill source is in full compliance with applicable standards, regulations and technical specifications.
  4. Contractor's Information:
    - a. Corporate background.
    - b. Contractor's capabilities:
      - 1) Information on equipment (numbers and types) and personnel (number of site managers, number of crews, etc.).
      - 2) Anticipated average daily production.
      - 3) Contractor's Quality Control/Quality Assurance Plan for installation of the granular fill materials.

### 1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. If granular fill materials are delivered to the site prior to placement approval, materials shall be stockpiled on-site in areas designated by the Owner. Provisions shall be implemented to minimize surface water impacts and erosion potential. Removal and placement of granular fill material shall be done in a manner to minimize intrusion of soils adjacent to and beneath the stockpile.

### 1.05 PROJECT CONDITIONS

A. General:

1. In general, the Contractor shall conduct his Work in such a manner as to minimize damage and disposition to the site and surrounding areas. All poles, trees, shrubbery, fences, pavements, railroads, sewer, water, natural gas, and/or other pipes, wires, conduits, culverts, drainage ditches, manholes, tunnels, tunnel shafts, buildings and all structures, and property along the landfill shall be supported and protected from injury by the Installer during the construction and until the completion of said landfill and appurtenances. The Contractor shall be responsible for all damages to structures and property and shall save and keep the Owner harmless from any liability or expense for damage or repairs to the same.
2. The Contractor shall conduct the Work so that no equipment, material, or debris will be placed on or allowed to fall upon private property in the vicinity of the Work unless he shall have first obtained the Owner's written consent thereto.

PART 2 PRODUCTS

2.01 MATERIAL

A. Subgrade:

1. The bottom geosynthetic layer shall be placed on a prepared subgrade consisting of, at a minimum, a 6-inch layer of in-situ soil or select fill compacted to 90 percent standard Proctor density (ASTM D 698). Material to be used for construction of the prepared subgrade shall be obtained from on-site borrow areas approved by the Engineer.
2. The surface of the soil upon which a geosynthetic liner will be installed must be free of stones greater than 1/2-inch in any dimension, organic matter, local irregularities, protrusions, loose soil, and any abrupt changes in grade that could damage the geosynthetic liner.
3. The material shall have a particle size gradation (ASTM D 422) within the following limits:

Sieve Size	Percent Passing By Weight
1/2 inch	100
200	<35%

B. Drainage Layer (Basalt Rock Material):

1. The drainage layer material shall consist processed and screened basalt rock material generated during the rock removal operation. Processed and screened material shall conform to the following gradation requirements:

Sieve Size	Percent Passing By Weight
½ inch	100
200	<15

2. The drainage layer material shall be well-graded inorganics noncalcareous material, free from organic substance (<5%) and other deleterious matter with a minimum hydraulic conductivity of  $1 \times 10^{-4}$  cm/sec or greater.
3. Uniformity coefficient (Cu) shall be less than 6 where Cu is defined as D60/D10.
4. Material to be used for construction of the prepared Drainage Layer (Basalt Rock Material) shall be obtained from on-site stockpile areas as shown in the Drawings.

C. Drainage Layer (Ground Glass Cullet):

1. The crushed glass cullet can be used as a drainage layer material, and shall conform to the following gradation requirements:

Sieve Size	Percent Passing By Weight
3/4 inch	100
200	<5

2. The drainage layer material shall be well-graded, free from organic substance and other deleterious matter with a minimum hydraulic conductivity of  $1 \times 10^{-4}$  cm/sec or greater.
3. Uniformity coefficient (Cu) shall be less than 6 where Cu is defined as D60/D10.
4. Material to be used for construction of the prepared Drainage Layer (Ground Glass Cullet) shall be obtained from on-site stockpile area as shown in the Drawings.

D. Select Aggregate (Gravel):

1. Washed, select aggregate shall be used for bedding material around the perforated leachate and gas collection pipes in the lined area, wrapped with geotextile fabric as shown on the Drawings, and as specified herein. The select aggregate shall be sound, hard, durable, resistant to weathering, and shall be free of overburden, spoil, shale, limestone, and organic material.
2. The select aggregate shall be rounded (ASTM D2488) and shall have particle size gradation (ASTM D422) within the following limits:

Sieve Size	Percent Passing by Weight
1-1/2 inch	100
1 inch	20-55
3/4 inch	<2

3. Select aggregate shall have a carbonate content of no more than 1% (ASTM D4373).

## 2.02 CONFORMANCE TESTING

### A. Drainage Layer Material

1. Conformance testing shall be performed by the Contractor on samples from each source of granular fill material to assure compliance with the Specifications. The following test shall be performed on the samples.
  - a. Sieve Analysis (ASTM D422) every 1,500 cy.
- B. Select Aggregate (Gravel) – Leachate Collection Piping and Sump Area
  1. Gradation analysis shall be performed by the Contractor on samples for each source of the select aggregate (Gravel) to assure compliance with the Specifications. The following test shall be performed on the samples.
    - a. Sieve Analysis (ASTM D422)
    - b. Carbonate Content (ASTM D4373)

### PART 3 EXECUTION

#### 3.01 GRANULAR FILL MATERIAL

- A. After installation completion and acceptance of the liner system and related Work activities, Owner shall place the drainage layer material to the minimum thickness and area extent as shown on the Drawings.
- B. During the placement of the drainage layer material, no construction equipment shall be allowed directly on the geomembrane and any damage to the geomembrane shall be repaired immediately in accordance with Section 02662, High Density Polyethylene (HDPE) Geomembrane Liner.
- C. Care shall be taken to protect the geomembrane liner. Ramps shall be provided at down slopes and in other heavily traveled areas. All heavily traveled areas shall have a minimum of three (3) feet of material above the liner. Only large radius turns by the loader and other equipment shall be permitted as sharp turns may damage the liner.
- D. Granular fill materials can only be spread when the geomembrane is taut or stretched evenly over the base of the landfill. The granular fill materials shall not be spread when the geomembrane is elongated due to higher daytime temperatures and exposure to sun. The Contractor must make provisions to cover the geomembrane under non-elongated conditions.
- E. No material shall be placed, spread, or compacted while the ground or material is frozen or thawing or during unfavorable weather conditions. The surface must be made smooth and free from ruts or indentations at the end of any working day when significant precipitation is forecast.
- F. A three (3)-inch minimum layer of select aggregate material shall be placed in the bottom of the leachate collection trench. The leachate piping shall be installed, and shall be backfilled with select aggregate to the depth and width shown on the Drawings. Care shall be taken during backfilling of the pipe to assure the pipe will not be crushed or otherwise damaged. The geotextile fabric shall then be overlapped at least twenty-four (24) inches over the select aggregate.

- G. Following construction of the leachate piping, the select aggregate material shall be brought to design grade.

### 3.02 FIELD QUALITY CONTROL

- A. The drainage layer thickness shall be measured periodically throughout the day (minimum six (6) test per acre) during construction to confirm that the thickness of the installed material is in accordance with the Drawings.
- B. Any sample or area tested shall be rejected, removed and replaced if it does not meet the requirements of the technical specifications. Reconstructed areas shall have feathered, overlapping edges that tie into adjacent fill material.

### 3.03 DISPOSAL OF WASTE MATERIAL

- A. Upon completion of the granular fill material installation, the Contractor shall dispose of all trash, waste material, and equipment used in connection with the performed Work and shall leave the premises in a neat and acceptable condition.

### 3.04 ACCEPTANCE

- A. The Contractor shall retain all ownership and responsibility for the granular fill material until acceptance by the Owner. The granular fill material shall be accepted by the Owner when all of the following conditions are met:
  - 1. Installation is completed.
  - 2. Verification in the form of a Certificate of Acceptance of the adequacy of the installation, including associated testing. A copy of example Acceptance Form can be provided by Owner upon request.
  - 3. Certification by the Contractor and Engineer's Field Representative that the granular fill materials were installed in accordance with the Drawings, Technical Specifications and the CQA Plan.

END OF SECTION

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SECTION 02272  
NONWOVEN GEOTEXTILE FABRIC

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required to install nonwoven geotextile fabric complete as shown on the Drawings and as specified herein.

1.02 RELATED WORK

- A. Earthwork is included in Section 02200.
- B. Granular Fill Materials are included in Section 02230.
- C. Geosynthetic Clay Liner is included in Section 02275.
- D. High Density Polyethylene (HDPE) Pipe is included in Section 02623.
- E. High Density Polyethylene (HDPE) Liner is included in Section 02776.

1.03 SUBMITTALS

- A. Within 15 calendar days following the Effective Date of the Agreement, submit the following information in accordance with Section 01300:
  - 1. MANUFACTURER's background information.
  - 2. Information on factory size, equipment, personnel, number of shifts per day and production capacity per shift.
  - 3. List of material properties and samples of geotextile with attached certified test results.
  - 4. MANUFACTURER's quality control program and manual including description of laboratory facilities.
  - 5. A list of ten completed facilities where the geotextile is used including:
    - a. Name and purpose of facility, its location and date of installation.
    - b. Name of Owner, project manager, design engineer and installer.
    - c. Geotextile thickness, surface area, and use.
    - d. Information on performance of the facility.
  - 6. Shop Drawing, including details of overlap and seaming of the geotextile, anchoring, connections and other construction details any variance or additional details that deviate from the Drawings.
  - 7. Installation schedule.

8. A manual that specifically defines the quality control and quality assurance program during installation including MANUFACTURER's installation instructions.
9. Copy of quality control certificates in conformance with Paragraph 2.03 below.

#### 1.04 REFERENCE STANDARDS

##### A. ASTM International

1. ASTM D4355 - Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus.
2. ASTM D4491 - Test Method for Water Permeability of Geotextiles by Permittivity.
3. ASTM D4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
4. ASTM D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
5. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile.
6. ASTM D4759 - Standard Practice for Determining the Specification Conformance of Geosynthetics
7. ASTM D4833 - Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products.
8. ASTM D4873 - Standard Guide for Identification, Storage and Handling of Geosynthetic Rolls and Samples.
9. ASTM D5199 - Standard Test Method for Measuring Nominal Thickness of Geosynthetics.
10. ASTM D5261 - Standard Test Method for Mass Per Unit Area of Geotextiles.
11. ASTM D6241 - Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe

- B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

#### 1.05 APPLICATIONS

- A. The nonwoven geotextile is to be used for filtration for the leachate collection system.

#### 1.06 QUALITY ASSURANCE

- A. The quality control and quality assurance consists of conformance testing of the material delivered to the site and field quality control during installation.

- B. Conformance testing requirements are discussed in Paragraph 2.04 below. The purpose of conformance testing is to assure that the supplied material conforms to this Section and to the MANUFACTURER's quality control certificates.
- C. Field quality control requirements are discussed in Paragraph 3.03 below. The purpose of field quality control procedures is to assure that the geotextile material has been installed in accordance with this Section and MANUFACTURER's recommendations.

#### 1.07 DELIVERY, STORAGE AND HANDLING

- A. Geotextile labeling, shipment and storage shall follow ASTM D4873.
- B. Product labels shall clearly show the MANUFACTURER or supplier name, style name and roll number.
- C. Each shipping document shall include a notation certifying that the material is in accordance with the MANUFACTURER's certificate.
- D. Each geotextile roll shall be wrapped with a material that will protect the geotextile from damage due to shipment, water, sunlight and contaminants.
- E. The protective wrapping shall be maintained during periods of shipment and storage. If the wrapping is damaged prior to installation, the outer wrap(s) of geotextile material must be discarded before installation.
- F. During storage, geotextile rolls shall be elevated off the ground (a minimum of 3-in) and adequately covered to protect them from the following: site construction damage, extended exposure to ultraviolet (UV) radiation, precipitation, chemicals that are strong acids or strong bases, flames, sparks, temperature in excess of 71°C (160°F) and any other environmental condition that might damage the geotextile.

#### 1.08 MATERIAL WARRANTY

- A. The CONTRACTOR shall furnish the OWNER a written warranty from the geotextile MANUFACTURER that shall warrant the material, on a prorated basis, against manufacturing defect and material degradation for a period of five (5) years from the date of installation.
- B. Should a defect occur, which is covered under warranty, the Warrantor shall bear all costs for the repair and/or relocation and replacement of the geotextile material.

#### 1.09 GUARANTEE

- A. The CONTRACTOR shall guarantee the geotextile against defects in installation and workmanship for the period of two (2) years commencing with the date of Final Acceptance. The guarantee shall include the services of qualified service technicians and all materials and labor required for the repairs at no expense to the OWNER.

PART 2 PRODUCTS

2.01 GENERAL

- A. The use of a MANUFACTURER's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration.

2.02 MATERIALS

A. Nonwoven Geotextile Fabric

- 1. The geotextile fabric shall be a nonwoven needle punched material consisting of filaments formed into a stable network. The material shall be nonbiodegradable, nonreactive within a pH range of three to eleven, resistant to ultraviolet light exposure, and resistance to insects and rodents. Test results from any sampled roll in the lot, when tested in accordance with ASTM D4759, shall meet or exceed the values listed in Table 1.

TABLE 1: NONWOVEN GEOTEXTILE MINIMUM AVERAGE ROLL VALUES

PROPERTIES	TEST METHOD	UNIT	8 oz	10 oz
Mass per Unit Area	ASTM D5261	oz/yd <sup>2</sup>	8	10
Thickness	ASTM D5199	Mils	90	108
Grab Strength	ASTM D4632	lbs	220	260
Grab Elongation	ASTM D4632	percent	50	50
Trapezoid Tear Strength	ASTM D4533	lbs	80	100
Puncture Strength	ASTM D4833/D6241	lbs	120	165
Water Flow Rate	ASTM D4491	gpm/ft <sup>2</sup>	95	75
Permittivity	ASTM D4491	sec-1	1.2	1.0
Apparent Opening Size (Max)	ASTM D4751	mm sieve	0.180 80	0.150
UV Resistance	ASTM D4355	% Strength Retained	70	100

- 2. All strength values are in the weaker principal direction.
- 3. Nonwoven geotextile fabric shall be manufactured by GSE, SKAPS Industries, TenCate Mirafí, Syntec, Propex, or by an approved MANUFACTURER meeting the above physical properties.

2.03 QUALITY CONTROL DOCUMENTATION

- A. Prior to installation commencement of any geotextile material, provide to the OWNER the following information certified by the MANUFACTURER for the delivered geotextile.
  - 1. Each roll delivered to the site shall have the following identification information:
    - a. MANUFACTURER's name
    - b. Product identification
    - c. Lot number

- d. Thickness
  - e. Roll number
  - f. Roll dimensions
  - g. Gross roll weight
2. Quality control certificates, signed by the MANUFACTURER's quality assurance manager. Each certificate shall have roll identification number, testing procedures, and frequency and test results. At a minimum the following test results shall be provided every 100,000 sq ft, or as otherwise noted, of manufactured geotextile in accordance with test requirements specified in Paragraph 2.02 above.
- a. Thickness
  - b. Mass per unit area
  - c. Trapezoid Tear Strength
  - d. Puncture Strength
  - e. Grab Strength
  - f. Grab Elongation
  - g. Flow Rate (every 540,000 sf)
  - h. Apparent Opening Size (every 540,000 sf)

#### 2.04 CONFORMANCE TESTING

- A. At the discretion of the OWNER, conformance testing shall be performed by an independent GRI accredited Quality Assurance Laboratory (QAL) approved by the OWNER and provided and paid for by the CONTRACTOR. ENGINEER shall obtain samples from the delivered material, mark the machine direction, lot number and roll identification number. One sample shall be taken per 100,000 sq ft, or one sample per lot, whichever results in the greater number of conformance tests. A lot shall be defined as a group of consecutively numbered rolls from the same manufacturing line. This sampling frequency may be increased as deemed necessary by the ENGINEER. The samples shall be taken across the entire roll width and shall not include the first 3-ft. The following conformance tests shall be conducted at the laboratory.
1. Mass per unit area (ASTM D5261)
  2. Puncture Strength (ASTM D4833/D6241)
  3. Grab tensile (ASTM D4632)
  4. Flow Rate (ASTM D4491)
  5. Permittivity (ASTM D4491)
  6. Apparent opening size (ASTM D4751)
- B. These conformance tests shall be performed in accordance with test requirements Paragraph 2.02.
- C. All conformance test results shall be reviewed by the ENGINEER and accepted or rejected, prior to the deployment of the geotextile. All test results shall meet, or exceed, the property values listed in Paragraph 2.02 above.

- D. The CONTRACTOR may request that other samples be tested by the QAL with the MANUFACTURER's technical representative during testing procedures. This retesting shall be paid for by the CONTRACTOR. The MANUFACTURER may obtain additional samples from rolls immediately before and after the failing roll or as directed by the ENGINEER and have them tested by the QAL at his/her own expense. If these rolls pass then only the failing roll will be rejected. If they fail, then the entire lot will be rejected.
- E. If the geotextile fails the initial material conformance tests, the CONTRACTOR shall pay for the cost of subsequent conformance testing until all conformance tests are passed and the geotextile is accepted by the ENGINEER.

### PART 3 EXECUTION

#### 3.01 PREPARATION

##### A. General

- 1. Preparation of the subgrade shall be in accordance with Section 02230.
- 2. The subgrade shall be inspected by the ENGINEER prior to installation of the geotextile.

#### 3.02 INSTALLATION

##### A. Geotextile Placement

- 1. The geotextile shall be installed as shown on the Drawings and in accordance with the MANUFACTURER's recommendations and approved shop drawings.
- 2. Vehicular traffic across the geotextile shall not be allowed except as identified herein. Use of a low ground pressure All-Terrain Vehicle (ATV) that exerts a maximum of 6 psi may be allowed as standard operating procedure for deployment of geosynthetics, if endorsed by the MANUFACTURER in writing and approved by the ENGINEER. Vehicles, machinery, and equipment shall be operated to avoid abrupt stops, starts, or turns.
- 3. Granular fill materials shall be installed in accordance with Section 02230.
- 4. HDPE Pipe shall be installed in accordance with Section 02623.
- 5. During the placement of the granular fill material above the geotextile, no construction equipment shall be allowed directly on the geotextile, unless approved by the ENGINEER. Any damage shall be repaired immediately in accordance with this Section. CONTRACTOR shall maintain the minimum thickness of cover in accordance with Section 02230. The sand shall be placed in such a manner as to prevent pushing or pulling the geotextile out of its installed location.
- 6. Soil cover shall be brought to the work area with earth-carrying equipment, deposited on the previously spread soil cover, and then pushed onto the uncovered portion of the geotextile. This operation shall be repeated until the total area is covered.
- 7. Soil cover for the side slopes of the geotextile shall be placed at the bottom and pushed up so as to reduce any tension on the geotextile.

8. Damage (including: tears, punctures, thinly stretched section or defects not previously identified) to the geotextile occurring during the placement of soil cover shall be repaired immediately at no additional expense to the OWNER. Repair shall be made by overlaying another layer of geotextile over the damaged area with a 12-inch overlap all around. The patch shall be sewn/thermally bonded to the geotextile in accordance with Section 3.02.B.1.
9. The geotextile shall be cut with approved tools.
10. Geotextile fabric must be anchored when deployed on slopes.
11. Geotextile shall be covered as soon as possible after installation and approval. The geotextile fabric shall not be left exposed for more than 15 days after installation.

B. Field Seaming

1. The geotextile panels shall be sewn together or thermally bonded as recommended by the MANUFACTURER and approved by the ENGINEER. The thread used to sew the panels shall be of the same composition as the geotextile and as recommended by the MANUFACTURER. All seams shall be continuous. Seams shall be oriented down slopes perpendicular to grading contours unless otherwise specified. For thermal bonding, fusion welding techniques, recommendations by the MANUFACTURER shall be used. If thermal bonding is used, care shall be taken to avoid burn through of the geotextile. The area welded shall be clean and dry. The amount of overlap and type of stitch used to join geotextile panels shall be as recommended by the MANUFACTURER and approved by the ENGINEER.

3.03 FIELD QUALITY CONTROL

- A. Prior to placement of the soil cover, the geotextile installation and related work shall be inspected by the ENGINEER. All work in the system therein being inspected shall be complete, clean and ready for use. All work shall meet the requirements as to line, grade, cleanliness and workmanship, as determined by the ENGINEER.
- B. All discrepancies shall be noted and repaired at no additional cost. Final acceptance of the system shall be contingent upon the approval of the ENGINEER.

3.04 DISPOSAL OF WASTE MATERIAL

- A. Upon completion of installation, the CONTRACTOR shall remove and dispose, in a proper manner approved by the ENGINEER, of all trash, waste material and equipment used in connection with the performed work and shall leave the premises in a neat and acceptable condition.

END OF SECTION

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SECTION 02275  
GEOSYNTHETIC CLAY LINER (GCL)

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required to install Geosynthetic Clay Liner (GCL) as shown on the Drawings and as specified herein. The work shall include unloading, storing placement, seaming, and anchoring of the GCL, field quality control, and all other work as shown on the Drawings and as specified herein.
- B. Sufficient material and accessory bentonite shall be furnished to cover all areas as shown on the Drawings, including overlaps at field seams.

1.02 RELATED WORK

- A. Earthwork is included in Section 02200.
- B. Granular Fill is included in Section 02230.
- C. High Density Polyethylene (HDPE) Geomembrane Liner is included in Section 02776.

1.03 SUBMITTALS

- A. Within 30 calendar days following the Effective Date of the Agreement, submit the following information:
  - 1. Submittals relating to liner MANUFACTURER and liner:
    - a. Corporate Background
    - b. Manufacturing capabilities:
      - 1) Information on factory size, equipment, personnel, number of shifts per day and production capacity per shift.
      - 2) List of material properties and samples of liner with the attached certified test results as specified in Paragraph 1.03.A.3.
      - 3) MANUFACTURER's quality control program and manual including description of laboratory facilities.
      - 4) A list of ten similarly completed facilities totaling a minimum of ten million square feet, for which the MANUFACTURER has manufactured a GCL. The following information shall be provided for each facility.
        - a) Name and purpose of facility, its location and date of installation.
        - b) Name of Owner, project manager, design engineer and installer.
        - c) GCL surface area.
        - d) Information on performance of the facility.
    - c. The origin of the bentonite and geotextiles to be used in the manufacturing of the GCL including the suppliers name and production plant, as well as brand name and number.
    - d. MANUFACTURER's literature including:
      - 1) Material samples;
      - 2) Technical data including Minimum Average Roll Values (MARVs) for the items listed in Appendix A of this Section;

- 3) Material Warranty covering materials and workmanship of the GCL, including batch identifications and associated roll numbers;
  - 4) Certificate of permeability and bentonite content per square foot of mat, and;
  - 5) Copy of quality control certificates in conformance with Paragraphs 2.01 and 2.02.
2. Submittals relating to installing CONTRACTOR
- a. Background Information
  - b. CONTRACTOR shall submit a list of at least five (5) similar projects for which the CONTRACTOR has installed GCL. CONTRACTOR shall have installed a minimum of two million square feet of GCL materials. The following information shall be provided for each facility.
    - 1) Name and purpose of facility, its location and date of installation.
    - 2) Name of Owner, project manager, design engineer and installer.
    - 3) GCL surface area.
    - 4) Information on performance of the facility.
  - c. Installation capabilities:
    - 1) Information on equipment and personnel.
    - 2) Anticipated average daily production.
  - d. Shop drawings, including:
    - 1) A proposed plan detailing GCL storage location and methods;
    - 2) A proposed plan for placement and a proposed panel layout showing the installation layout identifying field seams as well as any variance or additional details which deviate from the Drawings.
    - 3) Details of seaming the GCL, anchoring, connections, penetrations, and other construction details.
    - 4) The CONTRACTOR shall perform and submit the analytical testing results for the GCL at the frequencies specified in Appendix A of this Section.
  - e. Installation schedule.
  - f. A quality control manual that specifically defines the quality control program during installation. The manual shall include daily procedures, installation techniques, field testing procedures, lab testing procedures, specific steps that are to be taken in the event of a failure or defect, personnel requirements, levels of authority and all other information necessary to ensure a high quality GCL installation.
  - g. Resume of the Supervisor to be assigned to the Project.
  - h. A list of personnel performing field seaming operations along with pertinent experience information.
3. Material Testing Requirements
- a. CONTRACTOR shall submit for approval results of direct shear testing on the bentonite mats, on the interface between the GCL and the HDPE geomembrane, and the interface between the GCL and the underlying fill material in accordance with ASTM D6243 and ASTM D5321. The tests shall consist of at least 3 separate shear tests run at normal stresses of 2, 40 and 76 psi.

The tests shall be performed on GCL samples hydrated a minimum of 48 hours under the normal stress at which the sample is to be sheared. Shearing shall occur at horizontal displacement rates no greater than 0.004 in/min to ensure that drained conditions are established everywhere on the shear plane during shearing. Results of shear tests shall also include determination of the internal shear strength of the GCL. GCL shall meet the following minimum requirements:

- 1) Interface Minimum Peak Friction Angle
- 2) Reinforced GCL/Textured Geomembrane: 23 deg.
- 3) Reinforced GCL/Processed Sand Layer (Subgrade): 23 deg.
- 4) Textured Geomembrane/Protective Sand (Drainage Layer): 23 deg.
- 5) Reinforced GCL Internal Shear Strength: 23 deg.

In addition to submitting the interface shear testing results, CONTRACTOR shall measure the asperity height of the actual textured geomembrane(s) used in accordance with ASTM D7466. CONTRACTOR shall submit results of interface shear testing and asperity height to ENGINEER for approval.

#### 1.04 REFERENCE STANDARDS

##### A. ASTM International

1. ASTM D421 - Standard Practice for Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants.
2. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup>(2,700 kN-m/m<sup>3</sup>)).
3. ASTM D2216 - Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.
4. ASTM D5261 Standard Test Method for Measuring the Mass per Unit Area of Geotextiles.
5. ASTM D5321 - Standard Test for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method.
6. ASTM D5887 Standard Test Method for Measurement of Index Flux Through Saturated Geosynthetic Clay Liner Specimens Using a Flexible Wall Permeameter
7. ASTM D5888 - Standard Guide for Storage and Handling of Geosynthetic Clay Liners.
8. ASTM D5890 - Standard Test Method for Swell Index of Clay Mineral Component of Geosynthetic Clay Liners.
9. ASTM D5891 - Standard Test Method for Fluid Loss of Clay Component of Geosynthetic Clay Liners.
10. ASTM D5993 - Standard Test Method for Measuring Mass Per Unit of Geosynthetic Clay Liners.
11. ASTM D6102-06 - Standard Guide for Installation of Geosynthetic Clay Liners.
12. ASTM D6243 – Standard Test Method for Determining the Internal and Interface Shear Resistance of Geosynthetic Clay Liner by the Direct Shear Method
13. ASTM D6496 - Test Method for Determining Average Bonding Peel Strength Between the Top and Bottom Layers of Needle-Punched Geosynthetic Clay Liners

14. ASTM D6766 – Test Method for Evaluation of Hydraulic Properties of Geosynthetic Clay Liners Permeated with Potentially Incompatible Liquids
15. ASTM D6768 - Test Method for Tensile Strength of Geosynthetic Clay Liners
16. ASTM D7466 - Standard Test Method for Measuring the Asperity Height of Textured Geomembrane

B. Geosynthetic Research Institute (GRI)

1. GCL3 Test Methods, Required Properties, and Testing Frequencies of Geosynthetic Clay Liners (GCLs)

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. In addition to the MANUFACTURER and installer requirements for qualifications and certification specified in Paragraph 1.03, the quality assurance consists of conformance testing of the material delivered to the site and field quality control during installation.

B. Conformance testing requirements are specified in Paragraph 2.03. The purpose of conformance testing is to assure that the supplied material conforms to the Specifications and to the MANUFACTURER's quality control certificates.

C. Field quality control requirements are specified in Paragraph 3.06. The purpose of field quality control procedures is to assure that the GCL has been installed in accordance with the Specifications and MANUFACTURER's recommendations.

D. Quality Control Plan

1. The forms for GCL quality control documentation, included in Appendix B, shall be used for field installation documentation. Alternative forms may be used for documentation as approved by the CQA Manager.

E. GCL Quality Control Documentation

1. Prior to commencing work, a pre-installation conference shall be held and the following Project personnel shall be identified by name and recorded in the Project files:
  - a. ENGINEER
  - b. CONTRACTOR's Representative
  - c. Resident Project Representative
  - d. CQA Manager
  - e. Installation Supervisor
  - f. Quality Assurance Laboratory
  - g. Quality Assurance Technician

2. Two duplicate project files shall be maintained. One shall be maintained by the CQA Manager and the other shall be maintained by the Installation Supervisor. At the end of each work day (no later than noon the following day) the files shall be updated and checked to assure that copies of all pertinent project information are included in each file.
3. Blank copies of the following four project forms shall be available onsite throughout the duration of the project:

<u>Form No.</u>	<u>Title</u>
a.	Daily CQC Report
b.	Subgrade Surface Approval
c.	Receiving QC Log
d.	GCL Installation Tracking Log

F. Record Drawings

1. Furnish record drawings and a copy of complete documentation for final installation of the GCL within 14 days of completing installation of each layer of GCL. Record drawings should detail the GCL panel Roll Number, Lot Number, and orientation in the liner system.

1.06 QUALIFICATIONS

A. Manufacturer

1. The MANUFACTURER of the GCL described hereunder shall have previously demonstrated his/her ability to produce this GCL by having at least two years continuous experience in the manufacturing of GCLs and successfully manufactured a minimum of 10 million square feet of GCL material.

B. Installer

1. The installer shall be the MANUFACTURER or an installer certified by the MANUFACTURER to install the GCL. Installation shall be performed under the constant direction of a single Installation Supervisor who shall remain on site and be in responsible charge, throughout the GCL installation, for GCL layout, seaming, patching, testing, repairs and all other activities required by the installer.
  - a. GCL Installer must either have installed GCL on at least 5 projects and at least 2 million square feet of GCL, or must provide to the ENGINEER satisfactory evidence, through similar experience in the installation of other types of geosynthetics, that the GCL will be installed in a competent, professional manner.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. The bentonite mat rolls shall be packaged and shipped by appropriate means to prevent damage of the bentonite mat rolls. The MANUFACTURER shall ensure that proper methods of securing and fastening the rolls of GCL during shipping will be implemented. The CQA staff will inspect the liner material as it arrives on site for any damage to the liner. Straps securing the liner during shipping shall not cut into the liner material. Any rolls that appear damaged as a result of tight fastening, or otherwise, may be rejected at the discretion of the ENGINEER. The CONTRACTOR shall be responsible for replacing any damaged or unacceptable material at no cost to the OWNER.

- B. Handling and storage of materials shall be in accordance with MANUFACTURER's recommendations and ASTM D5888 Guidance and is the responsibility of the CONTRACTOR.
- C. Materials shall be protected from UV and rain during storage and shall be kept dry before and during periods of rain. An additional tarpaulin or plastic sheet shall be used over the stacked rolls to provide extra protection for GCL material stored outdoors.
- D. No off-loading shall be performed unless the CQA Manager is present. Damage during off-loading shall be documented by the CQA Manager and CQA Technician (QAT). All damaged rolls must be separated from the undamaged rolls until the proper disposition of that material has been determined by the CQA Manager.
- E. The GCL rolls shall be stored so as to be protected from puncture, dirt, grease, water, moisture, mud, mechanical abrasions, excessive heat, and UV that may damage the GCL material. The rolls shall be stored in a secured area that is level (i.e. no wooden pallets), smooth, and above the ground surface a minimum of 3-inches to protect the GCL from standing water. The rolls shall not be stacked more than three rolls high.
- F. The GCL shall be wound around a cardboard core 4 inches in diameter to facilitate handling. The core is not intended to support the roll for lifting but should be sufficiently strong to prevent collapse during transit.

#### 1.08 WARRANTY

- A. The CONTRACTOR shall furnish the OWNER a written warranty from the GCL MANUFACTURER that shall warrant the material, on a prorated basis, against manufacturing defects and material degradation for a period of five (5) years from the date of installation.
- B. Should a defect occur, which is covered under warranty, the Warrantor shall bear all costs for the repair and/or relocation and replacement of the GCL.

#### 1.09 GUARANTEE

- A. The CONTRACTOR shall guarantee the GCL against defects in installation and workmanship for the period of two (2) years commencing with the date of Final Acceptance. The guarantee shall include the services of qualified service technicians and all materials required for the repairs at no expense to the OWNER.

#### 1.10 DEFINITIONS AND RESPONSIBILITIES

- A. Manufacturer
  - 1. The MANUFACTURER is the firm or corporation responsible for production of the GCL material to be used in the Project. The MANUFACTURER is responsible for any damage to the GCL until the material is accepted by the ENGINEER or his/her field representative upon delivery. The MANUFACTURER shall produce a consistent product meeting the Specifications and shall provide quality control documentation for the product specified herein.

B. Installer

1. The installer is the firm responsible for installation of the GCL. The installer shall be the MANUFACTURER or an approved installer by the MANUFACTURER to install the MANUFACTURER's GCL. The installer shall provide a Installation Supervisor responsible for the installation field crew. The installer shall be responsible for field handling, storing, placing, seaming and all other aspects of the GCL installation. The CONTRACTOR is ultimately responsible for installation of the GCL and final acceptance of the project by the OWNER.

PART 2 PRODUCTS

2.01 MATERIALS

A. General

1. The GCL shall be formulated and manufactured from polypropylene geotextiles and high swelling sodium bentonite.
2. The reinforced GCL material shall be BentoLiner NWL as manufactured by GSE Lining Technology, LLC, Bentomat ST or Bentomat DN as manufactured by CETCO, or an approved equal.
3. Reinforced GCL shall be used in all areas of the cell.. The materials shall be manufactured by the mechanical bonding of the needle punch process to enhance the friction characteristics of the liner and to maintain the integrity of the liner under hydration. Needle punched bentonite geocomposites are those which, by the process of a needling board (similar to that used in the manufacture of standard non-woven geotextiles) have fibers of a non-woven geotextile pushed through the bentonite clay core and integrated into a woven or non-woven geotextile without the use of any chemical binders or adhesives.
4. No disassociation of geotextile components from the bentonite core shall occur under any conditions.
5. The GCL shall be manufactured utilizing bentonite with a minimum of 0.75 pounds per square foot at 0% moisture content per ASTM D5993. The bentonite shall have the following properties:
  - a. Free Swell: minimum 24 ml/ 2 grams minimum (ASTM D5890)
  - b. Fluid Loss: Maximum 18 ml (ASTM D5891)
6. Rolls shall be manufactured a minimum of 12 feet wide and 120 feet long. All rolls shall be labeled and bagged in packaging that is resistant to photodegradation by ultraviolet (UV) light.
7. The non-woven component of the geocomposite shall meet the requirements in Appendix A. The non-woven fabric shall be inspected by the MANUFACTURER for broken needles by permanently installed on-line metal detectors at the production facility. The MANUFACTURER must have an aggressive, thorough and effective means for ensuring that needles are detected and removed from all non-woven fabric produced. If the ENGINEER determines that the MANUFACTURER's quality assurance program is inadequate, the material may be rejected.

8. The woven component of the geocomposite shall be silt film woven geotextile meeting the requirements in Appendix A.
9. The accessory granular bentonite shall be similar to that used in the liner or as recommended by the MANUFACTURER for site specific use. Accessory granular Bentonite shall conform to the requirements listed in Appendix A.
10. A minimum overlap guide-line and a construction match-line delineating the overlap zone shall be imprinted with non-toxic ink on both edges of the GCL panel to ensure the accuracy of the seam. These lines shall be used during CQA to ensure the minimum overlap is achieved. The minimum overlap guideline shall indicate where the edge of the panel must be placed in order to achieve the correct overlap for each panel.

B. Properties

1. The GCL(s) shall meet the minimum average properties listed in Appendix A.

2.02 QUALITY CONTROL DOCUMENTATION

- A. Prior to installation commencement of any GCL material, the CONTRACTOR shall provide to the OWNER the following information certified by the MANUFACTURER for the delivered GCL.
  1. Origin, identification, and production of the Bentonite (supplier's name, brand name and production plant).
  2. Copies of quality control certificates issued by the Bentonite supplier.
  3. Each roll delivered to the Project site shall have the following identification information;
    - a. Manufacturer's name
    - b. Product identification
    - c. GCL roll weight
    - d. Roll number
    - e. Lot number
    - f. Roll dimensions
  4. Quality control certificates, signed by the MANUFACTURER's quality assurance manager. Each certificate shall have roll identification number, sampling procedures, frequency, and test results. At a minimum, the test results shall be in accordance with certified requirements specified in Appendix A.

2.03 CONFORMANCE TESTING

- A. Conformance testing shall be performed by an independent Quality Assurance Laboratory retained by the CONTRACTOR which is approved by the OWNER and ENGINEER. A Quality Assurance Technician (QAT) from the QAL shall obtain the samples from the roll, and mark the sample with an appropriate identification number. All costs for conformance testing will be paid for by the CONTRACTOR.
- B. These conformance tests shall be performed in accordance with Appendix A of the Specifications.

- C. All conformance test results shall be reviewed by the CQA Manager and accepted or rejected, prior to the placement of the GCL. All test results shall meet, or exceed, the property values listed in Appendix A. The course of action implemented for failing tests shall be approved by the CQA Manager. In case of failing test results, the MANUFACTURER may request that another sample be retested by the QAL with MANUFACTURER's technical representative present during the testing procedures. This retesting shall be paid for by the MANUFACTURER. The MANUFACTURER may also have the sample retested at two different laboratories approved by the ENGINEER. If both laboratories report passing results, the material shall be accepted. If both laboratories do not report passing results, all GCL material from the lot representing the failing sample will be considered out of specification and rejected. The MANUFACTURER reserves the right to obtain additional samples from rolls immediately before and after the failing roll or as directed by the QAT and test it by the QAL at his/her own expense. If these rolls pass, then only the failing roll will be rejected. If they fail, then the entire lot will be rejected.

### PART 3 EXECUTION

#### 3.01 SUBGRADE PREPARATION

- A. Preparation of the GCL liner system subgrade shall be as specified in Sections 02200 and 02230.
- B. The surface shall be smooth, uniform, free from sudden changes in grade (such as vehicular ruts), rocks, stones, debris, and deleterious materials. During actual placing and seaming of the liner, the GCL surface shall be kept free of all standing water. If the GCL below the liner becomes wet and unstable, it shall be removed and replaced.
- C. Before the liner installation begins, the CONTRACTOR and installer shall verify in writing and submit to the ENGINEER:
1. Lines and grades are in conformance with the Drawings and Specifications.
  2. The surface area to be lined has been rolled and compacted, free of irregularities and abrupt changes in grade.
- D. If the CONTRACTOR proceeds with installation of materials that cover the GCL prior to providing the appropriate documentation and test results verifying installation of the GCL, the CONTRACTOR will do so at his/her own risk. If the GCL is covered and failing tests are identified, the CONTRACTOR will be required to remove overlying liner system layers, repair the deficient GCL area(s) and reinstall the liner system in accordance with project specification requirements. Any liner system materials damaged during the repair work shall be replaced with new material. All costs associated with such actions will be paid for entirely by the CONTRACTOR including, but not limited to, labor, additional liner system material, testing, labor and material costs incurred by the ENGINEER to perform additional inspection services.

#### 3.02 ANCHOR TRENCH

- A. The anchor trench shall be constructed as shown on the design drawings and as specified herein.
- B. Slightly rounded corners shall be provided in the trench to avoid sharp bends in the GCL.

- C. The anchor trench shall be adequately drained to prevent water ponding and softening to adjacent soils. The anchor trench shall be backfilled with common fill and compacted to 90 percent of modified proctor density, ASTM D1557.
- D. The amount of trench open at any time shall be limited to one day of GCL installation capacity. The anchor trench shall be backfilled and compacted at the end of each day in accordance with the Specifications.

### 3.03 GCL PLACEMENT

#### A. Weather Conditions

- 1. GCL placement shall not proceed during precipitation, excessive moisture, in an area of ponded water, or excessive winds.

#### B. Method of Placement

- 1. Placement of the GCL shall be conducted in accordance with the MANUFACTURER's recommendations and in accordance with ASTM D6102 guidelines. Any deviations from these procedures must be pre-approved by the ENGINEER.
- 2. Each panel of the GCL shall be rolled out and installed in accordance with the approved shop drawings prepared by the CONTRACTOR. The layout shall be designed to keep field joining of the GCL to a minimum and consistent with proper methods of GCL installation.
- 3. GCL rolls shall be placed using proper spreader and rolling bars with chain or cloth slings. If a sheet must be replaced a distance greater than its width, a slip or rub sheet shall be used.
- 4. The QAT and CQA monitors shall inspect each panel, after placement and prior to seaming, for damage and/or defects. Defective or damaged panels shall be replaced or repaired, as approved by the ENGINEER.
- 5. The installer shall avoid dragging the GCL sheets.
- 6. All GCL shall be anchored as shown on the Drawings and consistent with MANUFACTURER's recommendations. Seams shall be perpendicular to the toe of slope at all times.
- 7. The GCL shall be properly weighted, if needed, to avoid uplift due to wind.
- 8. Vehicular traffic across the GCL shall not be allowed except as identified herein. Use of a low ground pressure All-Terrain Vehicle (ATV) that exerts a maximum of 6 psi may be allowed as standard operating procedure for deployment of geosynthetics, if the GCL is dry, if endorsed by the MANUFACTURER in writing and approved by the ENGINEER. Vehicles, machinery, and equipment shall be operated to avoid abrupt stops, starts, or turns.
- 9. The GCL shall be kept free of debris, unnecessary tools and materials. In general, the GCL area shall remain neat in appearance.

10. Equipment necessary to perform the installation (generators, compressors, etc) shall have a scrap GCL sheet placed underneath to protect the installed GCL from possible damage.
11. In the opinion of the CQA Manager, any seam, or edge of GCL material exposed for more than 24 hours or considered partially hydrated when seaming occurs shall receive a 3-foot overlap (rainlap) from the adjoining GCL panel.
12. The CONTRACTOR shall only work on an area that can be completed in one working day. Completion shall be defined as the full installation and anchoring of the GCL liner and placement of the specified liners or cover soils. Upon completing placement of bentonite panels in any area, the geomembrane shall be immediately installed over bentonite panels as detailed in Section 02776. Under no circumstances will the ENGINEER allow the GCL mat to be exposed to the elements overnight.
13. The minimum allowable size for a GCL "panel" shall be 120 feet in length, unless approved by the ENGINEER.
14. The GCL shall not get wet before or during installation. The GCL mat shall not be installed during periods of any precipitation or in standing water. If a precipitation event occurs after the installation of a bentonite mat panel, but prior to covering with geomembrane, thin film plastic sheeting may be used to cover and temporarily protect the bentonite mat from moisture, if approved by the ENGINEER.
15. GCL material that appears hydrated prior to or during installation will not be accepted by the CQA Manager. GCL material, which has been hydrated prior to placement of confining stress greater than 0.75 psi, shall be removed and replaced at the CONTRACTOR's expense. Hydrated GCL is defined as material which has become soft as determined by squeezing the material with finger pressure, material which has exhibited visible swelling, or material which has a moisture content greater than 35 percent, or MANUFACTURER'S recommendation, as determined by ASTM D2216.
16. GCL panels shall be placed with the non-woven geotextile side facing up to maximize the shear strength characteristics. On sloped areas exceeding a steepness of 4H:1V, the long dimension of all panels shall be oriented parallel to the slope. Panels should be placed from the highest elevation to the lowest within the area to be lined, to facilitate drainage in the event of precipitation. Panels shall be placed free of tension or stress yet without wrinkles or folds. It is not permissible to stretch the GCL in order to fit a designated area. Panels shall not be dragged across the subgrade into position except where necessary to obtain the correct overlap for adjacent panels.
17. When covering GCL installed on sloped areas steeper than 4H:1V, the cover material should be pushed upslope to minimize tension on the GCL.
18. Any leading edge of panels left uncovered shall be protected at the end of the working day with a waterproof sheet, which is adequately secured with sandbags and other ballast.
19. Reinforced GCL panels on sideslopes shall extend a minimum of 10 ft beyond the interface of the steep sideslope and the bottom.

C. Liner Penetrations

1. GCL aprons or shrouds shall be furnished and installed where indicated on the Drawings. The aprons shall be of the same material as the GCL.
2. Aprons and shrouds shall fit snugly around the pipe.
3. For any penetrations or structures the mat will contact, a small notch (approximately 3 inches wide and 8 inches deep) shall be cut against the edge of the subgrade area. The mat shall be brought up to the edge of the structure and trimmed to fit into the notch. The CONTRACTOR shall then hand-apply a pure bead of bentonite into half the notch. The mat shall then be inserted into the notch, with the remaining volume of the notch refilled with the pure bentonite and compacted.

3.04 FIELD SEAMS

- A. Individual panels of GCL shall be laid out and overlapped by a minimum of 24-inches for end seams and or minimum of 12-inches for side seams prior to seaming. The area to be seamed shall be cleaned and prepared prior to placement of granular bentonite.
- B. All seams shall have a seam number that corresponds with the panel layout numbers. The numbering system shall be used in the development of the record drawings. Seam numbers shall be derived from the combination of the two panel numbers that are to be seamed.
- C. Seam areas or runs shall also be flat and clear of any large rocks, debris, or ruts. Contacting surfaces shall be clean and clear of dirt or native soil with all edges pulled tight to maximize contact and to smooth out any wrinkles or creases. Overlaps shall verified by CQA monitors.
- D. Seams shall be augmented with granular bentonite to ensure seam integrity. Granular bentonite shall be dispersed evenly from the panel edge to the lap line at a minimum rate of 1/4 pound per lineal foot continuously along all seams or overlap areas.
- E. On gently sloping areas (gentler than 4H:1V) where seams may be placed across the slope, overlaps should be "shingled" so as to prevent flow into the seam.

3.05 DISPOSAL OF WASTE MATERIAL

- A. Upon completion of installation, the CONTRACTOR shall dispose of all trash, waste material and equipment used in connection with the performed work and shall leave the premises in a neat and acceptable condition.

3.06 FIELD QUALITY CONTROL

A. Repair Procedures

1. Any portion of the GCL exhibiting signs of defect shall be repaired. The following procedure should be used to repair these areas. The final decision as to the appropriate repair procedure shall be made by the ENGINEER.

Large rips or tears shall be repaired by completely exposing the affected area, removing all foreign objects or soil, and by then placing a patch over the damage, with a minimum

overlap of 12 inches on all edges. Accessory bentonite shall be placed between the patch and the repaired material at a rate of 1/4 pound per lineal foot of edge, spread in a 6-inch width. The above procedures shall also be implemented if a rip or tear occurs on a sloped surface. In this instance, the edges of the patch shall be fastened to the repaired liner with construction adhesive, in addition to the bentonite-enhanced seam.

END OF SECTION

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**APPENDIX A**  
**TABLE A: GEOSYNTHETIC CLAY LINER ANALYTICAL TESTING FREQUENCY**

MATERIAL	TEST	METHOD <sup>1,2,3</sup>	MIN. ACCEPTABLE VALUE <sup>9</sup> (REINFORCED)	TEST FREQUENCY	COMMENTS
BENTONITE <sup>6</sup>	Swell Index	ASTM D5890	24 mL/2g	Every 100,000 lb	by Manufacturer
	Fluid Loss	ASTM D5891	18 mL (max.)	Every 100,000 lb	by Manufacturer
	Moisture Content	ASTM D5993	35% (max.)	Every 100,000 lb	by Manufacturer
	Particle Size Distribution (Granular Bentonite)	ASTM D421	Submit Test Results	Every 100,000 lb	by Manufacturer
WOVEN GEOTEXTILE	Mass per unit area	ASTM D5261	3.0 oz./sy	Every 200,000 sq. ft.	by Manufacturer
NON-WOVEN GEOTEXTILE <sup>5</sup>	Mass per unit area	ASTM D5261	5.8 oz./sy	Every 200,000 sq. ft.	by Manufacturer
GCL	Hydraulic Conductivity <sup>8</sup>	ASTM D5887	$5 \times 10^{-9}$ cm/sec (max.)	Every week	by Manufacturer
	Tensile Strength <sup>4</sup>	ASTM D6768	23 lb./in.	Every 200,000 sq. ft.	by Manufacturer
	Peel Strength	ASTM D6496	2.1 lb./in.	Every 40,000 sq. ft.	by Manufacturer
	Mass per unit area <sup>7</sup>	ASTM D5993	0.81 lb/sf	Every 40,000 sq. ft.	field sample
	Index Flux	ASTM D5887	$1 \times 10^{-6}$ cm <sup>3</sup> /cm <sup>2</sup> /sec (max.)	Every Lot	field sample

Explanatory Notes for Table A-1:

1. Testing methods and values shall be in accordance with GRI-GCL3\* document
2. ASTM procedures modified as necessary to utilize three test specimens across the roll width. Results are reported as the average of these three values. Size of test specimens may also differ slightly from those indicated in ASTM methods.
3. All required values listed are minimum average roll values (MARVs) unless otherwise indicated.
4. All tensile testing on the geotextiles and on the GCL is performed with the test specimens oriented in the machine direction.
5. The values listed represent the non-woven geotextile before being needle punched into the GCL. The actual tensile strength of the non-woven may be higher but cannot be accurately measured due to difficulties in separating it from the woven geotextile.
6. These parameters are for the bentonite as delivered to the GCL MANUFACTURER, not for the bentonite in the finished product.
7. Mass of the GCL is measured after oven drying per the stated test method
8. Permeability testing is performed with a 5-psi confining pressure and a 2-psi head pressure.
9. Hydraulic Conductivity, Index Flux, and Fluid Loss are maximum values.

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## APPENDIX B

The following forms are included and shall be completed by the responsible party as shown on the forms.

Form No.	Title
CQC - 100	GCL Project QC Log
CQC - 101	Receiving QC Log
CQC - 102	Personnel QC Log
CQC - 103	Subgrade Surface Acceptance
CQC - 104	GCL Installation Tracking Log
CQC - 105	GCL Damage Report

**FORM CQC - 100**  
**GCL PROJECT QC LOG**  
(one sheet per project)

<b>PROJECT</b>	
NAME:	
NUMBER:	
LOCATION:	
OWNER:	
ADDRESS:	
CONTACT:	
PHONE:	
<b>ENGINEERING</b>	
ENGINEERING FIRM:	
ADDRESS:	
CONTACT:	
PHONE:	
<b>CONTRACTOR</b>	
GENERAL CONTRACTOR:	
ADDRESS:	
CONTACT:	
PHONE:	
<b>SUPPLIER OF GCL MATERIALS</b>	
NAME:	
ADDRESS:	
CONTACT:	
PHONE:	
<b>QC INSPECTION</b>	
NAME:	
ADDRESS:	
CONTACT:	

**FORM CQC - 100**  
**GCL PROJECT QC LOG**  
(one sheet per project)  
(Continued)

<b>TESTING LABORATORY</b>	
GCL TESTING LABORATORY:	
ADDRESS:	
CONTACT:	
PHONE:	
<b>FABRICATOR OF MATERIAL</b>	
NAME:	
ADDRESS:	
CONTACT:	
PHONE:	
<b>INSTALLER OF MATERIAL</b>	
NAME:	
ADDRESS:	
CONTACT:	
PHONE:	
<b>GCL MATERIALS</b>	
SPECIFIED GCL MATERIALS:	
TYPE:	
<b>MATERIAL CERTIFICATION</b>	
MATERIAL CERTIFICATION RECEIVED:	
DATE:	
ACCEPTED:	

**FORM CQC - 101**  
**RECEIVING QC LOG**  
(one sheet per truck)

PROJECT NAME:	
DATE:	
TIME:"	
PROJECT NUMBER:	
TRUCKERS ID:	
NO. OF PIECES ON BOARD:	
AGREE WITH PACKING LIST?	
CONDITION OF PACKAGING:	
VERIFY PROPER MATERIALS:	
VERIFY PROPER THICKNESS:	
IDENTIFY ROLL NUMBERS:	
IDENTIFY ACCESSORIES:	
IDENTIFY DAMAGED ITEMS:	
TYPE OF UNLOADING EQUIPMENT USED:	
OPERATOR:	
COMMENTS:	
STORAGE AREA CONDITION (SURFACE):	
LOCATION TO PLACEMENT AREA:	
MATERIAL PROPERLY COVERED:	
WEATHER CONDITIONS:	
TEMP.:	
SIGNATURES:	
QC INSPECTOR:	
SITE SUPERVISOR:	
COMMENTS:	

**FORM CQC - 102**  
**PERSONNEL QC LOG**  
(installation personnel)  
(complete for each mobilization or change of personnel)

PROJECT NAME:	
DATE:	
PROJECT NUMBER:	
SAFETY MEETING CONDUCTED ON MATERIALS HANDLING:	
GIVEN BY:	
DATE:	
SUPERINTENDENT OF INSTALLATION:	
INSTALLATION CREW PERSONNEL	
#1 CREW LEADER:	
HELPER:	
#2 CREW LEADER:	
HELPER:	
#3 CREW LEADER:	
HELPER:	
#4 CREW LEADER:	
HELPER:	
#5 CREW LEADER:	
HELPER:	
#6 CREW LEADER:	
HELPER:	
#7 CREW LEADER:	
HELPER:	
#8 CREW LEADER:	
HELPER:	
OTHER CREW MEMBERS	
NAME:	
NAME:	
SIGNED:	
QC INSPECTOR:	

**FORM CQC - 103**  
**SUBGRADE SURFACE ACCEPTANCE**  
(one sheet per Day of GCL Deployment)

Surface for GCL placement accepted, covered by panel numbers: \_\_\_\_\_

Approximate size of area: \_\_\_\_\_

**CERTIFICATE OF ACCEPTANCE OF SUBGRADE SOIL LINER BY INSTALLER**

I the undersigned, duly authorized representative of \_\_\_\_\_  
do hereby accept the soil liner surface as being acceptable for the placement of GCL.

\_\_\_\_\_  
Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

Certificate Accepted by Inspector - Company: \_\_\_\_\_

\_\_\_\_\_  
Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

QC INSPECTOR: \_\_\_\_\_

SITE SUPERVISOR: \_\_\_\_\_

INSTALLING SUPERVISOR: \_\_\_\_\_

COMMENTS:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_





SECTION 02623  
HIGH DENSITY POLYETHYLENE (HDPE) PIPE  
FOR LEACHATE COLLECTION SYSTEMS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and install high density polyethylene leachate pipe, fittings and appurtenances as shown on the Drawings and as specified herein.

1.02 RELATED WORK

- A. Granular Fill Materials are included in Section 02230.
- B. High Density Polyethylene (HDPE) Geomembrane Liner is included in Section 02776.
- C. Geotextile Fabric is included in Section 02272.

1.03 SUBMITTALS

- A. Submit, in accordance with Section 01300, and within 30 days following the Effective Date of the Agreement, the following:
  - 1. List of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site.
  - 2. The origin of the resin to be used in the manufacturing of the pipe including the suppliers name and production plant, as well as brand name and number.
  - 3. Documentation from the resin's manufacturer showing results of the following tests for resin identification:
    - a. Melt Flow Index     ASTM D1238
    - b. Density             ASTM D1505
  - 4. Manufacturer quality control manual describing implementation of quality control procedures during pipe manufacturing process.
  - 5. Pipe manufacturer's certification of compliance with these Specifications.
  - 6. Complete, detailed shop drawings of all polyethylene pipe, including the location of all fittings, joints and connections to structures.
  - 7. MANUFACTURER's recommendations for handling, storing and installing pipe and fittings.
  - 8. For each shipment of pipe a manufacturer's certification that the pipe was manufactured from the same resin identified in Paragraph 1.03A3.

9. Certification demonstrating that the joining technician was trained by the pipe manufacturer and is qualified to perform heat fusion welding.
10. Cleaning CONTRACTOR qualifications for all leachate piping that complies with Paragraphs 3.02.

#### 1.04 REFERENCE STANDARDS

##### A. ASTM International

1. ASTM D1238 - Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer.
2. ASTM D1505 - Standard Test Method for Density of Plastics by the Density-Gradient Technique.
3. ASTM D1603 - Standard Test Method for Carbon Black Content in Olefin Plastics.
4. ASTM F2620 Standard Practice for Heat Fusion of Polyethylene Pipe and Fittings.
5. ASTM D2837 - Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products.
6. ASTM D3350 - Standard Specification for Polyethylene Plastic Pipe and Fittings Materials.
7. ASTM F714 - Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
8. ASTM F1055 - Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and Crosslinked Polyethylene (PEX) Pipe and Tubing

##### B. Plastic Pipe Institute (PPI)

1. Handbook of Polyethylene Pipe

##### C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

#### 1.05 QUALITY ASSURANCE

##### A. Resin Evaluation

1. All incoming resin shall be sampled for conformance testing against test results supplied by the resin manufacturer. Samples shall be taken from the top and bottom of each compartment from every hopper car received. The following conformance tests shall be performed on the sampler:
  - a. Melt Flow Index      ASTM D1238
  - b. Density                ASTM D1505

- c. The results of these tests shall become part of the MANUFACTURER's permanent quality control records.

B. Finished Product Evaluation

1. Each length of pipe produced shall be checked by production staff for the items listed below. The results of all measurements shall be recorded on production sheets which become part of the MANUFACTURER's permanent records.
  - a. Pipe in process shall be checked visually, inside and out for cosmetic defects (grooves, pits, hollows, etc).
  - b. Pipe outside diameter shall be measured using a suitable periphery tape to ensure conformance with ASTM F714.
  - c. Pipe wall thickness shall be measured at twelve equally spaced locations around the circumference at both ends of the pipe to ensure conformance with ASTM F714.
  - d. Pipe length shall be measured.
  - e. Pipe marking shall be examined and checked for accuracy.
  - f. Pipe ends shall be checked to ensure they are cut square and clean.
  - g. Subject inside surface to a "reverse bend test" to ensure the pipe is free of oxidation (brittleness).

C. Stress Regression Testing

1. The polyethylene pipe MANUFACTURER shall provide certification that stress regression testing has been performed on the specific polyethylene resin being utilized in the manufacture of this product. This stress regression testing shall have been done in accordance with ASTM D2837 and the MANUFACTURER shall provide a product supplying a minimum Hydrostatic Design Basis (HDB) of 1600 psi as determined in accordance with ASTM D2837.

1.06 WARRANTY

- A. The CONTRACTOR shall furnish the OWNER a written warranty from the MANUFACTURER. The manufacturer shall warrant that the pipe shall be of merchantable quality (as defined by the Uniform Commercial Code) for a period of 1 year. The manufacturer shall guarantee that the pipe furnished is suitable for the purpose intended and free from defects of material and workmanship. In the event the pipe fails to perform as specified, the pipe manufacturer shall promptly replace defective pipe without any cost to the OWNER.
- B. Should a defect occur, which is covered under warranty, the Warrantor shall bear all costs for the repair and/or relocation and replacement.

1.07 GUARANTEE

- A. The CONTRACTOR shall guarantee the HDPE pipe against defects in installation and workmanship for the period of two (2) years commencing with the date of Final Acceptance.. The guarantee shall include the services of qualified service technicians and all materials required for the repairs at no expense to the OWNER.

## PART 2 PRODUCTS

### 2.01 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

- A. High Density Polyethylene (HDPE) Pipe resins shall be high molecular weight, high density polyethylene with a cell classification number of 345464C in accordance with ASTM D3350 and a minimum density of 0.955 in accordance with ASTM D1505.
- B. The pipes shall have the nominal dimensions shown on the Drawings, and shall meet the requirements of IPS Standard Dimension Ratio (SDR) 11, as specified in the drawings.
- C. All polyethylene pipe shall meet the requirements of ASTM F714.
- D. The pipe shall be joined with butt, heat fusion joints. All joints shall be made in strict compliance with the MANUFACTURER's recommendations.
- E. Pipe shall be furnished in standard laying lengths not exceeding 50-ft.
- F. All high density polyethylene pipe and fittings shall be made from the same resin. If rework compounds are required, only those generated in the manufacturer's own plant from resin compounds of the same class and type from the same raw material supplier shall be used.
- G. The polyethylene compound shall be suitably protected against degradation by ultraviolet light as required by ASTM D1603.

### 2.02 PIPE IDENTIFICATION

- A. The following shall be continuously indent printed on the pipe or spaced at intervals not exceeding 5-ft per ASTM F714:
  - 1. Name and/or trademark of the pipe MANUFACTURER.
  - 2. Nominal pipe size (outside diameter) in accordance with ASTM F714.
  - 3. Dimension ratio (DR) and pressure rating per ASTM F714.
  - 4. The letters PE followed by the polyethylene grade in accordance with ASTM D3350, (e.g., PE 345464C). Where applicable, the standard thermoplastic pipe materials designation code may be used as an alternative marking, eg. PE 3608.
  - 5. Manufacturing standard reference, e.g., ASTM F714.
  - 6. A production code from which the date and place of manufacture can be determined.

### 2.03 PERFORATIONS

- A. The leachate collection pipes inside the lined area, as shown on the Drawings, shall be perforated. The perforations shall be drilled into the pipe at the factory after manufacturing, as shown on the Drawings.
- B. The perforation shall be covered with tape compatible to the pipe material upon delivery to prevent soil material from entering the pipe prior to installation.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. High Density Polyethylene (HDPE) Pipe shall be installed in accordance with the instruction of the MANUFACTURER, as shown on the Drawings and as specified herein. All heat fusion joints shall be done by a factory qualified joining technician as designated by the pipe MANUFACTURER.
- B. Pipe shall be laid to lines and grade shown on the Drawings with bedding and backfill as shown on the Drawings. The tape covering the perforations shall be removed during installation. The pipe shall be installed such that perforations face the bottom of trench.
- C. When laying is not in progress, including lunchtime, the open ends of the pipe shall be closed by fabricated plugs, or by other approved means. All plugs shall be OD fitting type plugs. No plugs will be allowed that require insertion of the plug into pipe, unless approved by the ENGINEER.
- D. Pipe shall be stored on clean level ground to prevent undue scratching or gouging. The handling of the pipe shall be in such a manner that the pipe is not damaged by dragging it over sharp and cutting objects. 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.
- E. Sections of pipe with cuts, scratches or gouges deeper than allowed shall be removed completely and the ends of the pipeline rejoined.
- F. The pipe shall be joined by the method of thermal butt fusion, as outlined in ASTM F2620 or as recommended by the MANUFACTURER. All joints shall be made in strict compliance with the MANUFACTURER's recommendations. In tight locations in which the butt fusion equipment cannot be set up, a thermal coupling such as Central Electrofusion Systems, or equal, may be used. The pipe shall be joined as outlined in ASTM F1055.
- G. Mechanical connections of the polyethylene pipe to auxiliary equipment such as valves, pumps and tanks shall be through flanged connections which shall consist of the following:
  - 1. A stainless steel back-up, polyethylene flange shall be thermally butt-fused to the stub end of the pipe.
  - 2. A Type 316 stainless steel back up ring on both sides of the connection shall be used as approved by the ENGINEER.
- H. Flange connections shall be provided with a full face neoprene gasket.
- I. All HDPE pipe must be at the temperature of the surrounding soil at the time of backfilling and compaction.
- J. Installation of pipe shall be observed and accepted by the Engineer prior to backfilling.

3.02 CLEANING

- A. As pipe laying progresses, and at the conclusion of the work, thoroughly clean all of the new pipelines to remove all dirt, stones, pieces of wood or other material which may have entered during the construction period. Debris cleaned from the lines shall be removed from the job site. If, after this cleaning, any obstructions remain, they shall be removed.

END OF SECTION

SECTION 02776  
TEXTURED HIGH DENSITY POLYETHYLENE (HDPE)  
GEOMEMBRANE LINER

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The CONTRACTOR shall furnish all labor, materials, equipment and incidentals required and install High Density Polyethylene (HDPE) geomembrane as shown on the Drawings and as specified herein.

1.02 RELATED WORK

- A. Related Work includes, but is not limited to, the following:
1. Earthwork is included in Section 02200.
  2. Granular Fill is included in Section 02230.
  3. Geotextile is included in Section 02272.
  4. Geosynthetic Clay Liner is included in Section 02275.

1.03 SUBMITTALS

- A. Submit, in accordance with Section 01300, and within 15 calendar days from the Notice to Proceed, submit the following information:
1. Submittals relating to geomembrane MANUFACTURER and geomembrane:
    - a. Corporate Background
    - b. Manufacturing capabilities:
      - 1) Information on factory size, equipment, personnel, number of shifts per day and production capacity per shift.
      - 2) List of material performance properties and samples of the liner formulation with the attached certified test results.
        - a) Stress Crack Resistance (ASTM D 5397, App. A).
        - b) High Pressure OIT (ASTM D 5885).
        - c) Oven Aging @ 85°C (ASTM D 5721) with High Pressure OIT (ASTM D 5885) percent retained after 90 days.
        - d) UV Resistance (ASTM D 7238) with High Pressure OIT (ASTM D 5885) percent retained after 1,600 hours.
        - e) Interface Shear (ASTM D 5321) per Section 02275, Paragraph 1.03.A.3.
      - 3) MANUFACTURER's Quality Control program and manual including description of laboratory facilities including GAI-LAP and ISO 9001; 2008 Certifications.
      - 4) A list of ten completed facilities totaling a minimum of ten million square feet, for which the MANUFACTURER has manufactured HDPE geomembrane. The following information shall be provided for each facility.
        - a) Name and purpose of facility, its location and date of installation.
        - b) Name of OWNER, project manager, design engineer and INSTALLER.

- c) Geomembrane thickness and surface area.
      - d) Information on performance of the facility.
    - c. The origin of the resin to be used in the manufacturing of geomembrane including the suppliers name and production plant, as well as brand name and number.  
MANUFACTURER to provide statement certifying that no recycled polymer and no more than 10% rework of the same type of material is added to the resin.
    - d. Copy of Quality Control certificates in conformance with Paragraphs 2.01 and 2.02.
    - e. Certification that the HDPE geomembrane and extrudate produced for this project have the same properties.
    - f. A "Sample Warranty" in accordance with Paragraph 1.08A.
  2. Submittals relating to the installing CONTRACTOR
    - a. Background Information including Approved Installation Contractor (AIC) status documentation as issued by the International Association of Geosynthetic Installers.
    - b. Installation capabilities:
      - 1) Information on equipment (including tensiometer) and personnel.
      - 2) Anticipated average daily production (complete including QC measures).
      - 3) A list of minimum values for seam properties.
    - c. CONTRACTOR shall submit a list of at least five similar completed projects.  
Installing CONTRACTOR shall have installed a minimum of two million square feet of HDPE geomembrane. The following information shall be provided for each facility:
      - 1) Name and purpose of facility, its location and date of installation.
      - 2) Name of Owner, design engineer, MANUFACTURER and name and telephone number of contact at the facility who can discuss the project.
      - 3) Thickness of geomembrane and surface area of the installed geomembrane.
      - 4) Type of seaming, patching and tacking equipment.
      - 5) A copy of the MANUFACTURER's certification or approval letter.
- B. Within 30 days prior to liner installation submit the following:
1. Shop Drawings
    - a. Proposed panel layout showing the installation layout identifying field seams as well as any variance or additional details which deviate from the Drawings.
    - b. Details of seaming the geomembrane, anchoring, connections, penetrations and other construction details.
  2. Installation Schedule.
  3. Quality Control Manual
    - a. A Quality Control manual that specifically defines the quality assurance program during installation. The manual shall include daily procedures, welding techniques, field testing procedures, lab testing procedures, specific steps that are to be taken in the event of a failure or defect, personnel requirements, levels of authority and all other information necessary to ensure a high quality geomembrane installation.
  4. Field Personnel Information
    - a. Resume of the installation supervisor to be assigned to the project. The installation supervisor shall have installed or supervised the installation and seaming of a minimum of two million square feet of HDPE geomembrane liner.

- b. Resume of the master seamer to be assigned to the project. Master seamer must have completed a minimum of one million square feet of geomembrane seaming using the type of seaming apparatus proposed for use on this project.
- c. Resume of the quality control personnel to be assigned to the Project along with pertinent experience information.
- d. A list of personnel performing field seaming operations along with pertinent experience information.

#### 1.04 REFERENCE STANDARDS

##### A. ASTM International

1. ASTM D792 - Specific Gravity (Relative Density) and Density of Plastics by Displacement
2. ASTM D1004 - Test Method for Initial Tear Resistance of Plastics Film and Sheet
3. ASTM D1238 - Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer
4. ASTM D1505 - Test Method for Density of Plastics by the Density-Gradient Technique
5. ASTM D1603 - Test Method for Carbon Black in Olefin Plastics
6. ASTM D3895 - Test Method for Oxidative Induction Time of Polyolefins by Thermal Analysis
7. ASTM D4218 - Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
8. ASTM D4833 - Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products
9. ASTM D5199 - Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes
10. ASTM D5321 - Standard Test for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method.
11. ASTM D5397 - Procedure to Perform a Single Point Notched Constant Tensile Load - Appendix (SP-NCTL) Test
12. ASTM D5596 - Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics
13. ASTM D5721 - Practice for Air-Oven Aging of Polyolefin Geomembranes
14. ASTM D5885 - Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High Pressure Differential Scanning Calorimetry
15. ASTM D5994 - Test Method for Measuring the Core Thickness of Textured Geomembranes

16. ASTM D6392 – Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods
17. ASTM D6693 – Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes
18. ASTM D7007-09 - Standard Practices for Electrical Methods for Locating Leaks in Geomembranes Covered with Water or Earth Materials
19. ASTM D7466 - Standard Test Method for Measuring the Asperity Height of Textured Geomembrane

B. Geosynthetic Research Institute (GRI)

1. GM10 Specification for the Stress Crack Resistance of Geomembrane Sheet
2. GM11 Accelerated Weathering of Geomembranes using a Fluorescent UVA-Condensation Exposure Device
3. GM13 Test Methods, Test Properties and Testing Frequency for High density Polyethylene (HDPE) Textured Geomembranes
4. GM19 Seam Strength and Related Properties of Thermally Bonded Polyolefin Geomembranes

- C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

- A. In addition to MANUFACTURER and INSTALLER requirements for qualifications and certification specified in Paragraph 1.03 the Quality Assurance consists of conformance testing of the material delivered to the site and field quality control during installation.
- B. Conformance testing requirements are specified in Paragraph 2.03. The purpose of conformance testing is to assure that the supplied material conforms to this Section and to the MANUFACTURER's Quality Control certificates. The CONTRACTOR shall submit the results of all geosynthetic conformance tests to the ENGINEER prior to shipping the materials to the project site.
- C. Field quality control requirements are specified in Paragraph 3.06. The purpose of field quality control procedures is to assure that the geomembrane has been installed in accordance with the specifications and MANUFACTURER's recommendations.
- D. Quality Control Plan
  1. The forms in Appendix B shall be used for field installation documentation. Alternative forms may be used for documentation as approved by the ENGINEER's Field Representative (EFR).

E. Geomembrane Quality Control Documentation

1. Pre-installation Conference
  - a. Prior to commencing work, a pre-installation conference shall be held and the following project personnel shall be identified by name and recorded in the project files:
    - 1) OWNER's Representative
    - 2) CONTRACTOR's Representative
    - 3) ENGINEER's Field Representative
    - 4) Installation Supervisor
    - 5) Master Seamer
    - 6) Quality Assurance Laboratory
    - 7) Quality Assurance Technician
  - b. Two duplicate project files shall be maintained. One shall be maintained by the ENGINEER's Field Representative (EFR) and the other shall be maintained by the INSTALLER's QC Technician. The INSTALLER shall provide the EFR with daily documentation by the end of the following work day. At the end of each work week the files shall be updated and checked to assure that copies of all pertinent project information is included in each file.
  - c. Blank copies of the following project forms shall be available onsite throughout the duration of the project:

<u>Form No.</u>	<u>Title</u>
1	Subgrade Surface Acceptance
2	Daily QC Report
3	Material Receiving Log
4	Daily Panel Placement Log
5	Trial Weld Log
6	Daily Seaming Log
7	Seam Inspection Log-Air Pressure Test
8	Seam Inspection Log-Vacuum Test
9	Destructive Sample Log

1.06 QUALIFICATIONS

A. MANUFACTURER

1. The MANUFACTURER of the lining material described hereunder shall have previously demonstrated his/her ability to produce this geomembrane by having at least 5 years continuous experience in the manufacturing of HDPE geomembrane and successfully manufactured a minimum of 50 million square feet of similar liner material for hydraulic lining installations.

B. INSTALLER

1. The INSTALLER shall be the MANUFACTURER or an approved INSTALLER trained and certified to install the MANUFACTURER's geomembrane. The INSTALLER shall have current AIC status. Installation shall be performed under the constant direction of a single field installation supervisor who shall remain on site and be in responsible charge, through the geomembrane installation, for geomembrane layout, seaming, patching, testing, repairs and all other activities required by the INSTALLER. The field installation supervisor shall have installed or supervised the installation and seaming of a minimum of two million square feet of HDPE geomembrane liner.

1.07 DELIVERY, STORAGE AND HANDLING

- A. The geomembrane rolls shall be packaged and shipped by appropriate means to prevent damage of the geomembrane rolls. Off-loading and storage of the geomembrane is the responsibility of the CONTRACTOR. The CONTRACTOR shall be responsible for replacing any damaged or unacceptable material at no additional cost to the OWNER.
- B. No off-loading shall be performed unless the EFR is present. Damage during off-loading shall be documented by the EFR. All damaged rolls must be separated from the undamaged rolls until the proper disposition of that material has been determined by the EFR.
- C. The geomembrane rolls shall be stored so as to be protected from puncture, dirt, grease, water, moisture, mud, mechanical abrasions and excessive heat that may damage the geomembrane material. The rolls shall be stored on a prepared surface (not wooden pallets) and shall not be stacked more than two rolls high.

1.08 MATERIAL WARRANTY

- A. The CONTRACTOR shall furnish the OWNER a written warranty from the geomembrane MANUFACTURER that shall warrant the material, on a prorated basis, against manufacturing defects and material degradation for a period of twenty (20) years from the date of installation.
- B. Should a defect occur, which is covered under warranty, the Warrantor shall bear all costs for the repair and/or relocation and replacement of the geomembrane.

1.09 GUARANTEE

- A. The CONTRACTOR shall guarantee the HDPE geomembrane against defects in installation and workmanship for the period of two (2) years commencing with the date of Final Acceptance. The guarantee shall include the services of qualified service technicians and all materials required for the repairs at no expense to the OWNER.

1.10 DEFINITIONS AND RESPONSIBILITIES

A. CONTRACTOR

1. The CONTRACTOR is the firm or corporation with whom the OWNER has entered into agreement to construct the project. The CONTRACTOR is responsible for all submittals by the MANUFACTURER and the INSTALLER as required by the Specifications. The CONTRACTOR is also responsible for scheduling and coordination of the required work

with the MANUFACTURER and the INSTALLER to complete the project. The CONTRACTOR is responsible for furnishing as-built drawings and a copy of the complete documentation of the geomembrane system. The CONTRACTOR is also responsible for daily updating of the design drawings onsite and for any and all deviations from these Drawings. All deviations must be initialed and approved by the ENGINEER's Field Representative onsite.

B. MANUFACTURER

1. The MANUFACTURER is the firm or corporation responsible for production of the geomembrane material to be used in the project. The MANUFACTURER shall produce a consistent product meeting the project specifications and shall provide Quality Control documentation for the product specified herein. The MANUFACTURER is responsible for the condition of the geosynthetic until the material is accepted by the ENGINEER's Field Representative upon delivery and installation. The MANUFACTURER shall produce a product that consistently meets the Project Specifications.

C. Installer

1. The INSTALLER is the firm or corporation responsible for installation of the geomembrane. The INSTALLER shall be the MANUFACTURER or an approved INSTALLER trained and certified to install the MANUFACTURER's geomembrane. The INSTALLER shall be responsible for field handling, storing, placing, seaming and all other aspects of the geomembrane installation.

PART 2 PRODUCTS

2.01 MATERIALS

A. General

1. The resin from which the geomembrane is made shall be in the density range of 0.932 g/ml or higher, and have a melt index value per ASTM D1238 of less than 1.0 g/10 min. Formulated sheet density shall be 0.940 g/ml or higher.
2. The blended resin shall contain two to three percent carbon black, anti-oxidants and heat stabilizer, but no fillers or extenders. The resin shall be virgin material, with no more than two percent rework. If rework is used, it must be of the same formulation as the parent material. No post-consumer resin of any type shall be added to the formulation.
3. The geomembrane material shall be so produced as to be free of holes, blisters, undispersed raw materials, or any sign of contamination by foreign matter.
4. The sheets shall be manufactured in a minimum 20-ft seamless width. Labels on the roll shall identify the thickness, length, width and manufacturer's roll and lot number.

B. Properties

1. The geomembrane rolls shall be 60-mil HDPE and shall meet the specified physical, mechanical, and chemical property requirements listed in Appendix A, Table A1 and GRI GM13 Test Methods, Test Properties and Testing Frequency for High density Polyethylene (HDPE) Textured Geomembranes.

2. Surface texturing shall be of the same type of polymer and formulation as the base sheet polymer and its formulation.
3. The 60-mil HDPE geomembrane rolls have be textured on both sides.

C. Other Materials

1. Extrudate welding rods shall be of the same compound as the geomembrane and supplied by the MANUFACTURER and shall be delivered in the original sealed containers. Each container shall have a label bearing the brand name, manufacturer's lot number and complete directions as to proper storage.
2. Boots and shrouds for pipe penetration shall fit snugly around the pipe. Prefabricated material shall be designed to fit site specific conditions for the intended slope and size of pipe.

2.02 QUALITY CONTROL DOCUMENTATION

- A. Prior to installation commencement of any geomembrane material, the CONTRACTOR shall provide the following information certified by the MANUFACTURER for the delivered geomembrane material.
1. Origin, identification and production of the resin (supplier's name, brand name and production plant).
  2. Copies of Quality Control certificates issued by the resin supplier.
  3. MANUFACTURER's certification verifying that the quality of the resin used to manufacture the geomembrane meets the requirements specified in Paragraph 2.01.
  4. Each roll delivered to the project site shall have the following identification information:
    - a. MANUFACTURER's name
    - b. Product identification
    - c. Thickness
    - d. Roll number
    - e. Roll dimensions
    - f. Lot Number
  5. Quality Control certificates, signed by the MANUFACTURER's quality assurance manager, shall be submitted for each roll delivered to the site. Each certificate shall have roll identification number, sampling procedures, frequency and test results. At a minimum, test results shall be provided for each roll delivered to the site in accordance with test requirements specified in Appendix A, Table A1 and GRI GM13.

2.03 CONFORMANCE TESTING

- A. Conformance testing shall be performed by a GRI accredited independent Quality Assurance Laboratory (QAL) provided and paid for by the CONTRACTOR. A qualified technician [from the QAL] shall obtain the samples from the roll, mark the machine direction and identification number. The following conformance tests shall be conducted at the laboratory in accordance with GRI GM13:

1. Thickness
  2. Asperity Height
  3. Density
  4. Tensile properties
  5. Tear resistance
  6. Carbon black content
  7. Carbon black dispersion
  8. OIT
  9. High Pressure OIT
- B. These conformance tests shall be performed in accordance with Table A1, at a frequency of one sample per lot or one sample per 100,000 square feet, whichever results in the greater number of conformance tests. Oven Aging (ASTM D 5721) and UV Resistance (ASTM D 7238) shall be tested once per formulation as noted in Table A1. A lot number is defined as a continuous production process without changes to raw material or manufacturing methods. For every change in lot number, the CONTRACTOR shall perform conformance testing on the initial roll. This sampling frequency may be increased as deemed necessary by the ENGINEER. All costs for conformance testing will be paid for by the CONTRACTOR
- C. All conformance test results shall be reviewed by the ENGINEER and accepted or rejected, prior to the placement of the geomembrane. All test result shall meet, or exceed, the property values listed in Appendix A and the latest version of GRI GM13. The course of action implemented for retesting failing tests shall be approved by the ENGINEER. In case of failing test results, the MANUFACTURER may request that another sample be retested by the independent laboratory with MANUFACTURER's technical representative present during the testing procedures. This retesting shall be paid for by the CONTRACTOR. The MANUFACTURER may also have the sample retested at two different laboratories approved by the ENGINEER. If both laboratories report passing results, the material shall be accepted. If both laboratories do not report passing results, all geomembrane material from the lot representing the failing sample will be considered out of specification and rejected.

### PART 3 EXECUTION

#### 3.01 SUBGRADE PREPARATION

- A. Preparation of the liner subgrade shall be as specified in drawings and Specification Section(s) 02200 and 02230.
- B. The surface of the subgrade/GCL shall be smooth, uniform, free from sudden changes in grade (such as vehicular ruts), rocks, stones, debris and deleterious materials. During actual placing and seaming of the geomembrane, the subgrade shall be kept free of all standing water. If the subgrade below the geomembrane becomes wet and unstable, it shall be dried and recompacted.

If geosynthetic clay liner (GCL) is the geomembrane base, the GCL shall be installed as specified in Section 02275.

- C. Before the geomembrane installation begins, the EFR, CONTRACTOR and INSTALLER shall verify in writing and submit to the ENGINEER that:
1. The subgrade has been properly installed and approved by the ENGINEER
  2. The surface is free from irregularities and abrupt changes in grade.
  3. The surface is free from any objectionable material capable of damaging the geomembrane.
  4. CONTRACTOR shall use all necessary means to control impacts from stormwater runoff and protect the subgrade from erosion. CONTRACTOR shall construct diversion berms and other structures as required to direct stormwater runoff away from the work area.

### 3.02 ANCHOR TRENCH

- A. The anchor trench shall be constructed as shown on the Drawings and as specified herein.
- B. The anchor trench shall be adequately drained to prevent water ponding and softening to adjacent soils. The anchor trench shall be backfilled with fill materials as shown on the Drawings and compacted to at least 90 percent of the Modified Proctor maximum dry density, as determined by ASTM D1557.
- C. The amount of trench open at any time shall be limited to one day of geomembrane installation capacity. Geosynthetic material in the anchor trench shall be temporary anchored with sandbags or other suitable materials.
- D. Backfilling of the anchor trench shall be conducted when the geomembrane is in its most contracted (taut) state.
- E. Care shall be taken when backfilling and compacting the trenches to prevent any damage to the lining materials.

### 3.03 GEOMEMBRANE PLACEMENT

- A. Weather Conditions
1. Geomembrane placement shall not proceed at an ambient temperature below 32 degrees F or above 104 degrees F unless otherwise authorized, in writing, by the ENGINEER or his/her field representative. Geomembrane placement shall not be performed during precipitation, excessive moisture, in an area of ponded water, or excessive winds that adversely affect the geomembrane placement.
- B. Method of Placement
1. Each panel of the geomembrane shall be rolled out and installed in accordance with the approved shop drawings prepared by the CONTRACTOR. The layout shall be designed to

- keep field seams of the HDPE geomembrane liner to a minimum and consistent with proper methods of HDPE geomembrane installation.
2. For geomembrane placed on 4 horizontal to 1 vertical (4H:1V) or steeper slopes, the seams shall be oriented in the direction of the slope (i.e., perpendicular to top of slope). Horizontal seams across the slope are not permitted, unless approved by the ENGINEER.
  3. Each geomembrane panel shall be identified by panel number, roll number, and date of deployment. The geomembrane panel number shall be placed on the ends of each panel.
  4. The equipment used to deploy the geomembrane shall not cause damage to the subgrade layer. If damage occurs, the CONTRACTOR shall suspend all geomembrane placement activities and repair the damages and immediately employ an alternative method for geomembrane deployment. Geomembrane rolls shall be placed using proper spreader and rolling bars so that the geomembrane would not be stretched during deployment. If a sheet must be replaced a distance greater than its width, a slip sheet shall be used.
  5. The EFR shall inspect each panel, after placement and prior to seaming, for damage and/or defects. Defective or damaged panels shall be replaced or repaired, in accordance with Paragraph 3.07G.
  6. The INSTALLER shall avoid dragging the geomembrane sheets on rough soil subbase.
  7. All geomembrane shall be anchored as shown on the Drawings and consistent with MANUFACTURER's recommendations.
  8. Personnel working on the geomembrane shall not smoke, wear damaging shoes or involve themselves in any activity that may damage the geomembrane.
  9. All edges of the geomembrane shall be properly weighted to avoid uplift due to wind.
  10. Vehicular traffic across the geomembrane shall not be allowed, except as specified herein. Rubber-tired ATV's and trucks are acceptable if wheel contact is less than 6 psi. Any vehicle used prior to or after liner placement shall be first approved by the EFR. All vehicles are restricted from traveling on the liner material unless a temporary access is constructed. Vehicles, machinery, and equipment shall be operated to avoid abrupt stops, starts, or turns.
  11. All damaged areas and destructive sample locations shall be recorded and located on the as-built drawings.
  12. When tying into existing geomembrane, all excavation of previously installed liner shall be performed by hand to prevent damage.
  13. The geomembrane shall be kept free of debris, unnecessary tools and materials. In general, the geomembrane area shall remain neat in appearance.
  14. Equipment necessary to perform the installation (generators, compressors, etc) shall have a scrap geomembrane sheet placed underneath to protect the installed geomembrane from possible damage.

15. No welder or testing equipment shall be allowed to remain on top of the installed geomembrane overnight. All equipment must be removed and stored away from the installed geomembrane.
16. No fueling of INSTALLER's equipment will be allowed on top of the installed geomembrane. No fuel containers shall be allowed on the geomembrane.

C. Liner Boots (Pipe Penetrations)

1. HDPE boots or shrouds shall be furnished and installed where indicated on the Drawings. The boots shall be of the same material as the geomembrane.
2. One end of the boots shall terminate in a skirt section suitable for welding to the geomembrane liner. The overlap between the boot and the geomembrane shall be approximately 18-in. The boot shall be welded to the geomembrane as previously specified herein.
3. Boots and shrouds shall fit snugly around the pipe. Prefabricated material shall be designed to fit site specific condition, for the intended slope and size of pipe.
4. A Neoprene rubber gasket shall be used between the boot and the pipe with a stainless steel clamp to provide an airtight seal. An HDPE sacrificial sheet shall be used between the boot or shroud and the clamp for protection.
5. For pipes larger than 4-in diameter, a second clamp shall be used. The fastener of the second clamp shall be located on the opposite side of the pipe from the first clamp, to compensate for uneven pressure and elongation.

3.04 FIELD SEAMS

- A. Individual panels of geomembrane shall be laid out and overlapped by a minimum of 4-in prior to welding. The area to be welded shall be cleaned and prepared in accordance with the quality control welding procedures approved by the EFR.
- B. Double track hot wedge fusion welds shall be used for straight welding. Care shall be taken during welding to prevent damage the underlying layer(s).
- C. Extrusion welds shall be used for patches, repairs and penetration boots, and detailed work.
- D. The welding equipment used shall be capable of continuously monitoring and controlling the temperatures in the zone of contact where the machine is actually fusing the geomembrane material so as to ensure that changes in environmental conditions will not affect the integrity of the weld.
- E. No "fish mouths" will be allowed within the seam area. Where "fish mouths" occur, the material shall be cut, overlapped and a patch extrusion weld shall be applied. All welds upon completion of the work shall be tightly bonded. Any geomembrane area showing injury due to excessive scuffing, puncture, or distress from any cause shall be replaced or repaired with an additional piece of geomembrane. The number of patches per 100-ft length shall not exceed five. If more than five patches per 100-ft length are necessary, then the entire 100-ft length of seam shall be removed. Further welding will cease at this time and the ENGINEER shall be notified.

- F. All seams shall have a seam number that corresponds with the panel layout numbers. The numbering system shall be used in the development of the as-built drawings. Seam numbers shall be derived from the combination of the two panel numbers that are to be welded together.
- G. All fusion welded "T" seams (i.e., the result of the geomembrane panels placed perpendicular to each other) shall be double welded where possible. The extrusion process shall be used for the second weld.
- H. All extrudate shall be free of dirt, dry and protected from damage.
- I. If an extrusion welder is stopped for longer than one minute, it shall be purged to remove heat-degraded extrudate. All purged extrudate shall be placed on a sacrificial sheet and disposed of.
- J. In general, seams should be oriented parallel to the line of maximum slope. In corners and odd-shaped geometric locations, the number of seams should be minimized. No horizontal seam should be less than 5 feet from the toe or crest of the slope, or from areas of potential stress concentrations, unless otherwise authorized by the ENGINEER. Horizontal seams shall be offset in adjacent panels by at least one panel width and seams shall be "shingled" downhill.
- K. All panels placed on sloped surfaces shall extend 10 ft inward (on the flat) from the toe of slope or edge of trench.
- L. All end seams shall be staggered a minimum of 5-ft in length between contiguous panels. No end seams are allowed on slopes 25 percent (4 horizontal and 1 vertical) or greater, unless otherwise approved by the ENGINEER.
- M. To prevent moisture buildup during fusion welding, it may be necessary to place a movable protective layer of plastic (skid sheet) directly below each overlap of geomembrane that is to be seamed.
- N. If required, a firm substrate shall be provided by using a flat board or similar hard surface directly under the seam overlap to achieve proper support.
- O. All seam welds shall extend the full extent into the anchor trench.
- P. All factory seams, field seams and repair welds shall meet seam strength requirements specified in Appendix A, Table A2 and GRI GM19

### 3.05 SEAMING WEATHER CONDITIONS

- A. Normal Weather Conditions
  - 1. The normal required weather conditions for seaming are:
    - a. Ambient temperature higher than 32 degrees F and lower than 104 degrees F.
    - b. No precipitation or other excessive moisture, such as fog or dew.
    - c. No excessive winds.
  - 2. These weather conditions shall be fulfilled during seaming process.

B. Cold Weather Conditions

1. If the ambient air temperature is below 32 degrees F, the following procedures shall be implemented:
  - a. Preheating the surface of the geomembrane to achieve normal temperature range.
  - b. Preheating may be waived by the EFR if the INSTALLER demonstrates that satisfactory welds of equivalent quality may be obtained without preheating at the expected temperature of installation.
  - c. Preheating devices shall be approved by the MANUFACTURER.
  - d. Care shall be taken to assure that surface temperatures are not lowered below the minimum required surface temperature for welding due to winds.
  - e. Additional destructive tests samples shall be taken at the discretion of the EFR
  - f. Test seams, as described in Paragraph 3.06A, shall be performed under the same ambient temperature conditions as the actual seams.

C. Warm Weather Conditions

1. If the ambient air temperature is above 104 degrees F, no seaming of geomembrane shall be permitted unless the INSTALLER can demonstrate to the satisfaction of the EFR that geomembrane seam quality is not adversely impacted.
2. Test seams shall be performed under the same ambient air temperature conditions as the actual seams.
3. Additional destructive tests shall be taken at the discretion of the EFR.

3.06 FIELD QUALITY CONTROL

A. Start-up Testing

1. A test weld 3-ft long from each welding machine shall be run upon the beginning of each shift and every four hours thereafter, under the same conditions as exist for the geomembrane welding. The test weld shall be marked with date, time of day, Seamer's initials, temperature and speed settings (for fusion welds) or temperature and preheat settings (for extrusion welds), and machine number. A tensiometer shall be required to be on-site before and during geomembrane installation for the purpose of testing samples. Six 1-in wide specimens shall be cut from the test weld and tested on-site in the presence of the EFR for shear and peel strength (3 each) in accordance with Appendix A, Table A2 and GRI GM19. No welder may start work until the sample weld has been approved by the EFR.
2. Test seams shall be performed under the same conditions as the actual seams and shall be at least 3-ft long and 1-ft wide after seaming. Material for test seams shall be cut out of the approved geomembrane rolls.

B. Nondestructive Seam Testing

1. The INSTALLER shall perform nondestructive test on all field seams over their full length. The purpose of this test is to assure continuity and integrity of the seams. Vacuum and air pressure tests shall be used for nondestructive testing. The vacuum test shall be

used for extrusion welds. The air pressure test shall be used for double track hot wedge welds.

2. Vacuum Testing
  - a. Equipment for testing single wedge fusion seams and extrusion seams shall be comprised of the following:
    - 1) A vacuum box assembly consisting of a rigid housing, a transparent viewing window, a soft rubber gasket attached to the bottom, port hole or valve assembly and a vacuum gauge.
    - 2) A vacuum tank and pump assembly equipped with a pressure controller and pipe connections.
    - 3) A rubber pressure/vacuum hose with fittings and connections.
    - 4) A plastic bucket and wide paint brush.
    - 5) A soapy solution.
  - b. The following procedures shall be followed by the INSTALLER:
    - 1) Excess sheet overlap shall be trimmed away.
    - 2) Clean the window, gasket surfaces and check for leaks.
    - 3) Energize the vacuum pump and reduce the tank pressure to approximately 5 psi.
    - 4) Wet a strip of geomembrane approximately 12-in by 48-in (length of box) with the soapy solution.
    - 5) Place the box over the wetted area and compress.
    - 6) Close the bleed valve and open the vacuum valve.
    - 7) Ensure that a leak-tight seal is created.
    - 8) For a minimum period of 10 seconds, examine the geomembrane through the viewing window for the presence of soap bubbles.
    - 9) If no bubbles appear after 10 seconds, close the vacuum valve and open the bleed valve, move the box over the next adjoining area with a minimum of 3-in overlap and repeat the process.
    - 10) All areas where soap bubbles appear shall be marked and repaired in accordance with Paragraph 3.07G and then retested.
    - 11) All test locations which have passed vacuum testing shall be marked with the test date and individual performing the test.
  - c. If the seam is not accessible to vacuum box equipment cannot be tested prior to final installation, the seaming operations shall be observed by the EFR for uniformity and completeness.
3. Air Pressure Testing (for double track fusion seams only).
  - a. The following procedures are applicable to those processes which produce a double seam with an enclosed space.
  - b. Equipment for testing double fusion seams shall be comprised of the following:
    - 1) An air pump equipped with pressure gauge capable of generating and sustaining a pressure between 25 and 30 psi and mounted on a cushion to protect the geomembrane.
    - 2) A manometer equipped with a sharp hollow needle, or other approved pressure feed device.
  - c. The following procedures shall be followed by the INSTALLER:
    - 1) Seal both ends of the seam to be tested. The length of seam shall not exceed 500-ft without approval by the EFR.
    - 2) Insert needle or other approved pressure feed device into the tunnel created by the double wedge fusion weld.

- 3) Energize the air pump to a pressure between 25 and 30 psi. After allowing two minutes for relaxation, the pressure shall be monitored over a test period not less than five minutes.
  - 4) If the loss of pressure exceeds 4-psi, or the pressure does not stabilize, the weld shall be considered faulty (unless the INSTALLER can demonstrate that monitoring for an additional five minutes does not cause an additional loss in pressure in excess of 1 psi, and that the pressure stabilizes within the second monitoring period). Locate the faulty area, repair in accordance with Paragraph 3.07G and retest.
  - 5) If the faulty area cannot be isolated and repaired, the length of seam which cannot be tested shall be capped with geomembrane strip, extrusion welded and vacuum tested. The seam shall be documented as a failed seam indicating the corrective measure.
  - 6) If the pressure loss is less than 4 psi after five minutes, cut the air channel on the opposite end the pressure device to confirm there is no blockage and verify the length of the seam tested. Remove needle of other approved pressured feed device and seal with an extrusion weld.
  - 7) Remove needle or other approved pressure feed device and seal.
  - 8) All test locations which have passed air pressure testing shall be marked with the test date and individual performing the test.
- d. Destructive seam testing shall be performed in accordance with Paragraph 3.07 below.

### 3.07 DESTRUCTIVE SEAM TESTING

A. The purpose of the destructive testing is to evaluate seam strength properties. Unless otherwise approved by the ENGINEER, a minimum of one destructive test sample shall be obtained per 500-ft of performed seam length or one sample per machine per day, whichever yields the largest number of samples. The location of samples shall be determined by the EFR. Selection of such locations may be prompted by suspicion of overheating, contamination, or other potential cause that may adversely impact the welds. Location at samples shall not be revealed to INSTALLER in advance. Sampling shall be performed by the INSTALLER. Testing of field samples shall be performed by INSTALLER's qualified technicians.

#### B. Sampling Procedures

1. Samples shall be cut by the INSTALLER at locations chosen by the EFR as the seaming progresses.
2. The seams shall not be covered by another material before they have been tested and accepted by EFR.
3. Upon obtaining each sample, assign a number to the sample and mark it accordingly.
4. Record sample location on layout drawing.
5. Record purpose of the sample, statistical routine or suspicious weld area.
6. Holes in the geomembrane resulting from destructive seam testing shall be immediately repaired in accordance with Paragraph 3.07G.

#### C. Size and Disposition of Samples

1. Two samples shall be cut with a 1-in wide die, with the seam centered parallel to the width. The distance between these two samples shall be no less than 36-in. If the samples pass the field test described in Paragraph 3.07D, a sample for laboratory testing shall be taken.
2. The sample for laboratory testing shall be located between the samples for field testing. The sample for laboratory testing shall be 12-in wide by 36-in long with the seam centered lengthwise. The sample shall be cut into three parts and distributed as follows:
  - a. One portion to the INSTALLER for optional field testing, 12-in by 12-in.
  - b. One portion for geosynthetic laboratory quality assurance testing, 12-in by 12-in.
  - c. One portion to the ENGINEER for archive storage, 12-in by 12-in.

#### D. Field Testing

1. The following shall be performed by the INSTALLER's qualified technician in the presence of the EFR:
  - a. The INSTALLER shall cut six 1-in wide replicate specimens from the field testing samples to be tested for shear and peel strength, in accordance with the criteria set in Appendix A, Table A2 and GRI GM19.
  - b. The INSTALLER shall test three specimens for shear seam strength and three for peel strength. All replicate test specimens shall pass for the seam to be acceptable.
  - c. Samples shall be tested with a tensiometer equipped with a drive/pull apparatus adjusted to a pull rate of 2-in per minute for both peel and shear testing. Each sample shall be tested until film tearing bond (FTB) is achieved. At a minimum, the required pass criteria for peel shall be as specified in Appendix A, Table A2 and GRI GM19.
  - d. Any specimen that fails through the weld or through the fusion at the weld sheet interface is a non-FTB (Film Tearing Bond) break and shall be considered a failure even if it achieves the acceptable strengths. The following are unacceptable locus-of-break patterns (codes):
    - 1) Double track hot wedge fusion welds - AD & AD-BRK > 25%
    - 2) Extrusion Welds - AD1, AD2 & AD-WLD\*  
\*unless strength is achieved

#### E. Quality Assurance Laboratory Test

1. The EFR shall package and ship destructive test samples to the GRI accredited independent Quality Assurance Laboratory (QAL) approved by the ENGINEER by overnight delivery service. Tests are to be paid for by the CONTRACTOR.
2. Laboratory test shall include shear and peel strength tests performed in accordance with ASTM D6392. The minimum acceptable values obtained in these tests shall be in accordance with Appendix A, Table A2 and GRI GM19.
3. At least five specimen shall be tested each for shear and peel strength. A passing test shall meet the minimum required values in all five specimens tested for each method.
4. The QAL shall provide verbal test results to the EFR no more than 24 hours after they receive the samples. The EFR shall review the laboratory results as soon as they become available.

#### F. Procedures for Destructive Test Failure

1. The following procedures shall apply whenever a sample fails a destructive test, whether that test is conducted in the field or by the QAL. The INSTALLER has two options.
  - a. The INSTALLER can repair the seam between any two passing test locations in accordance with Paragraph 3.07G.
  - b. The INSTALLER can retrace the welding path to an intermediate location a minimum of 10-ft on each side of the failed sample. The sample shall be tested in the field. Subsequent failure of test samples shall cause the testing to move further down the seam until the extent of faulty seam has been determined. Costs for shipping and retesting destructive samples shall be borne by the CONTRACTOR.
  - c. In the event the whole seam is determined to be faulty the ENGINEER may request samples to be taken from the previous seam welded by the same machine and welder, until two passing tests are obtained.
2. All acceptable repaired seams shall be bound by two conservative passing locations on each side of the original sample. In cases where repaired seam exceeds 150-ft, a sample taken from the zone in which the seam has been repaired must pass destructive testing. Repairs shall be made in accordance with Paragraph 3.07G.
3. The EFR shall document all actions taken in conjunction with destructive test failures.

#### G. Repair Procedures

1. Any portion of the geomembrane exhibiting signs of any kind of defect, or failing a destructive or a nondestructive test, shall be repaired. Several procedures exist for the repair of these areas. The final decision as to the appropriate repair procedure shall be made by the EFR.
2. The repair procedures available include:
  - a. Patching, used to repair large holes, tears, undispersed raw materials and contamination by foreign matter.
  - b. Spot welding or seaming used to repair small tears, pinholes, or other minor, localized defects.
  - c. Capping, is used to repair large lengths of failed seams.
  - d. Removing bad seam and replacing with a strip of new material welded in place.
  - e. For small lengths of failed seam (less than 3 feet), extrusion welding can be used to repair provided there is sufficient overlap between the two geomembrane panels.
  - f. Extrusion welding the flap of a fusion welded seam is not an acceptable repair procedure.
3. For any repair method, the following provisions shall be satisfied:
  - a. Surfaces of the geomembrane which are to be repaired using extrusion methods shall be abraded no more than one hour prior to the repair.
  - b. All surfaces shall be clean and dry at the time of the repair.
  - c. All seaming equipment used in repairing procedures shall be qualified.
  - d. All patches and caps shall extend at least 4-in beyond the edge of the defect.
  - e. All patches shall have rounded corners.

#### H. Repair Verification

1. Each repair shall be numbered and logged by the INSTALLER. Each repair shall be nondestructively tested using the methods described in Paragraph 3.06 as appropriate.

Repairs, which pass the nondestructive test, shall be taken as an indication of an adequate repair. Repairs more than 150-ft long may be of sufficient length to require destructive test sampling at the discretion of the EFR. Failed test of the repaired section indicates that the repair shall be redone and retested until a passing test results are achieved. The EFR shall observe all nondestructive testing of repairs. The INSTALLER shall record the number of each repair, date and test outcome.

I. Wrinkles

1. Large wrinkles that remain in the sheet as result of temperature expansion or uneven surface preparation may need removal as determined by the EFR in consideration of applied loads on the wrinkle. Should the wrinkle need removing, the lower down-slope edge of the wrinkle shall be cut, overlapped and repaired as described in Paragraph 3.07G. Both ends of the wrinkle repair shall be patched. Caution must be taken in removing any wrinkles. Wrinkles are needed to allow for future contraction of the geomembrane liner, especially in cold weather.

J. Construction Equipment

1. Vehicular traffic across the geomembrane shall not be allowed, except as specified herein. Rubber-tired ATV's and trucks are acceptable if wheel contact is less than 6 psi. Any vehicle used prior to or after liner placement shall be first approved by the EFR. All vehicles are restricted from traveling on the liner material unless a temporary access is constructed. Vehicles, machinery, and equipment shall be operated to avoid abrupt stops, starts, or turns.
2. Construction equipment or vehicles with steel tracks shall not be permitted on the geomembrane.
3. Other equipment such as portable generators and power centers shall be permitted if the support apparatus is protected from damaging the liner, and if care is taken to prevent leaking lubricants from damaging the geomembrane.

3.08 DISPOSAL OF WASTE MATERIAL

- A. Upon completion of installation, the CONTRACTOR shall properly remove and dispose of all trash, waste material and equipment used in connection with the performed work and shall leave the premises in a neat and acceptable condition.

3.09 AS-BUILT DRAWINGS

- A. The INSTALLER shall prepare and submit to the ENGINEER an as-built drawing reflecting the actual installation of geomembrane liner, including the location of all seams, the location of destructive samples, and the location of all repair work. The as-built drawing shall be submitted to the ENGINEER within twenty-one [21] days of job completion. In addition, a copy of the complete documentation package will accompany the as-built drawing.

END OF SECTION

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APPENDIX A

<b>TABLE A1 MATERIAL PROPERTIES HIGH DENSITY POLYETHYLENE (HDPE) GEOMEMBRANE TEXTURED SHEET</b>					
				<b>Specified Thickness (mil)</b>	<b>Min. Testing</b>
<b>Property</b>	<b>Unit</b>	<b>Value</b>	<b>Test Method</b>	<b>60</b>	<b>Frequency</b>
Thickness	Mil	min. ave.	ASTM D5994		
-Minimum Average	Mil			57	per roll
-Lowest Individual	Mil			51	
-Asperity Height <sup>2</sup>	Mil	min. ave.	ASTM D7466	18	per roll
Density	g/ml	min.	ASTM D1505/D792	0.940	200,000 lb
Tensile Properties	lb/in	min. ave.	ASTM D6693 Type IV		20,000 lb
-Yield Stress	lb/in			126	
-Break Stress	lb/in			90	
-Yield Elongation	%			12	
-Break Elongation	%			100	
Tear Resistance	lb	min. ave.	ASTM D1004	42	45,000 lb
Puncture Resistance	lb	min. ave.	ASTM D4833	90	45,000 lb
Stress Crack Resistance	Hr.	min.	ASTM D5397 (APP. A)	200	per GRI-GM10
Carbon Black Content	%	range	ASTM 4218 ASTM D1603	2-3	20,000 lb
Carbon Black Dispersion		category	ASTM D5596	9 in 1 or 2, ≤ 1 in 3	45,000 lb
Oxidative Induction Time					
-Standard OIT, or	Minutes	min. ave.	ASTM D3895	100	200,000 lb
-High Pressure OIT	Minutes	min. ave.	ASTM D5885	400	200,000 lb
Oven Aging @ 85C			ASTM D5721		
-Standard OIT, or	% retained after 90 days	min. ave.	ASTM D3895	55	per formulation
-High Pressure OIT	% retained after 90 days	min. ave.	ASTM D5885	80	per formulation
UV Resistance			GRI-GM11		
-High Pressure OIT	% retained after 1600 hrs	min. ave.	ASTM D5885	50	per formulation

<sup>1</sup>Testing methods and procedures shall be in accordance with GRI, GM13 document.

<sup>2</sup>Material with a higher asperity height may be used to obtain the minimum peak friction angles specified in Section 1.03A(4)

<b>TABLE A2 FACTORY AND FIELD SEAMS PROPERTIES HIGH DENSITY POLYETHYLENE (HDPE) GEOMEMBRANE</b>				
<b>PROPERTY</b>	<b>UNIT</b>	<b>VALUE</b>	<b>TEST METHOD<sup>1</sup></b>	<b>SPECIFIED THICKNESS (mil)</b>
				<b>60</b>
Shear Strength				
Fusion	lb/in	min.	ASTM D6392	120
Extrusion	lb/in	min.	ASTM D6392	120
Peel Strength				
Fusion	lb/in	min.	ASTM D6392	91
Extrusion	lb/in	min.	ASTM D6392	78

<sup>1</sup>Testing methods and procedures shall be in accordance with ASTM D6392 and GRI, GM19 document.

APPENDIX B

The following forms are included and shall be completed by the responsible party as shown on the forms.

Form No.	Title
1.	Subgrade Surface Acceptance
2.	Daily CQC Report
3.	Material Receiving Log
4.	Daily Panel Placement Log
5.	Trial Weld Log
6.	Daily Seaming Log
7.	Seam Inspection Log - Air Pressure Testing
8.	Seam Inspection Log - Vacuum Testing
9.	Destructive Sample Log

**SUBGRADE SURFACE ACCEPTANCE**

DATE: \_\_\_\_\_ PROJECT NUMBER: \_\_\_\_\_

PROJECT NAME: \_\_\_\_\_

EARTH CONTRACTOR: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_ STATE: \_\_\_\_\_ ZIP: \_\_\_\_\_

SUPERINTENDENT OF PROJECT: \_\_\_\_\_ PHONE: \_\_\_\_\_

GEOMEMBRANE INSTALLER: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_ STATE: \_\_\_\_\_ ZIP: \_\_\_\_\_

SUPERINTENDENT OF PROJECT: \_\_\_\_\_ PHONE: \_\_\_\_\_

**CERTIFICATE OF ACCEPTANCE  
OF SUBGRADE SOIL BY INSTALLER**

I the undersigned, duly authorize representative of \_\_\_\_\_  
do hereby accept the soil surface as being acceptable for placement of a geomembrane liner.

Name	Signature	Title	Date
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Certificate Accepted by Inspector-Company: \_\_\_\_\_

Name	Signature	Title	Date
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EFR: \_\_\_\_\_

CONTRACTOR'S REPRESENTATIVE: \_\_\_\_\_

INSTALLING SUPERVISOR: \_\_\_\_\_

*Use back for comments.*

FORM 1

**DAILY CQC REPORT**

PROJECT: \_\_\_\_\_

DATE: \_\_\_\_\_ WEATHER: \_\_\_\_\_ TEMP.: AM \_\_\_ PM \_\_\_

CONTRACTOR: \_\_\_\_\_

Log: \_\_\_\_\_

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Deficiencies and Corrective Actions: \_\_\_\_\_

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Outstanding Items: \_\_\_\_\_

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Attachments: \_\_\_\_\_

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QA/QC MANAGER: \_\_\_\_\_ DATE: \_\_\_\_\_

FORM 2















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SECTION 03100  
CONCRETE FORMWORK

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and design, install and remove formwork for cast-in-place concrete as shown on the Drawings and as specified herein.
- B. Secure to forms as required or set for embedment as required, all miscellaneous metal items, sleeves, reglets, anchor bolts, inserts and other items furnished under other Sections and required to be cast into concrete.

1.02 RELATED WORK

- A. Concrete Reinforcement is included in Section 03200.
- B. Cast-in-Place Concrete is included in Section 03300.

1.03 REFERENCE STANDARDS

- A. American Concrete Institute (ACI)
  - 1. ACI 301 - Specifications for Structural Concrete for Buildings.
  - 2. ACI 318 - Building Code Requirements for Reinforced Concrete.
  - 3. ACI 347 - Formwork for Concrete.
- B. American Plywood Association (APA)
  - 1. Material grades and designations as specified.
- C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.04 SYSTEM DESCRIPTION

- A. General: Architectural Concrete is wall, slab, beam or column concrete which will have surfaces exposed to view in the finished work.
- B. Structural design responsibility: All forms and shoring shall be designed at the CONTRACTOR's expense by a professional engineer registered in the State of New Mexico. Formwork shall be designed and erected in accordance with the requirements of ACI 301 and ACI 318 and as recommended in ACI 347 and shall comply with all applicable regulations and codes. The design shall consider any special requirements due to the use of plasticized and/or retarded set concrete.

## PART 2 PRODUCTS

### 2.01 GENERAL

- A. The usage of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configurations desired.

### 2.02 MATERIALS

- A. Forms for cast-in-place concrete shall be made of wood, metal, or other approved material. Wood forms for the project shall be new and unused. Construct wood forms of sound lumber or plywood of suitable dimensions and free from knotholes and loose knots. Where used for exposed surfaces, dress and match boards. Sand plywood smooth and fit adjacent panels with tight joints. Metal forms may be used when approved by the ENGINEER and shall be of an appropriate type for the class of work involved. All forms shall be designed and constructed to provide a flat, uniform concrete surface requiring minimal finishing or repairs.
- B. Wall Forms
  - 1. Forms for all exposed exterior and interior concrete walls shall be new and unused "Plyform" exterior grade plywood panels manufactured in compliance with the APA and bearing the trademark of that group, or equal acceptable to the ENGINEER. Provide B grade or better veneer on all faces to be placed against concrete during forming. The class of material and grades of interior plies shall be of sufficient strength and stiffness to provide a flat, uniform concrete surface requiring minimal finishing and grinding.
  - 2. All joints or gaps in forms shall be taped, gasketed, plugged, and/or caulked with an approved material so that the joint will remain watertight and will withstand placing pressures without bulging outward or creating surface patterns.
- C. Rustications shall be at the location and shall conform to the details shown on the Drawings. Moldings for chamfers and rustications shall be milled and planed smooth. Rustications and corner strips shall be of a nonabsorbent material, compatible with the form surface and fully sealed on all sides to prohibit the loss of paste or water between the two surfaces.
- D. Form Release Agent
  - 1. Coat all forming surfaces in contact with concrete using an effective, non-staining, non-residual, water based, bond-breaking form coating unless otherwise noted.
- E. Concrete surfaces which are to be painted shall be formed with hard plastic finished plywood or a similar material which does not require a form release agent unless the CONTRACTOR can substantiate to the satisfaction of the ENGINEER that the form release agent will not remain on the formed surface after it is stripped.
- F. Form Ties
  - 1. Form ties encased in concrete other than those specified in the following paragraphs shall be designed so that, after removal of the projecting part, no metal shall remain within 1-1/2-in of the face of the concrete. The part of the tie to be removed shall be at least 1/2-in diameter

or be provided with a wood or metal cone at least ½-in diameter and 1-1/2-in long. Form ties in concrete exposed to view shall be the cone-washer type.

2. Form ties for exposed exterior and interior walls shall be as specified in the preceding paragraph except that the cones shall be of approved wood or plastic.
3. Flat bar ties for panel forms shall have plastic or rubber inserts having a minimum depth of 1-1/2-in and sufficient dimensions to permit proper patching of the tie hole.
4. Common wire shall not be used for form ties.
5. Alternate form ties consisting of tapered through-bolts at least 1-in in diameter at smallest end or through-bolts that utilize a removable tapered sleeve of the same minimum size may be used at the CONTRACTOR's option. Obtain ENGINEER's acceptance of system and spacing of ties prior to ordering or purchase of forming. Clean, fill and seal form tie hole with non-shrink cement grout. The CONTRACTOR shall be responsible for watertightness of the form ties and any repairs needed.

### PART 3 EXECUTION

#### 3.01 GENERAL

- A. Forms shall be used for all cast-in-place concrete including sides of footings. Forms shall be constructed and placed so that the resulting concrete will be of the shape, lines, dimensions and appearance indicated on the Drawings.
- B. Forms for walls shall have removable panels at the bottom for cleaning, inspection and joint surface preparation. Forms for walls of considerable height shall have closable intermediate inspection ports. Tremies and hoppers for placing concrete shall be used to allow concrete inspection, prevent segregation and prevent the accumulation of hardened concrete on the forms above the fresh concrete.
- C. Molding, bevels, or other types of chamfer strips shall be placed to produce blockouts, rustications, or chamfers as shown on the Drawings or as specified herein. Chamfer strips shall be provided at horizontal and vertical projecting corners to produce a 3/4-in chamfer. Rectangular or trapezoidal moldings shall be placed in locations requiring sealants where specified or shown on the Drawings. Sizes of moldings shall conform to the sealants manufacturer's recommendations.
- D. Forms shall be sufficiently rigid to withstand construction loads and vibration and to prevent displacement or sagging between supports. Construct forms so that the concrete will not be damaged by their removal. The CONTRACTOR shall be entirely responsible for the adequacy of the forming system.
- E. Before form material is re-used, all surfaces to be in contact with concrete shall be thoroughly cleaned, all damaged places repaired, all projecting nails withdrawn and all protrusions smoothed. Reuse of wooden forms for other than rough finish will be permitted only if a "like new" condition of the form is maintained.

### 3.02 FORM TOLERANCES

- A. Forms shall be surfaced, designed and constructed in accordance with the recommendations of ACI 347 and shall meet the following additional requirements for the specified finishes.
- B. Formed Surface Exposed to View: Edges of all form panels in contact with concrete shall be flush within 1/32-in and forms for plane surfaces shall be such that the concrete will be plane within 1/16-in in 4-ft. Forms shall be tight to prevent the passage of mortar, water and grout. The maximum deviation of the finish wall surface at any point shall not exceed 1/4-in from the intended surface as shown on the Drawings. Form panels shall be arranged symmetrically and in an orderly manner to minimize the number of seams.
- C. Formed surfaces not exposed to view or buried shall meet requirements of Class "C" Surface in ACI 347.
- D. Formed rough surfaces including mass concrete, pipe encasement, electrical duct encasement and other similar installations shall have no minimum requirements for surface smoothness and surface deflections. The overall dimensions of the concrete shall be plus or minus 1-in.
- E. All smooth faces to be exposed to view shall have surface deflections limited to 1/32-in at any point and the variation in wall deflection shall not exceed 1/16-in per 4-ft. The maximum deviation of the finished wall surface at any point shall not exceed 1/4-in from the intended surface as shown on the Drawings. All textured faces, from lines, or rustications to be exposed to view shall be straight, plumb and true with a variation of no more than 1/2-in in 10-ft measured in any direction.

### 3.03 FORM PREPARATION

- A. Wood forms in contact with the concrete shall be coated with an effective release agent prior to form installation.
- B. Steel forms shall be thoroughly cleaned and mill scale and other ferrous deposits shall be sandblasted or otherwise removed from the contact surface for all forms, except those utilized for surfaces receiving a rough finish. All forms shall have the contact surfaces coated with a release agent.

### 3.04 REMOVAL OF FORMS

- A. The CONTRACTOR shall be responsible for all damage resulting from removal of forms. Forms and shoring for structural slabs or beams shall remain in place in accordance with ACI 301 and ACI 347. Form removal shall conform to the requirements specified in Section 03300.

### 3.05 INSPECTION

- A. The ENGINEER shall be notified when the forms are complete and ready for inspection at least 6 hours prior to the proposed concrete placement.

- B. Failure of the forms to comply with the requirements specified herein, or to produce concrete complying with requirements of this Section, shall be grounds for rejection of that portion of the concrete work. Rejected work shall be repaired or replaced as directed by the ENGINEER at no additional cost to the OWNER. Such repair or replacement shall be subject to the requirements of this Section and approval of the ENGINEER.

END OF SECTION

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SECTION 03200  
CONCRETE REINFORCEMENT

PART 1 PRODUCTS

1.01 SCOPE OF WORK

- A. The CONTRACTOR shall furnish all labor, materials, equipment and incidentals required and install all concrete reinforcement complete as shown on the Drawings and as specified herein.
- B. Furnish only all the deformed steel reinforcement required to be entirely built into the concrete masonry unit construction.

1.02 RELATED REQUIREMENTS

- A. The Contract Documents include, but are not limited to, the following related sections:
  - 1. Cast-in-place Concrete is included in Section 03300.

1.03 SUBMITTALS

- A. Submit, in accordance with Section 01300, shop drawings and product data showing materials of construction and details of installation for:
  - 1. Reinforcing steel. Placement drawings shall conform to the recommendations of ACI 315. All reinforcement in a concrete placement shall be included on a single placement drawing or cross referenced to the main pertinent placement drawing. This drawing shall include the additional reinforcement (around openings, at corners, etc.) shown on the standard detail sheets. Bars to have special coatings and/or to be of special steel or special yield strength are to be clearly identified.
  - 2. Bar bending details. The bars shall be referenced to the same identification marks shown on the placement drawings. Bars to have special coatings and/or to be of special steel or special yield strength are to be clearly identified.
- B. Submit Test Reports, in accordance with Section 01300, of each of the following items.
  - 1. Certified copy of mill test on each steel proposed for use showing the physical properties of the steel and the chemical analysis.

1.04 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
  - 1. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
  - 2. ASTM A184 - Standard Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.
  - 3. ASTM A185 – Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

4. ASTM A496 - Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement
5. ASTM A497 - Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.
6. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
7. ASTM A616 - Specification for Rail-Steel Deformed and Plain Bars for Concrete Reinforcement<sup>8</sup>.
8. ASTM A617 - Specification for Axle-Steel Deformed and Plain Bars for Concrete Reinforcement
9. ASTM A706 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
10. ASTM A767 - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
11. ASTM A775 - Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
12. ASTM A884 - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Fabric for Reinforcement.

B. American Concrete Institute (ACI)

1. ACI 117 - Standard Tolerance for Concrete Construction and Materials
2. ACI 301 - Specifications for Structural Concrete for Buildings
3. ACI 318 - Building Code Requirements for Reinforced Concrete
4. ACI 350R - Environmental Engineering Concrete Structures
5. SP-66 (ACI 315) - ACI Detailing Manual

C. Concrete Reinforcing Steel Institute (CRSI)

D. American Welding Society (AWS)

1. AWS D1.4 Structural Welding Code - Reinforcing Steel

E. Where reference is made to one of the above standards, the revision in effect at the time of the bid opening shall apply.

1.05 DELIVERY, HANDLING AND STORAGE

- A. Reinforcing steel shall be substantially free from mill scale, rust, dirt, grease, or other foreign matter.

- B. Reinforcing steel shall be shipped and stored with bars of the same size and shape fastened in bundles with durable tags, marked in a legible manner with waterproof markings showing the same "mark" designations as those shown on the submitted Placing Drawings.
- C. Reinforcing steel shall be stored off the ground, protected from moisture, and kept free from dirt, oil, or other injurious contaminants.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Materials shall be new, of domestic manufacture, and shall comply with the following material specifications.
- B. Deformed Concrete Reinforcing Bars: ASTM A615, Grade 60 deformed bars.
- C. Concrete Reinforcing Bars required on the Drawings to be Field Bent or Welded: ASTM A706.
- D. Welded Steel Wire Fabric: ASTM A185.
- E. Welded Deformed Steel Wire Fabric: ASTM A497.
- F. Welded Plain Bar Mats: ASTM A704 and ASTM A615 Grade 60 plain bars.
- G. Fabricated Deformed Steel Bar Mats: ASTM A184 and ASTM A615 Grade 60 deformed bars.
- H. The following alternate materials are allowed:
  - 1. ASTM A615 Grade 60 may be used for ASTM A706 provided the following requirements are satisfied:
    - a. The actual yield strength of the reinforcing steel based on mill tests shall not exceed the specified yield strength by more than 18,000 psi. Retests shall not exceed this value by more than an additional 3000 psi.
    - b. The ratio of the actual ultimate tensile strength to the actual tensile yield strength of the reinforcement shall not be less than 1.25.
    - c. The carbon equivalency (CE) of A615 bars shall be 0.55 or less.
- I. Reinforcing Steel Accessories
  - 1. Plastic Protected Bar Supports: CRSI Bar Support Specifications, Class 1 - Maximum Protection.
  - 2. Stainless Steel Protected Bar Supports: CRSI Bar Support Specifications, Class 2 - Moderate Protection.
  - 3. Precast Concrete Block Bar Supports: CRSI Bar Support Specifications, Precast Blocks.
- J. Tie Wire
  - 1. Tie Wires for Reinforcement shall be 16-gauge or heavier, black annealed wire.

## 2.02 FABRICATION

- A. Fabrication of reinforcement shall be in compliance with the CRSI.
- B. Bars shall be cold bent. Bars shall not be straightened or rebent.
- C. Bars shall be bent around a revolving collar having a diameter of not less than that recommended by the CRSI.
- D. Bar ends that are to be butt spliced, placed through limited diameter holes in metal, or threaded, shall have the applicable end(s) saw-cut. Such ends shall terminate in flat surfaces within 1-1/2 degrees of a right angle to the axis of the bar.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Surface condition, bending, spacing, and tolerances of placement of reinforcement shall comply with the CRSI. The CONTRACTOR shall be solely responsible for providing an adequate number of bars and maintaining the spacing and clearances shown on the Drawings.
- B. Except as otherwise indicated on the Drawings, the minimum concrete cover of reinforcement shall be as follows:
  - 1. Concrete cast against and permanently exposed to earth: 3-in.
  - 2. Concrete exposed to soil, water, sewage, sludge and/or weather: 2-in.
  - 3. Concrete not exposed to soil, water, sewage, sludge and/or weather:
    - a. Slabs (top and bottom cover), walls, joists, shells and folded plate members - 1-in.
    - b. Beams and columns (principal reinforcement, ties, spirals, and stirrups) - 1-1/2-in.
- C. Reinforcement which will be exposed for a considerable length of time after being placed shall be coated with a heavy coat of neat cement slurry.
- D. No reinforcing steel bars shall be welded either during fabrication or erection unless specifically shown on the Drawings or specified, or unless prior written approval has been obtained from the ENGINEER. All bars that have been welded, including tack welds, without such approval shall be immediately removed from the work. When welding of reinforcement is approved or called for, it shall comply with AWS D1.4.
- E. Reinforcing steel interfering with the location of other reinforcing steel, conduits or embedded items, may be moved within the specified tolerances or one bar diameter, whichever is greater. Greater displacement of bars to avoid interference, shall only be made with the approval of the ENGINEER. Do not cut reinforcement to install inserts, conduits, mechanical openings or other items without the prior approval of the ENGINEER.
- F. Securely support and tie reinforcing steel to prevent movement during concrete placement. Secure dowels in place before placing concrete.

- G. Reinforcing steel bars shall not be field bent except where shown on the Drawings or specifically authorized in writing by the ENGINEER. If authorized, bars shall be cold-bent around the standard diameter spool specified in the CRSI. Do not heat bars. Closely inspect the reinforcing steel for breaks. If the reinforcing steel is damaged, replace, Cadweld or otherwise repair as directed by the ENGINEER. Do not bend reinforcement after it is embedded in concrete unless specifically shown otherwise on the Drawings.

### 3.02 REINFORCEMENT AROUND OPENINGS

- A. Unless specific additional reinforcement around openings is shown on the Drawings, provide additional reinforcing steel on each side of the opening equivalent to one half of the cross-sectional area of the reinforcing steel interrupted by an opening. The bars shall have sufficient length to develop bond at each end beyond the opening or penetration.

### 3.03 SPLICING OF REINFORCEMENT

- A. Splices designated as compression splices on the Drawings, unless otherwise noted, shall be 30 bar diameters, but not less than 12-in. The lap splice length for column vertical bars shall be based on the bar size in the column above.
- B. Tension lap splices shall be provided at all laps in compliance with the applicable tables in the ACI 315. Splices in adjacent bars shall be staggered. Class A splices shall be used when 50 percent or less of the bars are spliced within the required lap length. Class B splices shall be used at all other locations.
- C. Except as otherwise indicated on the Drawings, splices in circumferential reinforcement in circular walls shall be Class B tension splices and shall be staggered. Adjacent bars shall not be spliced within the required lap length.
- D. Install wire fabric in as long lengths as practicable. Splices in welded wire fabric shall be lapped in accordance with the requirements of ACI-318 but not less than 12-in. The spliced fabrics shall be tied together with wire ties spaced not more than 24-in on center and laced with wire of the same diameter as the welded wire fabric. Do not position laps midway between supporting beams, or directly over beams of continuous structures. Offset splices in adjacent widths to prevent continuous splices.

### 3.04 ACCESSORIES

- A. The CONTRACTOR shall be solely responsible for determining, providing and installing accessories such as chairs, chair bars, and the like in sufficient quantities and strength to adequately support the reinforcement and prevent its displacement during the erection of the reinforcement and the placement of concrete.
- B. Use precast concrete blocks where the reinforcing steel is to be supported over soil.
- C. Stainless steel bar supports or steel chairs with stainless steel tips shall be used where the chairs are set on forms for a concrete surface that will be exposed to weather, high humidity, or liquid (including bottom of slabs over liquid containing areas). Use of galvanized or plastic tipped metal chairs is permissible in all other locations unless otherwise noted on the Drawings or specified.

- D. Alternate methods of supporting top steel in slabs, such as steel channels supported on the bottom steel or vertical reinforcing steel fastened to the bottom and top mats, may be used if approved by the ENGINEER.

### 3.05 INSPECTION

- A. In no case shall any reinforcing steel be covered with concrete until the installation of the reinforcement, including the size, spacing and position of the reinforcement has been observed by the ENGINEER and the ENGINEER's release to proceed with the concreting has been obtained. The ENGINEER shall be given ample prior notice of the readiness of placed reinforcement for observation. The forms shall be kept open until the OWNER has finished his observations of the reinforcing steel.

END OF SECTION

SECTION 03300  
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SUBMITTALS

A. Submit the following.

1. Product data for reinforcement, forming accessories, admixtures, patching compounds, curing compounds, and others as requested by ENGINEER.
2. Shop drawings for fabricating, bending and placing concrete reinforcement.
3. Laboratory test reports or evaluation reports for concrete materials and concrete mix designs.
4. Written report to ENGINEER for each proposed concrete mix at least 15 days prior to start of concreting. Do not begin concrete production until mixes have been reviewed by ENGINEER.

1.02 QUALITY ASSURANCE

- A. Comply with provisions of ACI 301, "Specifications for Structural Concrete for Buildings," ACI 318, "Building Code Requirements for Reinforced Concrete" and CRSI "Manual of Standard Practice," except where more stringent requirements are indicated.

PART 2 PRODUCTS

2.01 FORM MATERIALS

- A. Furnish form materials with sufficient stability to withstand pressure of placed concrete without bow or deflection.
1. Forms for Exposed Concrete Surfaces: Suitable panel-type material to provide continuous, straight, smooth, exposed surfaces.

2.02 REINFORCING MATERIALS

- A. Deformed Reinforcing Bars: ASTM A615, Grade 60, unless otherwise indicated.

2.03 CONCRETE MATERIALS

- A. Portland Cement: ASTM C150, Type 1.
- B. Fly Ash: ASTM C618, Type F.
- C. Aggregates: ASTM C33, local aggregates of proven durability may be used when acceptable to ENGINEER.
- D. Water: Potable.

## 2.04 ADMIXTURES

- A. Provide admixtures that contain not more than 0.1 percent chloride ions.
  - 1. Air-Entraining Admixture: ASTM C260.
  - 2. Water-Reducing, Retarding, and Accelerating Chemical Admixtures: ASTM C494.

## 2.05 RELATED MATERIALS

- A. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz per sq yd, complying with AASHTO M182, Class 2.
- B. Moisture-Retaining Cover: Waterproof paper, polyethylene film, or polyethylene-coated burlap, complying with ASTM C171.
- C. Membrane-Forming Curing Compound: ASTM C309, Type I. Moisture loss not more than 0.55 kg/sq meter when applied at 200 sq ft/gal.
- D. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.

## 2.06 MIX PROPORTIONS AND DESIGN

- A. Proportion mixes complying with mix design procedures specified in ACI 301.
  - 1. Limit use of fly ash to not exceed 25 percent of cement content by weight.
  - 2. Design mixes to provide normal weight concrete with the following properties:
    - a. 3000 psi, 28 day compressive strength; water-cement ratio, 0.58 maximum (non-air-entrained), 0.46 maximum (air-entrained).
  - 3. Limit maximum water-cement ratio of concrete exposed to freezing and thawing to 0.45. Limit maximum water-cement ratio of concrete exposed to deicing salts, brackish water, or seawater to 0.40.
  - 4. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
    - a. Slabs: Not more than 3-in.
  - 5. Adjust mix designs when material characteristics, job conditions, weather, test results, or other circumstances warrant. Do not use revised concrete mixes until laboratory test data and strength results have been submitted to and reviewed by ENGINEER.
- B. Use air-entraining admixture in exterior exposed concrete, providing not less than 4.5 percent or more than 7 percent entrained air for concrete exposed to freezing and thawing and from 2 percent to 4 percent for other concrete.
- C. Use water-reducing, accelerating and retarding admixtures that have been tested and accepted in mix designs in strict compliance with MANUFACTURER's directions.

## 2.07 JOB-SITE MIXING

- A. Use drum-type batch machine mixer, mixing not less than 1-1/2 minutes for 1 cu yd or smaller capacity. Increase mixing time at least 15 seconds for each additional cu yd.
  - 1. Ready-Mix Concrete: ASTM C94.

## PART 3 EXECUTION

### 3.01 FORMWORK

- A. Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation and position. Select form materials to obtain required finishes.
  - 1. Maintain formwork tolerances and surface irregularities within ACI 347 limits, Class A tolerances for concrete exposed to view and Class C tolerances for other concrete surfaces.
  - 2. Provide openings in formwork to accommodate work of other trades. Accurately place and securely support items built into forms.
  - 3. Clean and adjust forms prior to concrete placement. Apply form-release agents or wet forms as required. Retighten forms during concrete placement, if required, to eliminate mortar leaks.

### 3.02 REINFORCEMENT

- A. Accurately position and support reinforcement and secure against displacement. Locate and support reinforcement to maintain minimum cover with metal chairs, runners, bolsters, spacers and hangers as required. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

### 3.03 INSTALLATION OF EMBEDDED ITEMS

- A. Set and build anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting diagrams, templates and instructions provided by others for locating and setting.

### 3.04 CONCRETE PLACEMENT

- A. Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," for placing concrete in a continuous operation within planned joints or sections. Do not begin concrete placement until other affected work is completed.
  - 1. Consolidate placed concrete using mechanical vibrating equipment with hand rodding and tamping so that concrete is worked around reinforcement and other embedded items and into forms.
  - 2. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placing and curing.
    - a. In cold weather comply with ACI 306.
    - b. In hot weather comply with ACI 305.

### 3.05 FINISH OF FORMED SURFACE

- A. Smooth-Formed Finish: Provide a smooth finish for concrete surfaces exposed to view and surfaces to be covered with a coating or covering material applied directly to concrete. Repair and patch defective areas, with fins and other projections completely removed and smoothed.

### 3.06 MONOLITHIC SLAB FINISHES

- A. Nonslip Broom Finish: Apply nonslip broom finish to exterior concrete platforms, steps and ramps and elsewhere as indicated.
  - 1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route.

### 3.07 CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry and windy weather, apply an evaporation control compound according to MANUFACTURER's instructions after screeding and bull floating, but before power floating and troweling.
  - 1. Begin initial curing as soon as free water has disappeared from exposed surfaces.
  - 2. Continue curing unformed concrete surfaces by water ponding, continuous fog spraying, continuously wetted absorptive cover, or by moisture-retaining cover curing. Cure formed surfaces by moist curing until forms are removed. Keep concrete continuously moist for not less than 72 hours for high-early strength concrete and 7 days for all other concrete.
  - 3. Apply membrane-forming curing compound to exposed interior slabs and to exterior slabs, walks and curbs as soon as final finishing operations are complete. Apply uniformly according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
    - a. Use membrane-curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

### 3.08 FIELD QUALITY CONTROL

- A. Perform sampling and testing during concrete placement, as follows:
- B. The OWNER will employ a testing agency to perform tests and to submit test reports. Sampling and testing for quality control during concrete placement is the CONTRACTORS responsibility and may include the following, as directed by ENGINEER.
  - 1. Sampling Fresh Concrete: ASTM C172, except modified for slump to comply with ASTM C94.
    - a. Slump: ASTM C143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
    - b. Air Content: ASTM C173, volumetric method for lightweight or normal weight concrete; ASTM C231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.

- c. Concrete Temperature: ASTM C1064; one test hourly when air temperature is 40 degrees F (4 degrees C) and below, when 80 degrees F (27 degrees C) and above and one test for each set of compressive-strength specimens.
  - d. Compression Test Specimen: ASTM C31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
  - e. Compressive-Strength Tests: ASTM C39; one set for each day's pour exceeding 5 cu yd plus additional sets for each 50 cu yd more than the first 25 cu yd of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
  3. When total quantity of a given class of concrete is less than 50 cu yd, ENGINEER may waive strength testing if adequate evidence of satisfactory strength is provided.
  4. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
  5. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.
  6. Test results will be reported in writing to ENGINEER, ready-mix producer and CONTRACTOR within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength and type of break for both 7-day tests and 28-day tests.

### 3.09 NONDESTRUCTIVE TESTING

- A. Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

### 3.10 ADDITIONAL TESTS

- A. The CONTRACTOR will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by ENGINEER. CONTRACTOR may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed.

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# **Construction Plans**

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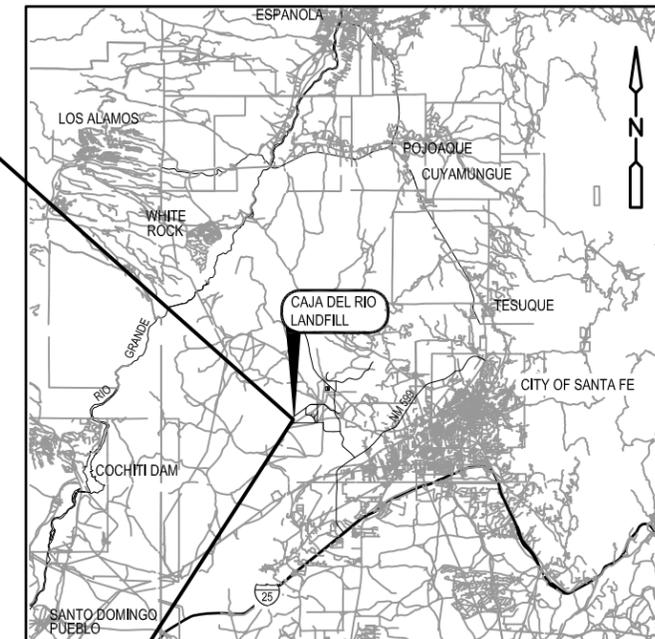
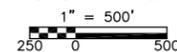
SANTA FE SOLID WASTE MANAGEMENT AGENCY  
**CAJA DEL RIO LANDFILL**

# CELL 5B LINER CONSTRUCTION

JUNE 2014



**SITE LOCATION MAP**



**VICINITY MAP**  
NO SCALE



**LIST OF DRAWINGS**

SHEET	TITLE
-	COVER SHEET, SITE LOCATION MAP, LIST OF DRAWINGS
G-1	GENERAL AND CIVIL NOTES, ABBREVIATIONS
C-1	OVERALL SITE PLAN, LEGEND
C-2	LINER AND LEACHATE COLLECTION SYSTEM PLAN
CD-1	LINER SYSTEM DETAILS
CD-2	LEACHATE COLLECTION SYSTEM DETAILS



**CDM Smith**  
 6000 Uptown Boulevard, NE, Suite 200  
 Albuquerque, NM 87110  
 Tel: (505) 243-3200

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**GENERAL NOTES:**

1. GENERAL NOTES AND ABBREVIATIONS APPLY TO ALL SHEETS, EXCEPT WHERE MORE SPECIFIC REQUIREMENTS ARE PROVIDED. SEE INDIVIDUAL DRAWINGS FOR ADDITIONAL ABBREVIATIONS, SYMBOLS, LEGENDS, NOTES, DETAILS AND OTHER REQUIREMENTS. IN ALL CASES THE INFORMATION SHOWN ON INDIVIDUAL DRAWINGS SHALL GOVERN OVER ANY GENERAL INFORMATION. NOT ALL SPECIFIED ITEMS AND/OR STANDARD DETAILS SHOWN MAY BE APPLICABLE TO THIS PROJECT.
2. UNLESS NOTED OTHERWISE, ALL WORK SHOWN IN THESE DOCUMENTS IS NEW AND TO BE PERFORMED UNDER THIS CONTRACT. ON SHEETS WHERE IT IS INDICATED THAT EXISTING IS TO BE MODIFIED AND/OR ADDED TO, WORK UNDER THIS CONTRACT IS NORMALLY SHOWN IN HEAVY LINES AND CALLOUTS ARE BOXED.
3. WRITTEN DISTANCES AND ELEVATIONS SHALL GOVERN OVER SCALED DISTANCES AND ELEVATIONS. PIPE LENGTHS SHOWN IN PROFILE OR PLAN ARE APPROXIMATE AND MAY VARY UP TO 5 PERCENT OF INDICATED LENGTH.
4. THE LOCATION OF ALL EXISTING UTILITIES, STRUCTURES, PROPERTY LINES, SUBSURFACE SOIL OR ROCK CONDITIONS ARE BASED ON THE BEST AVAILABLE INFORMATION AND ARE NOT WARRANTED TO BE EXACT, NOR IS IT WARRANTED THAT ALL ARE SHOWN. IN PARTICULAR ALL UNDERGROUND GAS LINES, UNDERGROUND AND/OR OVERHEAD ELECTRICAL AND TELEPHONE CABLES, AND POLES ARE NOT WARRANTED TO BE SHOWN.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATIONS OF ALL PROPERTY LINES, EASEMENTS, EXISTING UTILITIES AND OTHER EXISTING ITEMS. IT IS THE INTENT TO SHOW ALL PROPERTY LINES, EASEMENTS, UTILITIES, AND STRUCTURES. HOWEVER, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO SATISFY THEMSELVES THAT ALL EXISTING UTILITIES AND OTHER ITEMS, WHETHER SHOWN ON THESE DRAWINGS OR NOT, HAVE BEEN PROPERLY LOCATED.
  - 5.1 PRIOR TO THE START OF ANY CONSTRUCTION, THE CONTRACTOR SHALL CONTACT ALL UTILITIES OR OTHER OWNERS AND IF NECESSARY, MAKE EXPLORATORY EXCAVATIONS AND INQUIRIES TO DETERMINE THE EXACT LOCATION AND STATUS OF OPERATIONS OF UTILITIES AND STRUCTURES, AND THE LIMITS AND CHARACTER OF SOIL AND/OR ROCK.
  - 5.2 IF ANY ITEM REQUIRES RELOCATION AND/OR REQUIRES BEING TAKEN TEMPORARILY OUT OF SERVICE, THE CONTRACTOR SHALL NOTIFY THE OWNER OF THE ITEM WELL IN ADVANCE AND SHALL BE RESPONSIBLE FOR MAKING ALL ARRANGEMENTS WITH THE OWNER OF THE ITEM FOR TIMELY RELOCATION OF THE ITEM.
6. THE CONTRACTOR SHALL CONTACT BURIED CABLE LOCATION SERVICE AT 1-800-321-2537 FOR FIELD LOCATION OF UTILITIES AT LEAST 48 HOURS PRIOR TO THE START OF WORK.
7. THE CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR THE JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THESE REQUIREMENTS SHALL APPLY CONTINUOUSLY AND SHALL NOT BE LIMITED TO NORMAL WORKING HOURS. THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND THE CONSULTING ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE CONTRACTORS PERFORMANCE OF WORK ON THIS PROJECT.
8. FINAL LOCATIONS OF ALL FACILITIES SHALL BE RECORDED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS.
9. CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT EXISTING IMPROVEMENTS WHICH ARE TO REMAIN IN PLACE FROM DAMAGE. ALL IMPROVEMENTS WHICH ARE DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE EXPEDITIOUSLY REPAIRED OR RECONSTRUCTED TO THE ENGINEER'S SATISFACTION AT THE CONTRACTOR'S EXPENSE WITHOUT ADDITIONAL COMPENSATION.
10. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN ALL PERMITS NECESSARY FOR THIS PROJECT PRIOR TO COMMENCING CONSTRUCTION.
11. THE TERM "ACCEPTABLE TO ENGINEER" SHALL MEAN WRITTEN ACCEPTANCE BY ENGINEER AND IS TO BE RECEIVED BY THE CONTRACTOR BEFORE WORK IS STARTED.
12. ANY DEVIATIONS FROM CONTRACT DOCUMENTS, INCLUDING DRAWINGS AND/OR SPECIFICATIONS, MUST BE ACCEPTED BY THE ENGINEER, IN WRITING, PRIOR TO THE WORK BEING DONE. ANY DEVIATIONS PERFORMED WITHOUT THE ENGINEER'S ACCEPTANCE WILL NOT BE PAID FOR, AND MAY BE REQUIRED TO BE REDONE AT THE CONTRACTOR'S EXPENSE.
13. EXCEPT AS MODIFIED BY THE CONTRACT DOCUMENTS, ALL WORK SHALL BE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS (DRAWINGS, SPECIFICATIONS, ADDENDA, CHANGE ORDERS, APPROVED SUBMITTALS, ETC.) THE CONTRACTOR SHALL HAVE THE LATEST UPDATED VERSION OF THE ABOVE NAMED DOCUMENTS AT THE WORK SITE AT ALL TIMES.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE BY CONTRACTOR PERSONNEL WITH APPLICABLE CURRENT STATE REGULATIONS AND FEDERAL OSHA STANDARDS AND AS REQUIRED IN SECTION 107.8 OF THE NEW MEXICO STATE HIGHWAY AND TRANSPORTATION DEPT. STANDARD SPECIFICATIONS, 2014 EDITION.
15. THE ENGINEER IS NOT RESPONSIBLE FOR THE CONSTRUCTION METHODS OR TECHNIQUES, OR FOR THE EXECUTION OF THE WORK AS SHOWN ON THESE PLANS. THE OWNER AND ENGINEER SHALL NOT BE RESPONSIBLE FOR THE ACTS OR OMISSIONS OF THE CONTRACTOR, SUBCONTRACTORS, OR OTHER PERSONS PERFORMING ANY OF THE WORK, OR FOR THE FAILURE OF ANY OF THE CONTRACTORS OR SUBCONTRACTORS TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

16. ALL CIVIL SHEETS USE THE FOLLOWING DETAIL AND SECTION CALLOUT CONVENTION:



DETAIL LETTER OR SECTION NUMBER  
 DETAIL OR SECTION IS REFERENCED OR SHOWN ON SHEET CD-1\*

- \* IF SECTION OR DETAIL IS DRAWN ON THE SAME SHEET WHERE IT IS CALLED OUT, THE SHEET NUMBER IS REPLACED WITH A HYPHEN.
17. ELEVATIONS, NORTHINGS, AND EASTINGS ARE BASED ON FIELD SURVEY DATA PERFORMED IN MARCH 2014 BY MORRIS SURVEYING ENGINEERING, LLC.
18. ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED UNDER THIS CONTRACT, EXCEPT AS OTHERWISE STATED OR PROVIDED FOR HEREIN, SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE NEW MEXICO STATE HIGHWAY & TRANSPORTATION DEPARTMENT STANDARD SPECIFICATIONS (2014 EDITION) AND THE SUPPLEMENTAL TECHNICAL SPECIFICATIONS IN THE CONTRACT DOCUMENTS.

**CIVIL NOTES:**

1. CONTRACTOR SHALL TAKE NECESSARY MEASURES TO ENSURE THE PRESERVATION OF SURVEY MONUMENTS. THE CONTRACTOR SHALL NOT DISTURB ANY SURFACE MONUMENTS WITHOUT THE CONSENT OF THE ENGINEER, AND SHALL NOTIFY THE ENGINEER AND BEAR THE EXPENSE OF REPLACING ANY MONUMENTS THAT MAY BE DISTURBED WITHOUT PERMISSION. REPLACEMENT SHALL ONLY BE DONE BY THE ENGINEER AT THE CONTRACTOR'S EXPENSE.
2. PRELIMINARY SITE GRADING AND SUBGRADE PREPARATION HAS BEEN PERFORMED BY THE OWNER PRIOR TO THE START OF THIS CONTRACT.
3. ALL REFERENCES MADE HEREIN TO COMPACTION DENSITY OF SOIL REFER TO THE STANDARD PROCTOR TEST OR THE MODIFIED PROCTOR TEST - ASTM D-698 OR D-1557 RESPECTIVELY, AS NOTED.
4. THE CONTRACTOR IS RESPONSIBLE FOR TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES IN ACCORDANCE WITH NMSH&TD SPECIFICATIONS AND THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES).
5. THE CONTRACTOR IS RESPONSIBLE FOR FILING A NOTICE OF INTENT (NOI) WITH THE EPA CONCERNING A TEMPORARY STORM WATER POLLUTION PREVENTION PLAN FOR CONSTRUCTION. UPON COMPLETION AND ACCEPTANCE OF ALL WORK, CONTRACTOR MUST FILE A NOTICE OF TERMINATION (NOT) WITH THE EPA.
6. ALL EXISTING DRAINAGE FEATURES SHALL BE PROPERLY PROTECTED BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE OWNER.
7. THE CONTRACTOR IS NOTIFIED TO THE POTENTIAL PRESENCE OF EXPLOSIVE METHANE GAS. THIS GAS IS GENERATED IN DISPOSAL CELLS THROUGH THE NATURAL DECOMPOSITION OF WASTE MATERIALS.
8. ALL EXCAVATION, TRENCHING, AND SHORING ACTIVITIES MUST BE CARRIED OUT IN ACCORDANCE WITH OSHA 29 CFR 1926.650 SUBPART P.

**ABBREVIATIONS**

CMP	CORRUGATED METAL PIPE
COR	CORNER
DIA	DIAMETER
EXIST	EXISTING
FML	FLEXIBLE MEMBRANE LINER
GCL	GEOSYNTHETIC CLAY LINER
HDPE	HIGH-DENSITY POLYETHYLENE
INV	INVERT
LCS	LEACHATE COLLECTION SYSTEM
LF	LENGTH FEET
MIN	MINIMUM
MH	MANHOLE
MW	MONITORING WELL
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
PI	POINT OF INTERSECTION
PVC	POLYVINYL CHLORIDE
SDR	STANDARD DIAMETER RATIO
STA	STATION
TYP	TYPICAL

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REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. KADAMBALA  
 DRAWN BY: E. DOAK  
 SHEET CHK'D BY: A. BARICEVICH  
 CROSS CHK'D BY: K. GREENFELDER  
 APPROVED BY: K. GREENFELDER  
 DATE: JUNE 2014

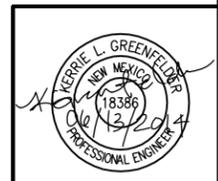


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SANTA FE SOLID WASTE MANAGEMENT AGENCY  
 CAJA DEL RIO LANDFILL  
 CELL 5B LINER CONSTRUCTION

GENERAL AND CIVIL NOTES  
 ABBREVIATIONS

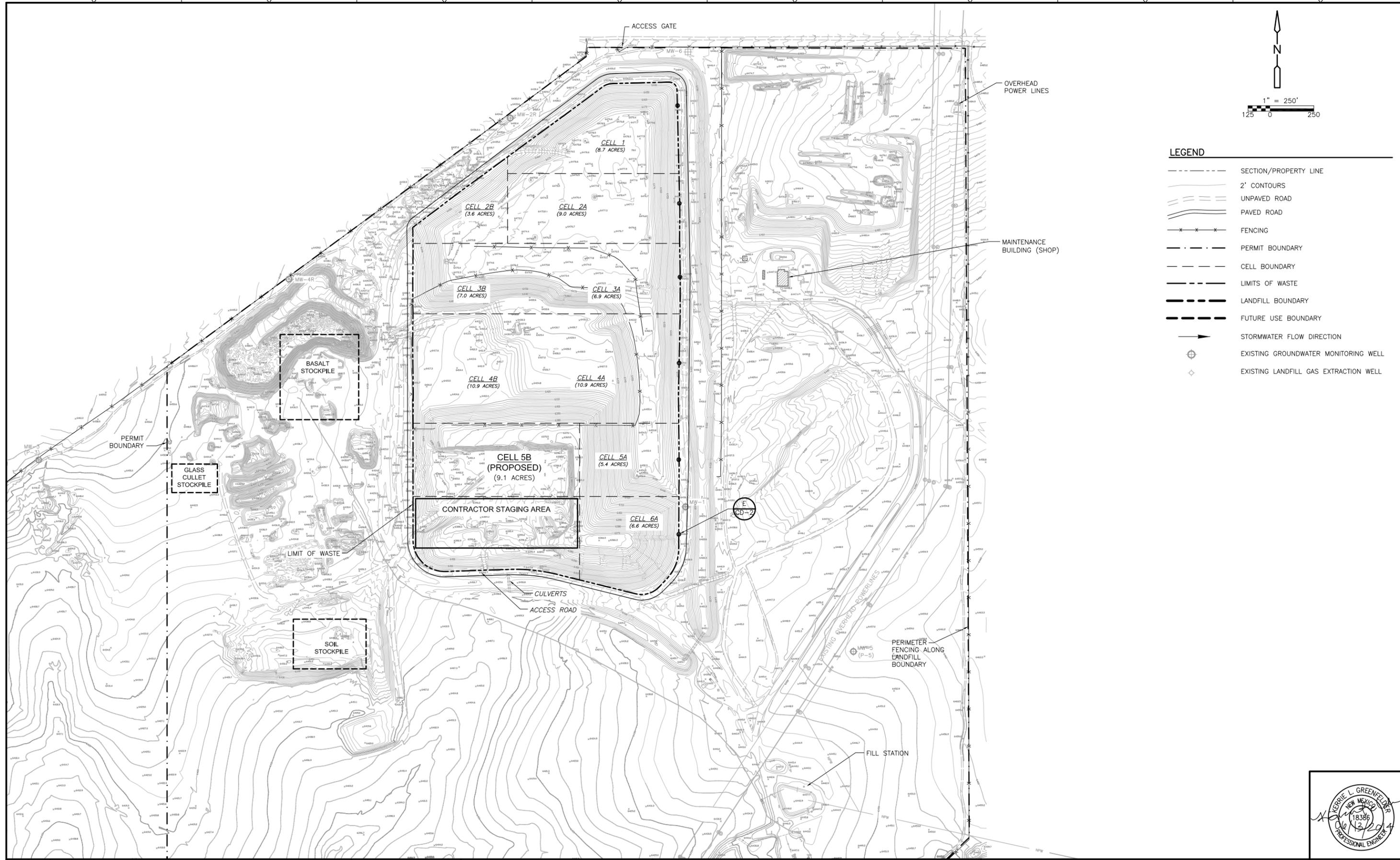
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**G-1**



PROJECT NO. 10679-91152  
 FILE NAME: GSHLG001.DWG  
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**G-1**



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**LEGEND**

	SECTION/PROPERTY LINE
	2' CONTOURS
	UNPAVED ROAD
	PAVED ROAD
	FENCING
	PERMIT BOUNDARY
	CELL BOUNDARY
	LIMITS OF WASTE
	LANDFILL BOUNDARY
	FUTURE USE BOUNDARY
	STORMWATER FLOW DIRECTION
	EXISTING GROUNDWATER MONITORING WELL
	EXISTING LANDFILL GAS EXTRACTION WELL

REV. NO.	DATE	DRWN	CHKD	REMARKS

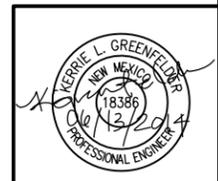
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 CAJA DEL RIO LANDFILL  
 CELL 5B LINER CONSTRUCTION

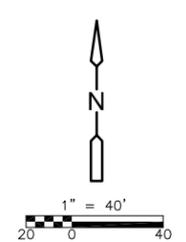
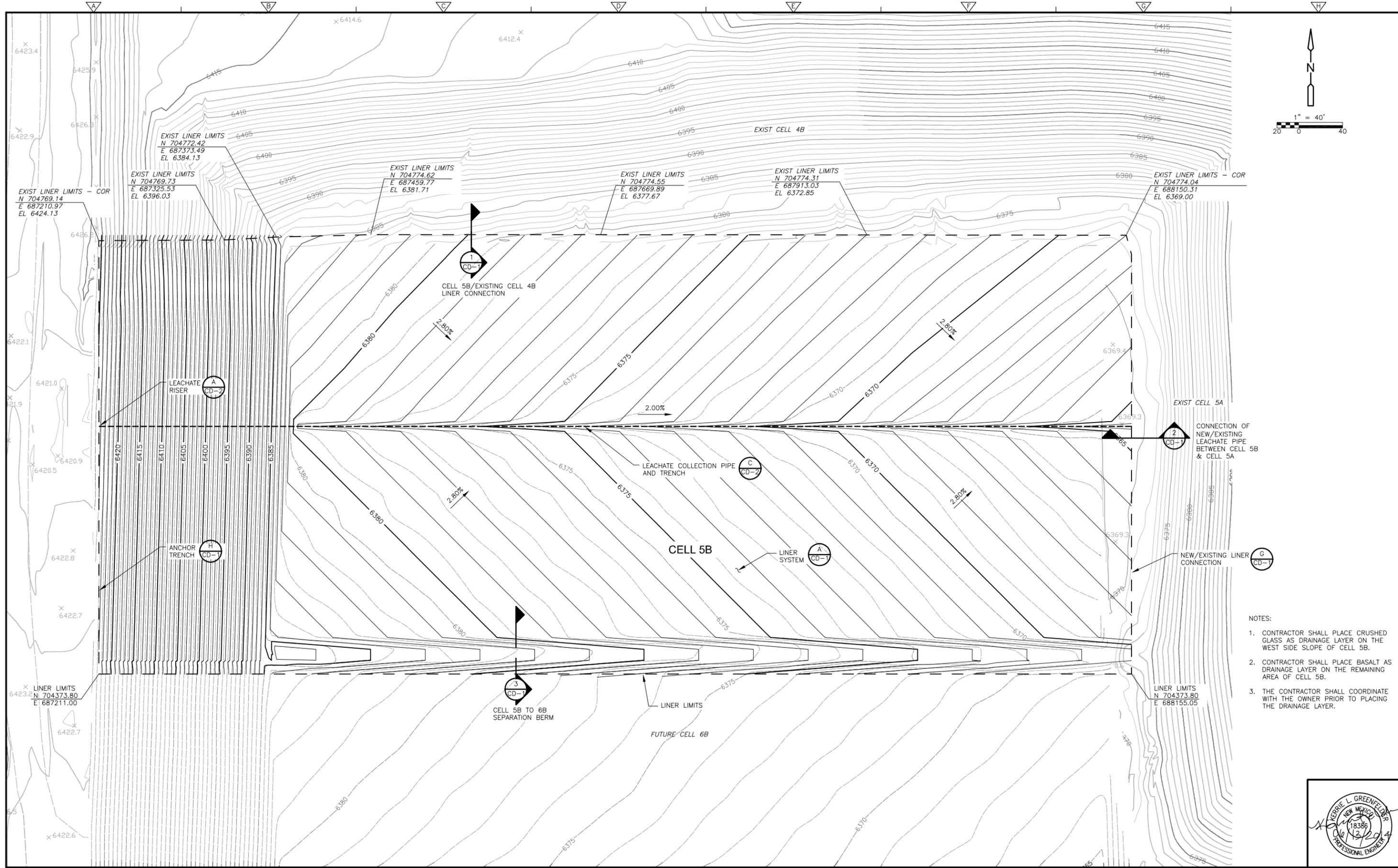
OVERALL SITE PLAN,  
 LEGEND

PROJECT NO. 10679-91152  
 FILE NAME: CSTPLC01  
 SHEET NO. C-1





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- NOTES:
1. CONTRACTOR SHALL PLACE CRUSHED GLASS AS DRAINAGE LAYER ON THE WEST SIDE SLOPE OF CELL 5B.
  2. CONTRACTOR SHALL PLACE BASALT AS DRAINAGE LAYER ON THE REMAINING AREA OF CELL 5B.
  3. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER PRIOR TO PLACING THE DRAINAGE LAYER.

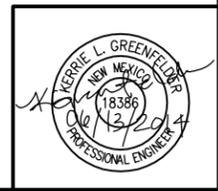
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 CAJA DEL RIO LANDFILL  
 CELL 5B LINER CONSTRUCTION

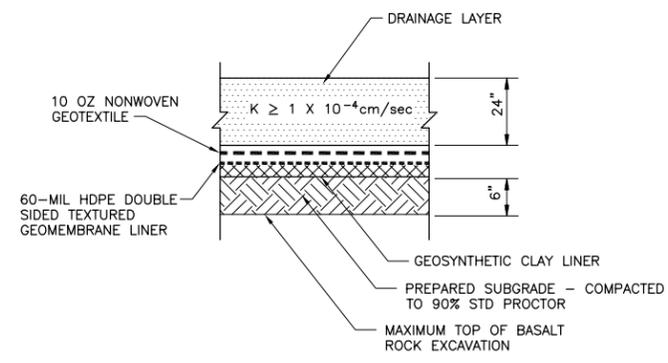
LINER AND LEACHATE COLLECTION SYSTEM  
 PLAN



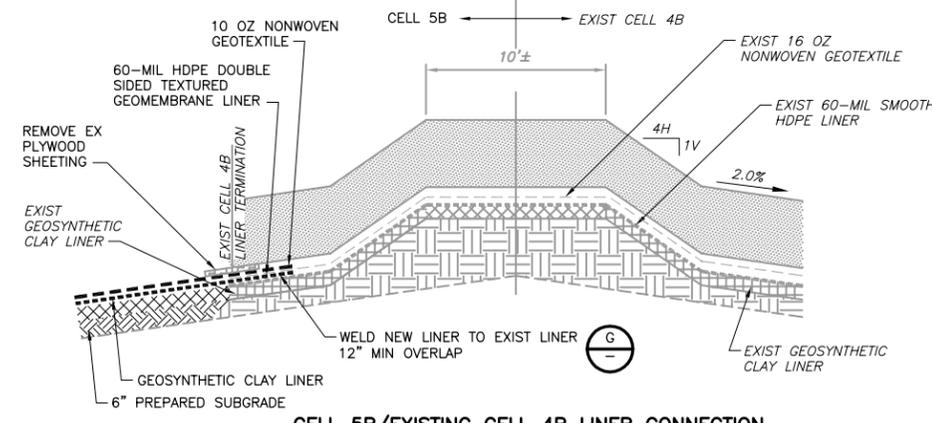
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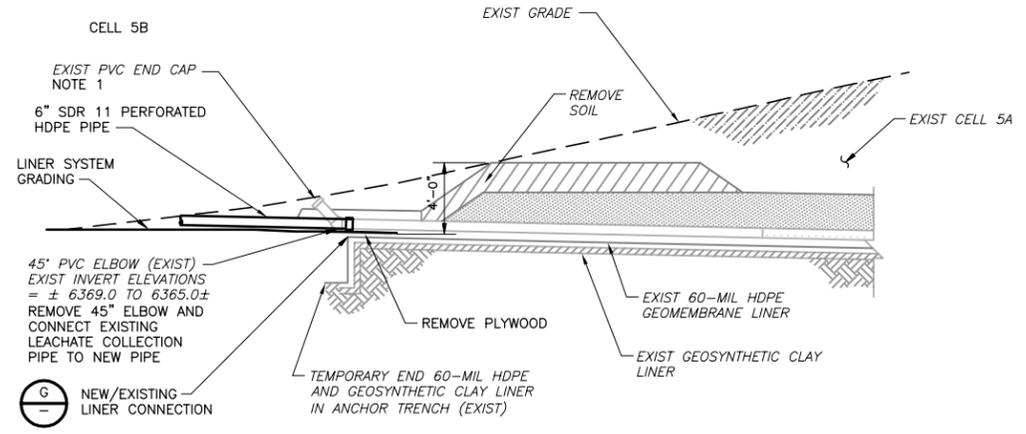
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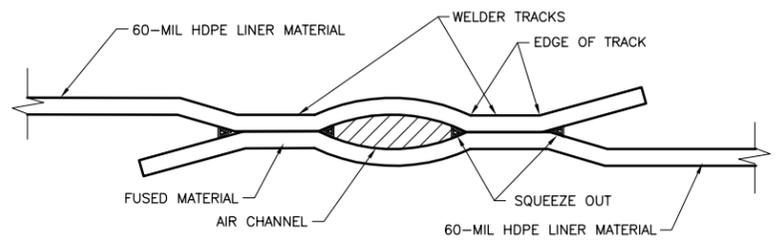
**LINER SYSTEM**  
**DETAIL A**  
 NTS C-2



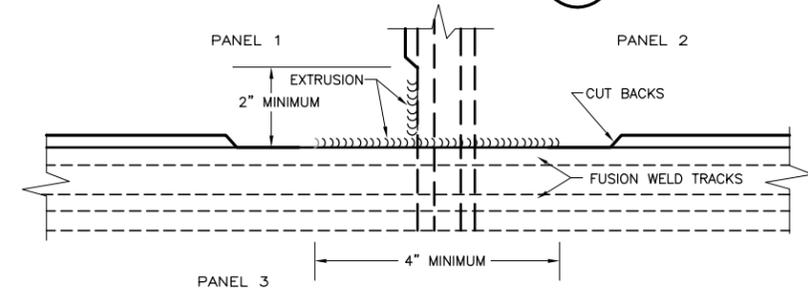
**CELL 5B/EXISTING CELL 4B LINER CONNECTION**  
**SECTION 1**  
 NTS C-2



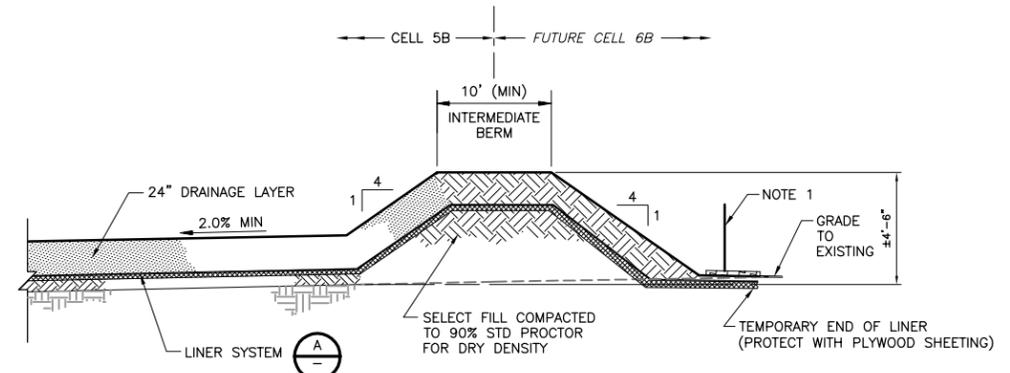
**CONNECTION OF NEW/EXISTING LINER AND LEACHATE PIPE**  
**SECTION 2**  
 NTS C-2



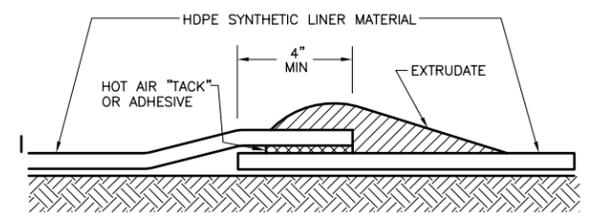
**TYPICAL FUSION WELD**  
**DETAIL B**  
 NTS



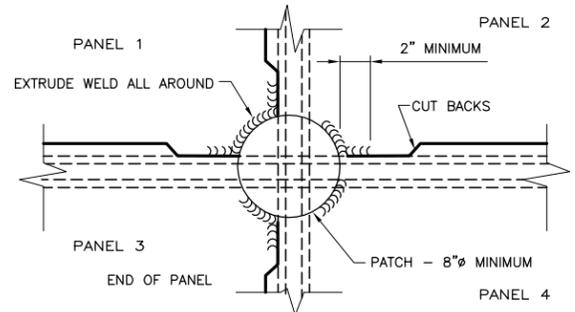
**TYPICAL "T" AT BUTT SEAM**  
**DETAIL E**  
 NTS



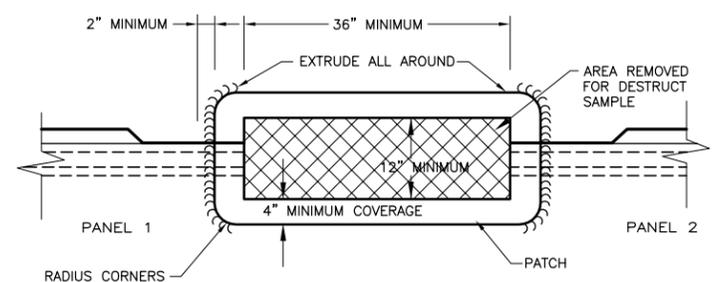
**CELL 5B TO CELL 6B SEPARATION BERM**  
**SECTION 3**  
 NTS C-2



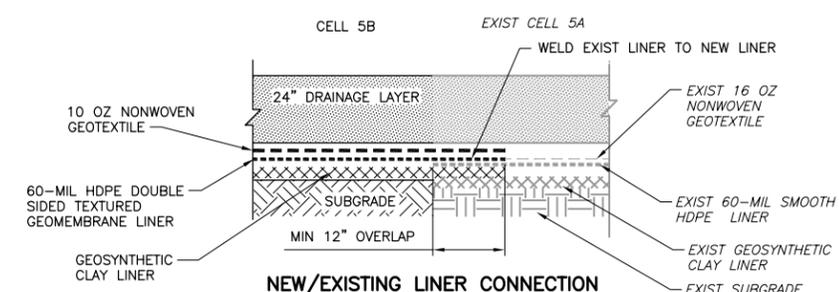
**TYPICAL EXTRUSION WELD**  
**DETAIL C**  
 NTS



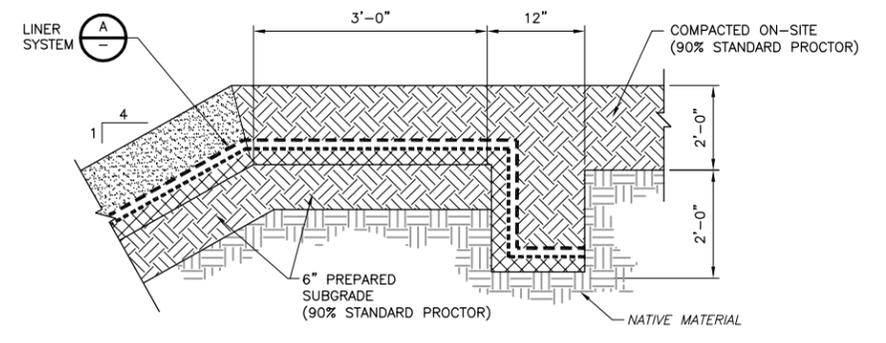
**TYPICAL PATCH AT PANEL END**  
**DETAIL F**  
 NTS



**TYPICAL DESTRUCT SAMPLE PATCH**  
**DETAIL D**  
 NTS



**NEW/EXISTING LINER CONNECTION**  
**DETAIL G**  
 NTS C-2



**LINER SYSTEM ANCHOR TRENCH**  
**DETAIL H**  
 NTS C-2

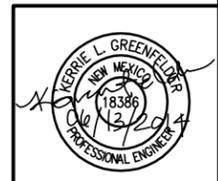
REV. NO.	DATE	DRWN	CHKD	REMARKS

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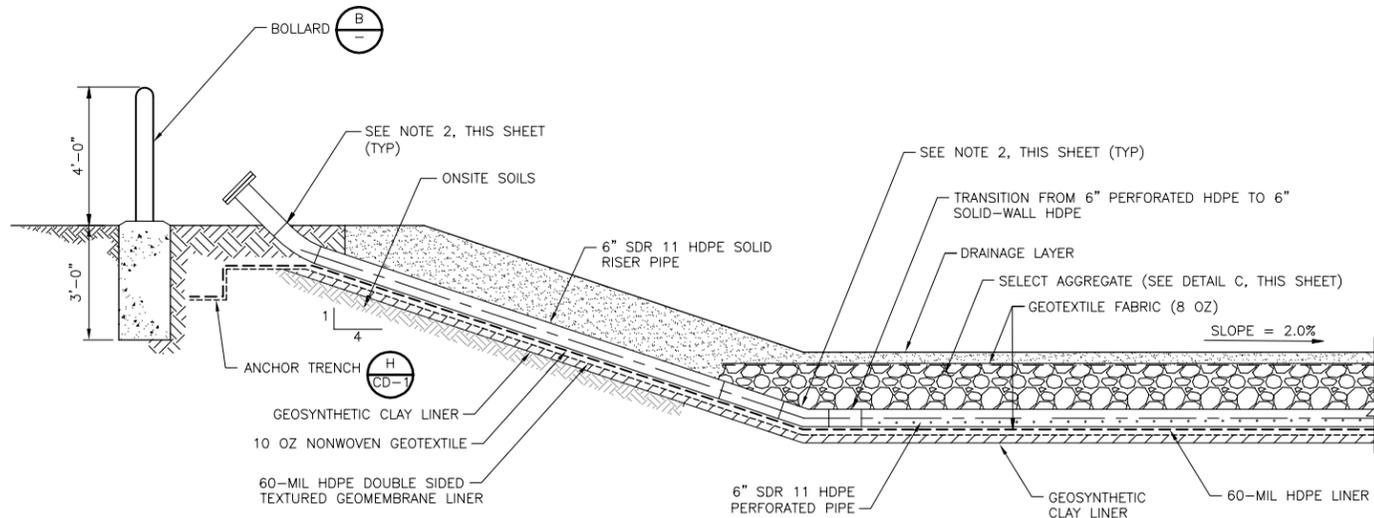
SANTA FE SOLID WASTE MANAGEMENT AGENCY  
 CAJA DEL RIO LANDFILL  
 CELL 5B LINER CONSTRUCTION

**LINER SYSTEM DETAILS**  
 SHEET NO. CD-1



PROJECT NO. 10679-91152  
 FILE NAME: CDTC001  
 SHEET NO. CD-1

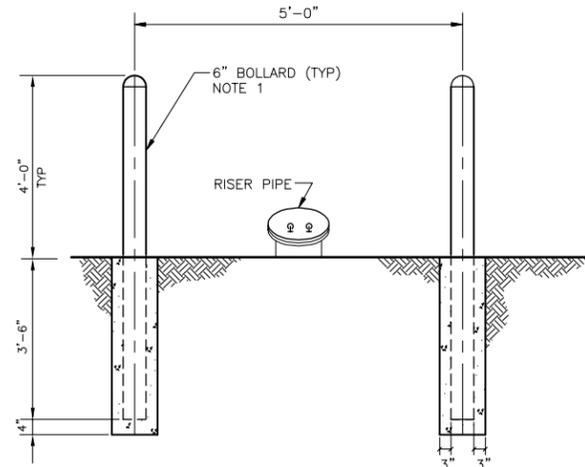




LEACHATE RISER  
DETAIL A  
NOT TO SCALE

NOTES:

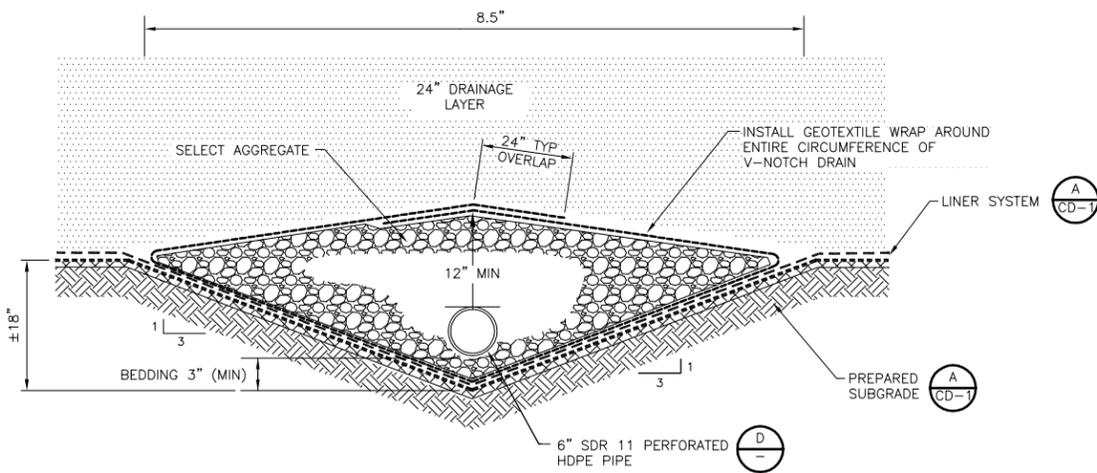
- PRIOR TO BACK FILLING TRENCHES FOR THE LEACHATE COLLECTION PIPING THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THAT ALL PIPE BENDS/FITTINGS/DEFLECTIONS WILL ALLOW FOR SFSWMA LEACHATE PIPE CLEANING EQUIPMENT TO BE LOWERED AND REMOVED FROM THE HEADER PIPE.
- 11 1/4" BENDS (MINIMUM) SHALL BE USED AND THE NUMBER OF BENDS SHALL BE DETERMINED IN THE FIELD.



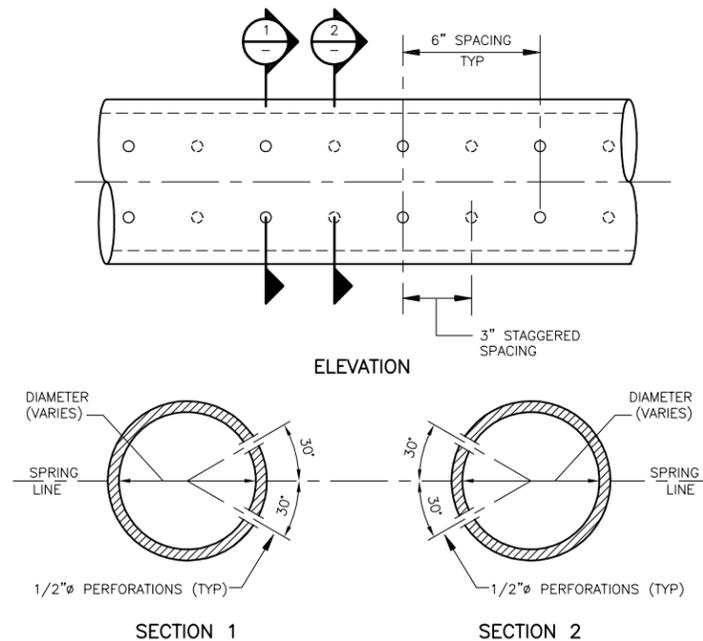
LEACHATE RISER BOLLARDS  
DETAIL B  
NTS

NOTE:

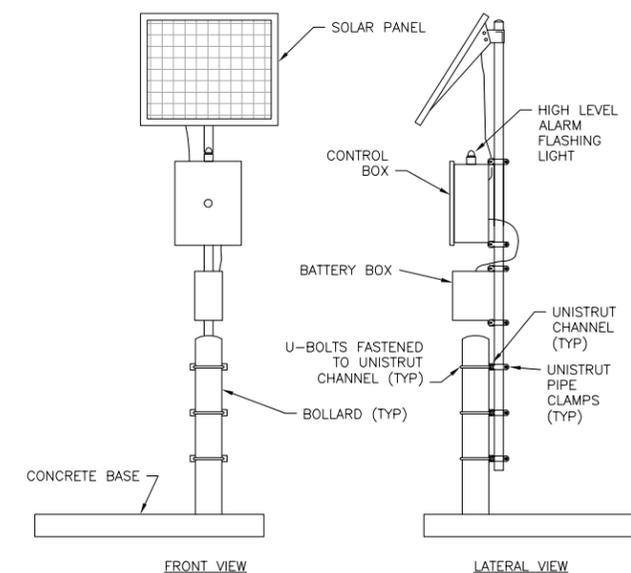
- BOLLARDS SHALL BE PAINTED SAFETY YELLOW.



LEACHATE COLLECTION PIPE AND TRENCH - FLOOR  
DETAIL C  
NTS



PERFORATED HDPE PIPE  
DETAIL D  
NTS



SOLAR POWERED LEVEL SENSOR  
DETAIL E  
NTS

NOTES:

- CONTRACTOR SHALL RETAIN A LICENSED PROFESSIONAL ENGINEER TO DESIGN A PUMP SYSTEM WITH LEVEL SENSOR AND HIGH LEVEL ALARM SYSTEM POWERED BY A SOLAR PANEL TO INDICATE WHEN THERE IS MORE THAN 12 INCHES OF HEAD ON THE LINER. THE HIGH LEVEL ALARM AND PUMP SYSTEM SHALL BE INSTALLED IN CELLS 1, 2, 3, 4, 5, AND 6. PUMP AND CONTROLS SHALL BE POWERED BY OWNER'S PORTABLE GENERATOR. CELLS 1-6 EACH HAVE 12" DIAMETER SIDESLOPE RISERS.
- IN ACCORDANCE WITH SPECIFICATION SECTION 01300, CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND PRODUCT CUT SECTIONS FOR THE PUMP AND HIGH LEVEL ALARM SYSTEM.
- CELLS 1-3: THE PUMP SHALL BE EPG COMPANIES INC. SURE PUMP MODEL WSDPT 3-3, 4" SUMP DRAINER WITH 1/2 HP 230 VAC 1 PHASE MOTOR INCLUDING 175' OF JACKETED MOTOR LEAD, 0-5 PSI (LT) SUBMERSIBLE LEVEL SENSOR WITH 175' OF LEAD, AND 175' OF 1/8" STAINLESS STEEL SUSPENSION CABLE WITH CLAMPS, OR APPROVED EQUAL. LEVEL SENSOR SHALL HAVE SETPOINTS FOR 2" OF HEAD, 11" OF HEAD, AND 12" OF HEAD ON THE LINER. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING LENGTHS OF LEAD/CABLE.
- CELLS 4-6: THE PUMP SHALL BE EPG COMPANIES INC. SURE PUMP MODEL WSDPT 3-6, 4" SUMP DRAINER WITH 1/2 HP 230 VAC 1 PHASE MOTOR INCLUDING 300' OF JACKETED MOTOR LEAD, 0-5 PSI (LT) SUBMERSIBLE LEVEL SENSOR WITH 300' OF LEAD, AND 300' OF 1/8" STAINLESS STEEL SUSPENSION CABLE WITH CLAMPS, OR APPROVED EQUAL. LEVEL SENSOR SHALL HAVE SETPOINTS FOR 2" OF HEAD, 11" OF HEAD, AND 12" OF HEAD ON THE LINER. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING LENGTHS OF LEAD/CABLE.
- CELLS 1-6: THE PUMP SYSTEM SHALL INCLUDE EPG COMPANIES INC. 316 STAINLESS STEEL DISCHARGE ADAPTER MODEL NW 1.5SS WITH 1.5"x1.25" HEX BUSHING (MXF) OR APPROVED EQUAL.
- CELLS 1-6: THE PUMP SYSTEM SHALL INCLUDE EPG COMPANIES INC. BREAKOUT BOX MODEL BJBPS00 FOR MOTOR LEAD WITH CONNECTION TERMINALS AND BREAKOUT BOX MODEL BJB600B FOR LEVEL SENSOR INCLUDING DESICCANT DRYER, BELLOWS, AND CONNECTION TERMINALS OR APPROVED EQUAL. BREAKOUT BOXES SHALL BE NEMA 4X, NON-METALLIC ENCLOSURE.
- CELLS 1-3: THE CONTROL PANEL SHALL BE AN EPG COMPANIES INC. PUMP MASTER L925PTGS. OR APPROVED EQUAL TO OPERATE 1/2 HP 230 VAC 1 PHASE MOTOR. CONTROL PANEL SHALL INCLUDE 12 VDC LEVELMASTER LEVEL CONTROL METER, 77C KW/HP VOLTAGE/PUMP MONITOR, 12 VDC TOP MOUNTED PUMP CALLED LIGHT (GREEN), 12 VDC TOP MOUNTED PUMP CALLED LIGHT (RED), AND A GENERATOR PLUG. CONTROL PANEL SHALL BE NEMA 4 RATED.
- CELLS 4-6: THE CONTROL PANEL SHALL BE AN EPG COMPANIES INC. PUMP MASTER L925PTGS. OR APPROVED EQUAL TO OPERATE 1/2 HP 230 VAC 1 PHASE MOTOR. CONTROL PANEL SHALL INCLUDE 12 VDC LEVELMASTER LEVEL CONTROL METER, 77C KW/HP VOLTAGE/PUMP MONITOR, 12 VDC TOP MOUNTED PUMP CALLED LIGHT (GREEN), 12 VDC TOP MOUNTED PUMP CALLED LIGHT (RED), AND A GENERATOR PLUG. CONTROL PANEL SHALL BE NEMA 4 RATED.
- THE SOLAR PANEL FOR EACH CELL SHALL BE A 90 WATT, 12 VOLT PANEL WITH CHARGER AND MAST MOUNT. SOLAR PANEL CONTROLLER SHALL PROVIDE POWER TO BATTERIES. BATTERIES SHALL BE PROVIDED THAT ARE CAPABLE OF STORING AND PROVIDING POWER TO THE CONTROL PANEL.
- CONTRACTOR SHALL PROVIDE 1 1/4" HDPE DISCHARGE PIPE FOR EACH PUMP. CONTRACTOR SHALL FIELD VERIFY LENGTH OF PIPE REQUIRED.
- CONTRACTOR SHALL SUBMIT ALL REQUIRED O&M MANUALS AND HAVE MANUFACTURER PROVIDE TRAINING IN ACCORDANCE WITH SECTION 01730.

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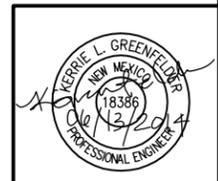
REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: R. KADAMBALA	
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SANTA FE SOLID WASTE MANAGEMENT AGENCY  
 CAJA DEL RIO LANDFILL  
 CELL 5B LINER CONSTRUCTION

LEACHATE COLLECTION SYSTEM DETAILS  
 SHEET NO. CD-2



PROJECT NO. 10679-91152
FILE NAME: CD02STDT.DWG
SHEET NO. CD-2

