MAYOR
DAVID R. MARTIN

PURCHASING AGENT
BEVERLY A. AVENI
PHONE : (203) 977-4107
FAX: (203) 977-5253
Email: baveni@.stamfordct.gov

CITY OF STAMFORD

OFFICE OF ADMINISTRATION
888 WASHINGTON BOULEVARD
STAMFORD, CT 06904-2152

SEALED BIDS MUST BE RECEIVED BY THE OFFICE OF THE PURCHASING DEPARTMENT, 888 WASHINGTON BLVD. STAMFORD, CT. 06901 BY THE DATE AND TIME OF BID OPENING
(REV: 12-2-13)

BID NUMBER: S-6442	**VENDOR NAME:**
REQUESTING DEPARTMENT: **PROJECT MANAGER:**	**ENGINEERING BUREAU** **JEFF BROWN: 203-627-6352 (Cell)** **Email: Jbrown2@stamfordct.gov**
DATE OF BID ISSUANCE:	**AUGUST 26, 2014**
TITLE OF BID:	**SCOFIELD YARD AND PARK LANDFILL CAPPING PROJECT.**
DATE OF BID OPENING:	**OCTOBER 7, 2014**
TIME:	**11:00 A.M.**
BID DEPOSIT REQUIRED: **IF YES, AMOUNT REQUIRED**	**YES (X) NO ( )** **5% OF BID**
SUCCESSFUL BIDDERS ONLY: **PERFORMANCE & PAYMENT BOND REQUIRED:** **IF YES, AMOUNT REQUIRED:**	**YES (X) NO ( )** **100% OF BID**
SUCCESSFUL BIDDERS ONLY: **MAINTENANCE BOND REQUIRED:** **IF YES, AMOUNT REQUIRED:**	**YES (X) NO ( )** **10% OF BID**

ALL TERMS AND CONDITIONS, SPECIFICATIONS AND BID FORMS ARE ATTACHED HERETO.

NOTE 1: MAINTENANCE BOND (SEE GENERAL CONDITIONS IN BID SPECIFICATIONS)

NOTE 2: A MANDATORY PRE-BID WALK THROUGH IS SCHEDULED FOR EITHER TUESDAY, SEPTEMBER 9, 2014, AT NOON, OR THURSDAY, SEPTEMBER 11, 2014, AT NOON, AT THE SCOFIELDTOWN YARD SALT DOME, LOCATED AT 612 SCOFIELDTOWN ROAD. (CALL JEFF BROWN AT 203-627-6352 TO PROVIDE THE DATE YOUR COMPANY REPRESENTATIVE WILL BE ATTENDING).

NOTE 3: BID DRAWINGS CAN BE PICKED UP FROM COUNTY REPRODUCTIONS, 39 BELDEN STREET, STAMFORD, CT 06902. TELE: (203) 348-3758; FAX: (203) 348-2654. A NON-REFUNDABLE FEE WILL BE CHARGED FOR THESE DOCUMENTS.

THE LOWEST RESPONSIBLE BIDDER MAY BE REQUIRED TO ATTEND A MEETING WITH CITY OFFICIALS PRIOR TO THE AWARDING OF THE BID CONTRACT

CITY OF STAMFORD, CONNECTICUT

IMPORTANT

Caution : The competitive bid/proposal process requires that the City of Stamford provide all competitors with equal and timely access to information. To enhance our capabilities, the Purchasing Department is providing bid information over the Internet. You may use this application provided you agree with the following understandings:

1. The City cannot guarantee that the equipment involved in this technology will be available to provide information or receive transmittals. IT IS YOUR RESPONSIBILITY TO ENSURE THAT YOU HAVE CURRENT INFORMATION AND THAT QUOTATIONS ARE RECEIVED AT THE DESIGNATED LOCATION, COMPLETE AND ON TIME.

2. The City is not responsible for the confidentiality of information transmitted over the Internet.

3. The City makes no guarantee as to the completeness or accuracy of downloaded "Request for Bid", "Request for Proposal" or "Request for Qualification".

4. Bids/Proposals must be received in hard copy in the Purchasing Department by the due date and time in order to be considered. Please be advised that the Purchasing Department does not accept bids or proposals by email or fax. More Information: (203) 977-4108, (203) 977-4107 or (203) 977-4994.

Last Modified on www.cityofstamford.org
(6/28/2010 - 7:28:18 AM)

CITY OF STAMFORD, CONNECTICUT

NOTE

EFFECTIVE AUGUST 3, 2009, THE PURCHASING DEPARTMENT WILL NOT REQUIRE THE SUBMISSION OF A BID PACKAGE THAT INCLUDES BID SPECIFICATIONS AND CONTRACT DOCUMENTATION. THE FOLLOWING DOCUMENTS WILL BE REQUIRED TO SATISFY BID SUBMISSION MANDATES:

1) NON-COLLUSION AFFIDAVIT (CONSTRUCTION BIDS ONLY)

2) BIDDER'S INFORMATION AND ACKNOWLEDGMENT FORM

3) BID FORMS (ONE ORIGINAL AND ONE COPY)

4) PRICING SHEETS (ONE ORIGINAL AND ONE COPY)

5) ADDENDA ACKNOWLEDGMENT FORM (IF APPLICABLE)

6) TECHNICAL SPECIFICATIONS OR SPECIFICATION CHECKLIST (IF APPLICABLE - ONE ORIGINAL AND ONE COPY)

THE PURCHASING AGENT RESERVES THE EXPRESS RIGHT, ON BEHALF OF THE CITY OF STAMFORD, TO WAIVE ANY/ALL TECHNICAL DEFECTS, IRREGULARITIES AND OMISSIONS IF THE BEST INTEREST OF THE CITY IS SERVED.

Effective: 8/1/09

Non-Collusion Affidavit

The undersigned, having been duly sworn, affirms and says that to the best of his/her knowledge and belief:

1. The prices in this Proposal have been arrived at independently without collusion, consultation, communication, or agreement with any other Proposer or with any competitor for the purpose of restricting competition.

2. Unless otherwise required by law, the prices, which have been quoted in this Proposal, have not been knowingly disclosed by the Proposer and will not knowingly be disclosed by the Proposer prior to opening, directly or indirectly, to any other Proposer or to any competitor.

3. No attempt has been made or will be made by the Proposer to induce any other person, partnership or corporation to submit or not to submit a Proposal for the purpose of restricting competition.

Name of Proposer:_____

By: _____

Print Name: _____

Title: _____

ACKNOWLEDGMENT

STATE OF :

S.S.: Date:_____

COUNTY OF :

Personally appeared _____, as _____ of the above named firm, and attested that the foregoing statements are true and accurate to the best of his/her knowledge and belief.

_____

Notary Public

My Commission Expires:_____

EFFECTIVE: 2/24/09

(Construction Only)

CITY OF STAMFORD
OFFICE OF POLICY & MANAGEMENT
888 WASHINGTON BOULEVARD
P.O. BOX 10152
STAMFORD, CONNECTICUT 06904-2152

BID No. S-

.....

BIDDERS TAKE NOTICE!!!

1. **ALL BIDS WILL BE OPENED PROMPTLY AT THE ADVERTISED TIME OF OPENING. THERE CAN AND WILL BE NO DELAYS OR POSTPONEMENTS WHICH ARE NOT PUBLICLY ADVERTISED. ANY BID RECEIVED AFTER THE ADVERTISED TIME OF OPENING CANNOT BE ACCEPTED.**

2. **IF BIDDER USES COURIER SERVICE FOR BID DELIVERY, IT SHALL BE THE BIDDER'S RESPONSIBILITY THAT THE BID REACHES THE PURCHASING DEPARTMENT BY THE DATE AND TIME SPECIFIED HEREIN.**

3. **ALL BIDS SUBMITTED TO THE CITY MUST BE IN A CLEARLY MARKED SEALED ENVELOPE.**

4. **OBLIGATION OF BIDDERS:**

   AT THE TIME OF OPENING BIDS, EACH BIDDER SHALL BE PRESUMED TO HAVE INSPECTED THE SITES, AND TO HAVE READ AND MADE HIMSELF THOROUGHLY FAMILIAR WITH THE PLANS AND CONTRACT DOCUMENTS INCLUDING ALL ADDENDA. THE FAILURE OR OMISSION OF ANY BIDDER TO RECEIVE OR EXAMINE ANY FORM, INSTRUMENT OR DOCUMENT SHALL IN NO WAY RELIEVE ANY BIDDER FROM ANY OBLIGATION IN RESPECT TO HIS BID.

   EACH BIDDER MUST FULLY INFORM HIMSELF OF THE CONSTRUCTION AND LABOR CONDITIONS RELATING TO THE WORK WHICH IS NOW OR WILL BE PERFORMED. FAILURE TO DO SO WILL NOT RELIEVE THE SUCCESSFUL BIDDER OF HIS OBLIGATION TO FURNISH ALL LABOR AND MATERIALS NECESSARY TO CARRY OUT THE PROVISIONS OF THE CONTRACT DOCUMENTS AND TO COMPLETE THE CONTEMPLATED WORK. INASMUCH AS POSSIBLE, THE CONTRACTOR MUST, IN CARRYING OUT HIS WORK, EMPLOY SUCH METHODS OR MEANS AS WILL NOT CAUSE ANY INTERRUPTIONS OR INTERFERENCE WITH THE WORK OF ANY OTHER CONTRACTOR.

MAYOR
DAVID R. MARTIN

PURCHASING AGENT
BEVERLY A. AVENI
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(Rev. 03-14-14)

GENERAL CONDITIONS

- Your bid is to be made F.O.B. Stamford, CT - including any/all delivery and unloading, if so required.

- The City of Stamford, as a municipal corporation in the State of Connecticut, is exempt from the payment of all taxes and none should be included in your bid.

- Bids shall be submitted on the proposal forms included and should be returned in a clearly marked envelope. Please be sure to fill in the bidder's name, address, etc. and the bid title and date of bid opening. Bid due dates are clearly stated on the bid cover sheet. If for any reason, the bid cover sheet is detached from the bid package, it will be the responsibility of the bidder to contact the City Purchasing Department to determine the actual bid due date.

- Bids received after the time and date indicated shall not be accepted and shall be returned unopened.

- Amendments and / or withdrawals to bids received shall not be allowed or accepted after the time and date of bid opening.

- Any verbal agreement or arrangement made by bidders with any City Agency, Employee, or Agent of the City shall be disregarded and have neither force nor affect upon the bid.

- The Purchasing Agent reserves the express right, on behalf of the City of Stamford, to waive any / all technical defects, irregularities and omissions if, the best interest of the City shall be served.

THE CITY OF STAMFORD RESERVES THE RIGHT TO REJECT ANY/ALL BIDS

No bidder may withdraw her/his/its bid for a period of **sixty (60) days** from the date of bid opening. Under no event or circumstances may a contractor withdraw a bid once the City has accepted the bid, so long as the City is diligent in proceeding towards the execution of a formal contract.

Any bid, which does not comply with or conform to the specifications contained herein, shall be rejected as non-conforming.

The successful bidder (hereinafter referred to as the Bidder) shall, at all times, guard the owner's property from any damage or loss caused by the execution of this bid and shall be solely liable for any damage or loss suffered as a result of the work itself - or non-completion thereof. The bidder shall, at the completion of the project, leave the project site in a condition acceptable to the City.

The bidder shall comply with all laws, ordinances, rules and regulations relevant to the completion of this bid and shall be solely responsible for the procurement of any/all requisite permits and compliance therewith.

The undersigned declare(s) that **I/WE AM/ARE** the only person(s) interested in this bid and that this bid is submitted without any connection with any other bidding entity. A further declaration is made that this bid price is fair and has been made without any aspect of collusion, price fixing or fraud. Further, that no employee or agent of the City of Stamford is directly or indirectly interested in any profits to be derived from the performance of this bid.

INQUIRIES:

All inquiries regarding this Bid must be in writing and must be postmarked or delivered at least **ten (10) working days** prior to the submission date and be addressed to the Project Manager identified on the front cover page of the Bid.

ASSIGNMENT:

The performance of the requirements of this bid shall not be assigned to a party not herein named without the express written consent of the City of Stamford. The Purchasing Agent shall only give such consent, for the purposes of this bid.

PERFORMANCE, PAYMENT AND MAINTENANCE BONDS (IF APPLICABLE):

If performance, payment and maintenance bonds are required for this bid as specified on the bid's Cover Sheet, the bidder shall furnish surety bonds from a licensed surety in the State of Connecticut and acceptable to the City of Stamford. The surety bonds shall be in the form of traditional bonds or in the form of an irrevocable letter of credit drawn on a financial institution acceptable to the City, in amounts stipulated. Said surety bonds shall be for the faithful and proper performance of all persons/corporations performing work towards the acceptable completion of this contract. The face value of the performance bond shall be as noted on the bid's Cover Sheet. The face value of the maintenance bond shall be as noted on the bid's Cover Sheet or $5,000.00, whichever is greater. The maintenance bond shall be for a period commencing upon the expiration of the performance bond and terminating twenty-four (24) months following completion and acceptance of the work by the City. Such maintenance bond shall be provided by the bidder to the City upon completion and acceptance of the work by the City. The cost of all such required surety bonds shall be borne entirely by the bidder. Said surety bonds shall be provided no later than **FIFTEEN (15) Calendar Days** from the date of **AWARD** of this bid.

The performance and payment bonds must both be underwritten by an insurance company licensed to do business in the State of Connecticut and currently listed in the Department of Treasury's Treasury Listing of approved Sureties **(MOST RECENT CIRCULAR)** and rated B+ or better by A. M. Best in the full stipulated amount of the contract.

BID DEPOSIT:

Bid deposits shall be made payable to the City of Stamford. Such deposit shall be in the form of a Bid Bond of Acceptable Surety, (see Performance Bonds); a Certified Bank Instrument or Postal Money Order. Any bid submitted without the required bid security shall be rejected as non-conforming.

PROJECT COMMENCEMENT:

Any project commencing without the proper authorization shall be declared **"NULL"** and **"VOID"** and no payment shall be authorized.

CLAYTON ACT:

The bidder offers and agrees to assign to the Public Body all rights, title and interest in and to all causes of action it may have under Section 4 of the Clayton Act, 15 U.S.C. and Sec. 15, or under Chapter 624 of the General Statutes of Connecticut, arising out of the purchase of services, property or intangibles of any kind pursuant to a public purchase contract or subcontract. This assignment shall be made and become effective at the time the purchasing body awards or accepts such contract without further acknowledgment by the parties.

NON-DISCRIMINATION AND AFFIRMATIVE ACTION; MINORITY BUSINESS ENTERPRISES

1) The contractor agrees and warrants that in the performance of the contract, it will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the State of Connecticut; and the contractor further agrees to take affirmative action to ensure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved.

(2) The contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the State of Connecticut Commission on Human Rights and Opportunities ["the Commission"].

(3) The contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the Commission, advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The contractor agrees to comply with each provision of Connecticut General Statutes Sections 46a-60 and 46a-60a, and with each regulation or relevant order issued by the Commission pursuant to the Connecticut General Statues.

(b) The contractor agrees and warrants that it will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on the public works project encompassed by the Bid Documents.

"Minority business enterprise" means any small contractor or supplier of materials fifty-one per cent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) Who are active in the daily affairs of the enterprise, (2) who have the power to direct the management and policies of the enterprise, and (3) who are members of a minority, as such term is defined in subsection (a) of Connecticut General Statutes Section 32-9n; and "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations. "Good faith efforts" shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements.

Determination of the contractor's good faith efforts shall include but shall not be limited to the following factors: the contractor's employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training; technical assistance activities and such other reasonable activities or efforts as the commission may prescribe that are designed to ensure the participation of minority business enterprises in public works projects.

NONDISCRIMINATION ON THE BASIS OF SEXUAL ORIENTATION

(1) The contractor agrees and warrants that in the performance of the contract, it will not discriminate or permit discrimination against any person or group of persons on the grounds of

sexual orientation, in any manner prohibited by the laws of the United States or of the state of Connecticut, and those employees is treated when employed without regard to their sexual orientation;

(2) The contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities ["the Commission"] advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment;

(3) The contractor agrees to comply with each provision of Connecticut General Statutes Section 4a-60a and with each regulation or relevant order issued by said Commission pursuant to the Connecticut General Statutes.

ADMINISTRATIVE RECONSIDERATION (26.53(d)).

Within thirty (30) days of being informed by the City of Stamford that it is not responsive because it has not documented sufficient good faith efforts, a bidder/offeror may request administrative reconsideration. Bidders/offerors should make this request in writing to the following Reconsideration Official:

Director of Administration
City of Stamford
888 Washington Boulevard
Stamford, CT 06901

The Reconsideration official will not have played any role in the original determination that the bidder/offeror did not document sufficient good faith efforts.

INSURANCE REQUIREMENTS (IF APPLICABLE - SEE ATTACHED APPENDIX 1):

GIFTS:

During the term of this contract, including any extensions, the Contractor shall refrain from making gifts of money, goods, real or personal property or services to any appointed or elected official or employee of the City of Stamford or the Stamford Board of Education or any appointed or elected official or employee of their Boards, Commissions, Departments, Agencies or Authorities. All references to the Contractor shall include its officers, directors, employees, and owners of more than 5% equity in the contractor. Violation of this provision shall constitute a material breach of this Agreement, for which this Agreement may be summarily terminated.

SET-OFF:

Pursuant to Section 23-18.4.1 of the Code of Ordinances, the Contractor agrees that the City shall have the right to set-off or withhold any payment, or portion thereof, due the Contractor under this Agreement, for and up to the amount of any taxes, penalties, lien fees and delinquent interest that have been levied by the City against any property of the Contractor, both real and personal, provided such taxes owed by the Contractor are delinquent and have been delinquent for a period of not less than one year.

WRITTEN AGREEMENT:

The successful bidder will be required to enter into a written Agreement with the City of Stamford for the completion of this project. **A sample copy of the Agreement is attached and made a part of these conditions. The sample is for illustrative purposes only and the terms of the final contract may differ substantially.**

QUANTITIES:

The quantities shown are approximate and for comparison purposes only. The actual amounts purchased shall be predicated upon satisfaction of the City's needs. In addition, the City reserves the right to award on an item by item basis.

The City reserves the right, subject to mutual agreement with the successful bidder, to extend the terms of this bid, at the bid price, for a mutually agreed upon period of time.

PAYMENT:

The City's terms of payment are "**NET THIRTY (30) DAYS AFTER PRESENTATION OF INVOICE.**" No invoice will be paid until acceptance of goods ordered.

PROMPT PAYMENT TO SUBCONTRACTORS:

Your attention is called to the serious problem of delayed payments to subcontractors for work completed and for which payment has been made by this Department to the general contractor or consultant.

Section 49-41a and Section 49-41c of the Connecticut General Statutes require general contractors to pay their subcontractors within **THIRTY (30) DAYS** of having received payment by the **City** for work performed or materials furnished by such subcontractor. In turn, subcontractors have **THIRTY (30) DAYS** upon receiving payment from the general contractor to pay their subcontractors.

Therefore, it is vital that prompt payments be made in accordance with the spirit and intent of this law.

TERMINATION:

A. TERMINATION FOR CAUSE. If, through any cause, the Contractor shall fail to fulfill, in a timely and proper manner, its obligations under this Agreement, or if the Contractor shall violate any of the covenants, agreements, or stipulations of this Agreement, the City shall thereupon have the right to terminate this Agreement for cause by giving written notice to the Contractor of such termination and specifying the effective date thereof, at least five (5) days before the effective date of such termination. In that event, all finished or unfinished reports, documents, data, studies, surveys, drawings, maps, models, photographs, and reports or other material prepared by the Contractor shall be entitled to receive just and equitable compensation for any satisfactory work completed on such documents and other materials to the effective date of termination.

The term "cause" includes, without limitation the following:

1) If the Contractor furnished any statement, representation, warranty or certification in connection with this Agreement, which is materially false, deceptive, incorrect, or incomplete.

2) If the Contractor fails to perform to the City's satisfaction any material requirement of the Agreement, or is in violation of any specific provision thereof.

3) If the City reasonably determines satisfactory performance of the Agreement is substantially endangered or can reasonably anticipate such an occurrence or default.

Notwithstanding the above, the Contractor shall not be relieved of liability to the City for any damages sustained by the City by virtue of any breach of the Agreement by the Contractor, and the City may withhold any payment to the Contractor for the purposes of setoff until such time as the exact amount of damages due the City from the Contractor is determined.

B. TERMINATION FOR CONVENIENCE. The City may terminate this Agreement at any time the City determines that the purposes of the distribution of monies under the Agreement would no longer be served by completion of the Work/Project. The City shall effect such termination by giving written notice of termination to the Contractor and specifying the effective date thereof, at least twenty (20) days before the effective date of such termination. In that event, all finished or unfinished documents and other materials as described in Subsection A shall, at the option of the City, become its property. If the Agreement is terminated by the City as provided herein, the Contractor shall be paid an amount which bears the same ratio to the total compensation as the services actually and satisfactorily performed to the effective date of termination bear to the total services of the Contractor pursuant to the terms of the Agreement, less payments of compensation previously made, and subject to the City's right of set off for any damages pursuant to the terms of the Agreement.

BID APPEAL AND HEARING PROCEDURES:

1. Any firm that believes the Bid process was unfair may appeal to the City. A letter stating reasons for appeal should be sent to the Director of Legal Affairs and the Purchasing Agent within five (5) calendar days of the Bid opening.

2. A hearing shall be conducted in accordance with C.G.,S. Section 4-176e through 4-181a, as amended, which are incorporated herein. The hearing officer shall issue a written decision within ninety (90) days of the last date of such hearing and state in the decision the reasons for the action taken.

3. Where applicable, review of protests by the FTA will be limited to the City's failure to have or follow its protest procedures, or its failure to review a complaint or protest. An appeal to the FTA must be received by the cognizant FTA regional or Headquarters Office within five (5) working days of the date the protester knew or should have known of the violation.

WRITTEN PROTEST PROCEDURES:

1. The procedures established hereunder shall be available to contractors for the purpose of handling and resolving disputes relating to procurements hereunder. A protester must exhaust all administrative remedies hereunder before pursuing a protest in any court of law. Where applicable any information received under such procedures shall be disclosed to the Federal Transit Administration ("FTA") and a protester must exhaust all administrative remedies before pursuing a protest with the FTA.

2. The term "contractor" means any person, firm or corporation which has contracted or seeks to contract with the City of Stamford.

3. The term "Hearing officer" shall mean a person appointed by the Mayor to hear and decide allegations made by any contractor relating to procurements hereunder.

NON-APPROPRIATION:

Contractor acknowledges that the City is a municipal corporation and that the City's obligation to make payments under this Agreement is contingent upon the appropriation by the City's Board of Representatives of funds sufficient for such purposes, for each budget year in which this Agreement is in effect. If sufficient funds to provide for the payment(s) hereunder are not appropriated, the City may terminate this Agreement upon notice in writing to the Contractor.

ARTICLE IV. LABOR STANDARDS AND RESPONSIBILITIES5

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5 Adopted 8-29-77 as Ord. No. 358.

Sec. 47-14. Hiring preferences.

A. In the employment of labor to perform the work specified in § 47-16A herein, preference shall be given to legal residents of the United States who are and continuously for at least three (3) months prior to their date of hire have been residents of the labor market area for the City of Stamford as established by the State Labor Commission under Section 31-52(b) of the Connecticut General Statutes, and if no such qualified person is available, then to legal residents who have continuously resided in the county in which the work is to be performed for at least three (3) months prior to their date of hire, and then to legal residents of the state who have continuously resided in the state at least three (3) months prior to their date of hire. Any contractor who knowingly and willfully employs any person in violation of any provision of this subsection shall be fined one hundred dollars ($100.00) for each week or fraction of a week each such person is employed.

B. Each contract specified in § 47-16A herein shall contain the following provisions: "In the employment of labor to perform the work specified herein, preference shall be given to legal residents of the United States who are and continuously for at least three (3) months prior to their date of hire have been residents of the labor market area for the City of Stamford as established by the State Labor Commission under Section 31-52(b) of the Connecticut General Statutes, and if no such qualified person is available, then to legal residents who have continuously resided in the county in which the work is to be performed for at least three (3) months prior to their date of hire, and then to citizens of the state who have continuously resided in the state at least three (3) months prior to their date of hire."

Sec. 47-15. Compliance with provisions.

A. Every person or employer with three (3) or more persons in his employ, contracting with the City of Stamford for public or publicly aided construction as defined in § 47-16A, shall be deemed to have accepted the provisions of this section, and these provisions shall thereupon become part of the contract documents and shall be incorporated therein. In particular, during the performance of this contract, the contractor shall be deemed to agree as follows:

(1) The contractor, by itself or its agent, will not discriminate against any employee or applicant for employment because of race, color, religious creed, age, sex, marital status, national origin, ancestry or physical disability, except in the case of a bona fide occupational qualification or need.

(2) The contractor will take affirmative action to make known that company's policy in this regard and to recruit and encourage all qualified persons to seek employment based on individual merit and to ensure that all qualified applicants are given employment and that employees are treated equally during employment without regard to their race, color, religious creed, age, sex, marital status, national origin, ancestry or physical disability. Such affirmative action and nondiscrimination shall be in respect to but not limited to the following: employment; terms and conditions of employment; upgrading, demolition 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 places, available to employees and applicants for employment, notices in form to be approved by the Commission on Human Rights of the City of Stamford, setting forth the provisions of this nondiscrimination clause.

(3) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religious creed, age, sex, marital status, national origin, ancestry or physical disability.

B. Each labor organization supplying labor to or having a labor contract with a person covered by Subsection A of this section shall be deemed to have accepted the provisions of this section. In particular, such union shall be deemed to agree as follows:

(1) The union will not discriminate against any union member or employee or applicant for union membership or employment because of race, color, religious creed, age, sex, marital status, national origin, ancestry or physical disability, unless such action is based on a bona fide occupational qualification.

(2) The union will take affirmative action to make known its policy in this regard and to encourage and recruit all qualified persons to seek union membership and employment based on individual merit and to ensure that all qualified applicants are given union membership and employment and that members and employees are treated equally during union membership and employment without regard to their race, color, religious creed, age, sex, marital status, national origin, ancestry or physical disability. Such affirmative action and nondiscrimination shall be in respect to but not be limited to the following: union membership; employment; terms and conditions of employment; upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; selection for training, including apprenticeship; and the benefits of collective bargaining rights. The union agrees to post in conspicuous places, available to employees, its members and applicants for employment or union membership, notices in form approved by the Commission on Human Rights of the City of Stamford, setting forth the provisions of this nondiscrimination clause.

C. The Commission on Human Rights and/or the Director of Operations5.1 shall have the right to inspect and obtain copies of personnel, employment and other relevant records of contractors and membership and other relevant records of unions subject to this Article for the purpose of investigation to determine compliance.

5.1 Editor's Note--The position of Commissioner of Public Works was eliminated by referendum on 11-7-1995. The responsibilities previously held by the Commissioner of Public Works are now held by the Director of Operations. See Charter, Sec. C5-10-1.

D. Upon due notice to a contractor or a union concerning which there is reasonable cause to believe noncompliance has occurred or is occurring, the Commission on Human Rights is empowered to hold a public hearing to determine whether or not any of the provisions of this section have been violated. In the event it is found that a contractor has not complied with this section or with the nondiscrimination and affirmative action clauses of his contract, the Commission on Human Rights may cancel, terminate or suspend such contract in whole or in part and the contractor may be declared ineligible for further city contracts until such time as the Commission shall certify that the contractor is in compliance, and such other sanctions may be imposed and remedies invoked as provided by law or rule or regulation promulgated thereunder. In the event it is found that a union has not complied with this section, the Commission may direct it to take steps to achieve compliance or be disqualified from furnishing labor to contractors subject to this section, or such other sanctions may be imposed and remedies invoked as

provided by law or by rule or regulation promulgated thereunder.

E. The Commission on Human Rights is hereby authorized to adopt, publish, amend and rescind rules and regulations, consistent with and in furtherance of the provisions of this section, to subpoena witnesses and require the production of documents to the same extent as is authorized by Section 31-125 of the Connecticut General Statutes, as the same may be, from time to time, amended.

Sec. 47-16. Wage and hour provisions.

A. Each contract for the construction, alteration or repair of any public works project by the City of Stamford or for any construction, alteration or repair project financed or subsidized in any way by the City of Stamford, including any such construction contract toward which the City of Stamford makes any cash payment, payment of in-kind services or provision of land for construction thereon, and all contracts involved in any part of the official redevelopment plan of the City of Stamford where the plan requires the City of Stamford to furnish cash, noncash equivalents or credits, in-kind services or any other expenditure of city staff, money or material, shall contain the following provision: "The wages paid on an hourly basis to any mechanic, laborer or workman employed upon the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such employee to any employee welfare fund, as defined in Subsection H of this section, shall be at a rate equal to the rate customary or prevailing for the same work in the same trade or occupation in the City of Stamford. Any contractor who is not obligated by agreement to make payment or contribution on behalf of such employees to any such employee welfare fund shall pay to each employee as part of his wages the amount of payment or contribution for his classification on each payday.

B. Any person who knowingly or willfully employs any mechanic, laborer or workman in the construction, alteration or repair of any public works project for or on behalf of the City of Stamford or in any building or construction project financed or subsidized in any way by the City of Stamford as defined in Subsection A at a rate of wage on an hourly basis which is less than customary or prevailing for the same work in the same trade or occupation in said City of Stamford, or who fails to pay the amount of payment or contributions paid or payable on behalf of each such employee to any employee welfare fund or, in lieu thereof, to the employee as provided by Subsection A, shall be fined not more than one hundred dollars ($100.00) for each offense. In addition, if it is found by the Director of Operations that any mechanic, laborer or workman employed by the contractor or any subcontractor directly on the site for the work covered by the contract has been or is being paid a rate of wages less than the rate of wages required by the contract to be paid as required by this section, the Director of Operations may, by written notice to the contractor, terminate such contractor's right to proceed with the work or such part of the work as to which there has been a failure to pay said required wages and to prosecute the work to completion by contract or otherwise, and the contractor and his sureties shall be liable to the City of Stamford for any excess costs occasioned the City of Stamford thereby. The Director of Operations shall, within two (2) days after taking such action, notify the State Labor Commissioner in writing of the name of the contractor or subcontractor, the project involved, the location of the work, the violations involved, the date the contract was terminated and steps taken to collect the required wages.

C. The Director of Operations may make complaint to the proper prosecuting authorities for violation of any provision of Subsection B.

D. For the purpose of predetermining the prevailing rate of wage on an hourly basis and the amount of payment or contribution paid or payable on behalf of each employee to any employee welfare fund as defined in Subsection H and for establishing classifications of skilled, semiskilled and ordinary labor, the Director of Operations shall be guided by determinations made by the Labor Commissioner of the State of Connecticut under C.G.S. § 31-53(e). If such determinations are not available, the Director of Operations shall hold a hearing at any required time in order to make his own determination.

E. In accordance with Subsection D, the Director of Operations shall determine the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of such employee to any employee welfare fund as defined in Subsection H, and the agent empowered to let such contract shall include such rate of wage and such amount of payment or contribution paid to any

employee welfare fund or, in lieu thereof, the amount to be paid directly to each employee therefor as provided in Subsection A for all classifications of labor in the proposal for the contract. The rate of wage on an hourly basis and the amount of payment or contributions to any welfare fund, as defined in Subsection H, or cash in lieu thereof, as provided in Subsection A, shall at all times be considered as the minimum rate for the classification for which it was established.

F. Each employer subject to the provisions of this section shall keep, maintain and preserve such records relating to the wages and hours worked by each employee and a schedule of the occupation or work classification at which each mechanic, laborer or workman on the project is employed during each workday and week in such manner and form as the Director of Operations establishes to assure the proper payments due such employees or welfare funds under this section.

G. The provisions of this section shall not apply where the total cost of all work to be performed by contractors and subcontractors in connection with any project covered by this section is less than five thousand dollars ($5,000.00).

H. As used in this section, "employee welfare fund" means any trust fund established by one (1) or more employers and one (1) or more labor organizations to provide from moneys, whether through the purchase of insurance or annuity contracts or otherwise, benefits under an employee welfare plan, provided that such term shall not include any such fund where the trustee or all the trustees are subject to supervision by the Bank Commissioner of this state or any other state or the Comptroller of the Currency of the United States or the Board of Governors of the Federal Reserve System; and "benefits under an employee welfare plan" means one (1) or more benefits or services under any plan established or maintained for employees or their families or dependents, or for both, including but not limited to medical, surgical or hospital care benefits; benefits in the event of sickness, accident, disability or death; benefits in the event of unemployment or retirement benefits.

Sec. 47-17. Statement of estimated value of work.

Any general contractor who bids on a job covered by § 47-16A above shall guarantee that he will directly perform at least thirty percent (30%) of the work with his own employees, and the apparent low bidder shall submit a letter so certifying and stating the portion of the work and the estimated value thereof that he proposes to do with his own employees.

CITY OF STAMFORD
PURCHASING DEPARTMENT
888 Washington Boulevard
Stamford, CT 06901-2152

ORDINANCE COMPLIANCE

THIS IS TO ACKNOWLEDGE AND CERTIFY THAT I/WE HAVE READ AND UNDERSTOOD CITY OF STAMFORD ORDINANCE NOS. 47-14 THRU 47-17 AND HEREBY CERTIFY THAT I/WE ARE IN TOTAL COMPLIANCE WITH SAME.

COMPANY NAME:

STREET ADDRESS:

CITY, STATE, ZIP:

TITLE OF PERSON
COMPLETING THIS FORM:

SIGNATURE:

DATE:

CITY OF STAMFORD

Bidders Information and Acknowledgment Form

Bidder's Name

Street Address

City	*State*	*Zip*

Business Telephone:

Printed Name and Title of Individual Submitting Bid

The undersigned acknowledges that the terms, conditions and specifications of this bid are understood and unconditionally accepted.	
Signature	*Date*

(PLEASE NOTE: THIS IS FOR CONSTRUCTION CONTRACTS – ORDINANCE 956)

PLEASE NOTE: THIS AGREEMENT IS PROVIDED AS AN EXAMPLE ONLY. THE ACTUAL CONTRACT SUBMITTED FOR YOUR FIRM'S SIGNATURE WILL VARY, BASED UPON THE PARTICULARS OF THE SPECIFIC BID PACKAGE).

AGREEMENT

THIS AGREEMENT dated this day of , by and between the **CITY OF STAMFORD,** a municipal corporation in the State of Connecticut, hereinafter referred to as the "City", 888 Washington Boulevard, Stamford, Connecticut 06904, acting herein by DAVID R. MARTIN, its Mayor, hereunto duly authorized, and _____with principal offices located at _____, hereinafter referred to as the "Contractor", acting herein by _____, its _____ duly authorized.

WITNESSETH

WHEREAS, the Contractor has submitted a Bid to the City, in response to the City's Bid No. S-_____, entitled _____.

WHEREAS, the City has accepted the Contractor's Bid for said work, pursuant to the terms hereinafter set forth.

NOW THEREFORE, THE PARTIES AGREE AS FOLLOWS:

1. SCOPE OF SERVICES. The scope of services shall consist of those duties, functions, obligations, responsibilities, and tasks set forth in:

a. The specifications contained in the City of Stamford Bid No. _____, which is incorporated by reference herein;

b. The Contractor's bid that was submitted in response to the City of Stamford Bid No. _____, incorporated by reference herein.

2. COMPENSATION. The City shall pay as compensation to the Contractor for all of the goods and services set forth in Paragraph 1 of this Agreement, the total amount of _____ **DOLLARS ($_____),** based upon the unit prices quoted in its bid submitted to the City for Bid No. _____.

The total shall include all charges, direct costs, indirect costs, expenses, and fees of the Contractor. Said compensation shall be paid by the City upon review and approval of the Contractor's invoices for payment, as required by the City's Code of Ordinances (hereinafter referred to as "the Code").

3. TIME OF COMMENCEMENT AND COMPLETION OF WORK. The Contractor shall commence the work on the date of execution of this Agreement by both parties, and shall complete the work in a diligent and efficient manner no later than _____. It is agreed and understood that time is of the essence and that if the Contractor fails to complete the work within the period allowed, the City shall have the right to terminate this Agreement and/or pursue appropriate legal recourse or the Contractor's breach of this Agreement.

4. REVIEW OF WORK. The Contractor will permit the City, its officers, agents, and employees, to review, at any time, all work performed under the terms of this Agreement at any stage of the work.

5. INDEMNIFICATION. The Contractor shall indemnify and hold harmless the City, its officers, agents and employees, from and, if requested, shall defend them against any loss, cost, damage, injury, liability, and claim for injury to or death of a person, including employees of the Contractor or loss of or damage to property, resulting directly or indirectly from the Contractor's performance of this Agreement, or by any omission to perform some duty imposed by law or agreement upon the Contractor, its officers, agents and employees. The foregoing indemnity shall include, without limitation, reasonable fees of attorneys, Contractors and experts, and related costs and the City's cost of investigating any claims against it.

In addition to the Contractor's obligation to indemnify the City, the Contractor specifically acknowledges and agrees that it has an immediate and independent obligation to defend the City from any claim which actually or potentially falls within this indemnification provision, even if the allegations are or may be groundless, false or fraudulent, which obligation arises at the time such claim is tendered to the Contractor by the City and continues at all times thereafter.

The Contractor shall indemnify and hold the City, its officers, agents and employees, harmless from all loss and liability, including attorneys' fees, court costs and all other litigation expenses arising out of the Contractor's performance of this Agreement.

6. ASSIGNMENT. The Contractor shall not assign, sub-contract, or transfer any portion of the work set forth herein without the prior written approval of the City.

7. BOOKS AND RECORDS. The Contractor shall maintain or cause to be maintained all records, books, or other documents relative to charges, costs, expenses, fees, alleged breaches of Agreement, settlement of claims, or any other matter pertaining to the Contractor's demand for compensation by the City for a period of not less than three (3) years from the date of the final payment for work performed under this Agreement.

8. REPRESENTATION. The Contractor represents that it is an expert in relation to the work to be performed under this Agreement. The Contractor further represents that it has the requisite skill, expertise, and knowledge necessary to perform the scope of services required under the terms of this Agreement, including any supplementary work and the City relies upon said representation in executing this Agreement.

9. INSURANCE. The Contractor shall provide and pay for such insurance as is more particularly described in the City's "Insurance Requirements" attached hereto as **APPENDIX 1.**

10. CHANGE ORDERS AND EXTRAS. Pursuant to Section 23-18.4C of the Code, it is specifically understood and agreed by the Contractor that all change orders and contract extras regarding this contract shall be governed by the City Charter and/or the Code. The City shall not be liable for payment of any additional costs unless the provisions of the City Charter and/or the Code are fully complied with.

11. SET-OFF. Pursuant to Section 23-18.4.1 of the Code of Ordinances, the Contractor agrees that the City shall have the right to set-off or withhold any payment, or portion thereof, due the Contractor under this Agreement, for and up to the amount of any taxes, penalties, lien fees and delinquent interest that have been levied by the City against any property of the Contractor, both real and personal, provided such taxes owed by the Contractor are delinquent and have been so delinquent for a period of not less than one year.

12. SUBCONTRACTING. The Contractor is prohibited from subcontracting, unless it has obtained, in writing, the permission of the City to employ the specific subcontractors proposed to be used by the Contractor. Pursuant to Section 103.4 of the Code of Ordinances, the Contractor shall provide the city with the names and addresses of all proposed subcontractors at least five (5) business days prior to their employment. An agreement made in violation of this provision shall confer no rights on any subcontractor and shall be null and void.

13. NON-APPROPRIATION. Contractor acknowledges that the City is a municipal corporation and that the City's obligation to make payments under this Agreement is contingent upon the appropriation by the City's Board of Representatives of funds sufficient for such purposes, for each budget year in which this Agreement is in effect. If sufficient funds to provide for the payment(s) hereunder are not appropriated, the City may terminate this Agreement upon notice in writing to the Contractor.

14. INTERPRETATION In the event there is a conflict between this Agreement and the City's Bid Package, and/or the Contractor's Bid, the City shall have sole discretion to determine which provision shall govern.

15. RESPONSIBLE EMPLOYER OBLIGATIONS. Pursuant to Ordinance *No. 958* of the Stamford Code of Ordinances, the Contractor shall comply with, and shall be responsible for the compliance of its subcontractors with:

1. the requirements of the 1996 Stamford Construction Jobs Agreement that contractors make every effort to employ qualified residents of Stamford at a targeted goal of twenty nine percent (29%) of the project's workforce, when available, which shall include a goal of that targeted percentage of one third (1/3) minorities and/or women;

2. all state and federal laws and regulations regarding prevailing wages;

3. all applicable state and federal laws and regulations, and the provisions of the Stamford Jobs Construction Agreement, regarding maintenance and participation in apprenticeship training programs;

4. all applicable state laws concerning employee health insurance;

5. All state and federal laws concerning classification of employees as employees rather than independent contractors; workers' compensation; unemployment taxes; and social security and income tax withholdings.

Any Contractor who fails to comply with subsections A through E of this Paragraph shall be subject to one or more of the following sanctions:

a. Cessation of work on the project until compliance is obtained;

b. Permanent removal from any further work on the project;

c. Withholding of payment due under any contract or subcontract;

d. Liquidated damages to the City in the amount of five percent (5%) of the dollar value of the contract.

e. Exclusion from the performance of future work on behalf of the City of Stamford.

16. INSPECTION OF CONTRACT WORK. Pursuant to Section 103-8 of the Code, as a condition precedent to the release of any Performance Bond hereunder, the Contractor shall inspect the work performed under this Agreement within thirty (30) days of the completion thereof. The City will additionally perform its own independent inspection.

17. ACCEPTANCE OR REJECTION OF CONTRACT WORK. Pursuant to Section 103-9 of the Code as a condition precedent to the release of any performance bond required hereunder, immediately following the inspection of contract work conducted pursuant to Paragraph 16 hereof, the Contractor shall submit to the City an affidavit setting forth either acceptance of the work performed under this Agreement or an itemized list of work to be corrected, repaired, or replaced.

18. TERMINATION.

A. TERMINATION FOR CAUSE. If, through any cause, the Contractor shall fail to fulfill, in a timely and proper manner, its obligations under this Agreement, or if the Contractor shall violate any of the covenants, agreements, or stipulations of this Agreement, the City shall thereupon have the right to terminate this Agreement for cause by giving written notice to the Contractor of such termination and specifying the effective date thereof, at least five (5) days before the effective date of such termination. In that event, all finished or unfinished reports, documents, data, studies, surveys, drawings, maps, models, photographs, and reports or other material prepared by the Contractor and/or its subcontractors under this Agreement shall, at the option of the City, become its property, and the Contractor shall be entitled to receive just and equitable compensation for any satisfactory work completed on such documents and other materials to the effective date of termination.

The term "cause" includes, without limitation the following:

1. If the Contractor furnished any statement, representation, warranty or certification in connection with this Agreement, which is materially false, deceptive, incorrect, or incomplete.

2. If the Contractor fails to perform to the City's satisfaction any material requirement of the Agreement, or is in violation of any specific provision thereof.

3. If the City reasonably determines satisfactory performance of the Agreement is substantially endangered or can reasonably anticipate such an occurrence or default.

Notwithstanding the above, the Contractor shall not be relieved of liability to the City for any damages sustained by the City by virtue of any breach of the Agreement by the Contractor, and the City may withhold any payment to the Contractor for the purposes of setoff until such time as the exact amount of damages due the City from the Contractor is determined.

B. TERMINATION FOR CONVENIENCE. The City may terminate this Agreement at any time the City determines that the purposes of the distribution of monies under the Agreement would no longer be served by completion of the Work/Project. The City shall effect such termination by giving written notice of termination to the Contractor and specifying the effective date thereof, at least twenty (20) days before the effective date of such termination. In that event, all finished or unfinished documents and other materials as described Subsection A shall, at the option of the City, become its property. If the Agreement is terminated by the City as provided herein, the Contractor shall be paid an amount which bears the same ratio to the total compensation as the services actually and satisfactorily performed to the effective date of termination bear to the total services of the Contractor pursuant to the terms of the Agreement, less payments of compensation previously made, and subject to the City's right of set off for any damages pursuant to the terms of the Agreement.

19. GIFTS: During the term of this contract, including any extensions, the Contractor shall refrain from making gifts of money, goods, real or personal property or services to any appointed or elected official or employee of the City of Stamford or the Stamford Board of Education or any appointed or elected official or employee of their Boards, Commissions, Departments, Agencies or Authorities. All references to the Contractor shall include its officers, directors, employees, and owners of more than 5% equity in the contractor. Violation of this provision shall constitute a material breach of this Agreement, for which this Agreement may be summarily terminated.

20. GOVERNING LAWS. This Agreement shall be governed by the laws of the State of Connecticut.

21. CITY CODE PROVISIONS. The provisions of the City of Stamford Code of Ordinances referenced herein can be found at **www.municode.com.**

22. PROOF OF PAYMENTS TO SUBCONTRACTORS. Upon receipt of any payment from the City, the Contractor shall pay each subcontractor and material supplier in proportion to the percentage of work completed by each subcontractor and material supplier. If for any reason, the Contractor receives less than the full payment due from the City, the Contractor shall be obligated to disburse on a pro rata basis those funds received, such that the Contractor, subcontractors and material suppliers each receive a prorated portion based upon the amount of the payment.
Within fourteen (30) calendar days of the receipt of any payment from the City, the Contractor shall be required to submit a completed form contained in the City's Bid Specifications, entitled "Statement of Payments made by General Contractors to Subcontractors" to the Project Manager, Clerk of the Works, Staff Engineer, or other City employee or official directly supervising the work of the Contractor. Failure to timely submit such form to the City shall entitle the City to withhold future payments to the Contractor until such time as the form has been submitted to the City.

IN WITNESS WHEREOF, the parties have hereunto set their hands and seals the day and year first above written.

Signed, sealed and delivered in the presence of:

CITY OF STAMFORD

_____

By_____

Beverly A. Aveni
Purchasing Agent
Date:

David R. Martin, Mayor
Date:

CONTRACTOR

_____

By_____

(Witness)

Date:

j

Date:

APPROVED AS TO INSURANCE:

APPROVED AS TO FORM:

_____

_____

Ann Marie Mones
Risk Manager
Date:

B. Rosenberg
Asst. Corp. Counsel
Date:

BID No. S-6442
REVISED: DECEMBER 2, 2013

STATEMENT OF PAYMENTS
MADE BY GENERAL CONTRACTOR
TO SUBCONTRACTORS

Bid No: S-6442

Pursuant to the Agreement of the parties, this form must be submitted to the City within thirty (30) calendar days of the receipt of any payment from the City.

1. Federal Employee Identification No. Social Security No.

   __ __ -__ __ __ __ __ __ __ __ __ __ __ - __ __ -__ __ __ __

2. Name

3. Address

4. Contractors' Total Gross Receipts from City of Stamford:_____

5. Payments to Subcontractors :

   Name and Address:

   Employer ID No.

   __ __ -__ __ __ __ __ __ __

   Amount of Payment:$_____

   Date of Payment:$_____

   Name and Address:

   Employer ID No.

   __ __ -__ __ __ __ __ __ __

   Amount of Payment:$_____

   Date of Payment:$_____

Name and Address:

Employer ID No.

__ __ -__ __ __ __ __ __ __

Amount of Payment:$_____

Date of Payment:$_____

Name and Address:

Employer ID No.

__ __ -__ __ __ __ __ __ __

Amount of Payment:$_____

Date of Payment:$_____

ACKNOWLEDGEMENT

Personally appeared before me at _____, this _____day of _____

_____, as _____ of _____, who affirmed under oath

that the foregoing information is true and accurate.

_____
NOTARY PUBLIC
My Commission Expires:_____

Bid No: S-6442
Form Revised: 12/2/2013

THE CITY OF STAMFORD

REQUEST FOR BIDS
FOR
BID No. S-6442

SCOFIELD YARD AND PARK LANDFILL CAPPING PROJECT
AT
SCOFIELD YARD AND PARK
612 SCOFIELDTOWN ROAD

CITY OF STAMFORD
ENGINEERING BUREAU
888 WASHINGTON BOULEVARD
STAMFORD, CT 06901

GENERAL INFORMATION

1. INTRODUCTION

This Bid Specification was prepared to solicit sealed bids on behalf of the City of Stamford Engineering Bureau from qualified responsible contractors for the landfill capping project at Scofieldtown Yard and Park, located at 612 Scofieldtown Road. Construction services shall include clearing and grubbing slopes; grading soil; installing access road around the site; processing and distributing fill on the slopes; installing geo membrane for landfill capping; furnishing and installing site drainage; grading soil and seeding above membrane; site improvements for public works area, including demolition of existing salt storage dome and installation of a new one; relocation of existing truck scale; construction of site office and equipment storage area; construction of recycling transfer station and public park; and installation of fencing. The terms “bidder” and “contractor” are used interchangeably in this document.

2. ISSUING OFFICE

This Bid is being issued by the Purchasing Department, on behalf of the Office of Operations, Engineering Bureau, City of Stamford, hereinafter referred to as the “City.”

3. REJECTION OF BIDS AND SELECTION OF OPTION

The City reserves the right, for any reason, to refuse any and all bids submitted under these bid specifications. The City also reserves the right to select the option that it believes is the most beneficial to the City of Stamford.

4. ADDENDA TO BID

Amendments to this Bid may be necessary prior to the closing date and will be furnished to all prospective bidders.

5. BASIS OF AWARD

An award will be made to the lowest, responsible, qualified bidder in compliance with the specifications, as applicable.

6. SUBMISSION OF BIDS

All sealed bids should be submitted to the City of Stamford’s Purchasing Department no later than October 7, 2014, at 11:00 A.M. at the address listed below:

Beverly Aveni, Purchasing Agent
Purchasing Department
City of Stamford
888 Washington Boulevard
Stamford, CT 06901
Telephone: (203) 977-4107

YOU MUST IDENTIFY THE BID TITLE AND BID NUMBER ON THE ENVELOPE THE BID IS SUBMITTED IN.

Late bids will be rejected.

PLEASE NOTE THAT A MANDATORY PRE-BID WALK THROUGH IS SCHEDULED FOR EITHER TUESDAY, SEPTEMBER 9, 2014, AT NOON, OR THURSDAY, SEPTEMBER 11, 2014, AT NOON, AT THE SCOFIELDTOWN YARD SALT DOME, LOCATED AT 612 SCOFIELDTOWN ROAD - (CALL JEFF BROWN AT 203-627-6352 TO PROVIDE DATE YOUR COMPANY REPRESENTATIVE WILL BE ATTENDING).

7. INDEPENDENT PROJECT COST DETERMINATION AND GRATUITIES

By submission of its offer the bidder certifies that in connection with this procurement:

A. The costs in the offer have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or competitor;
B. The bidder agrees that the prices quoted in this proposal will not change for a period of one hundred twenty (120) days after the receipt at the Purchasing Department of their bid;
C. Unless otherwise required by law, the costs that have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to award, directly or indirectly to any other bidder or to any competitor;
D. No attempt has been made or will be made by the bidder to induce any other person or firm to submit or not to submit a bid for the purpose of restricting competition; and
E. No elected or appointed officials or employees shall benefit financially or materially from any contract that may result from the procurement.

8. AVAILABILITY OF FUNDS

The contract award under this Bid Specification is contingent upon the availability of funding to the Office of Operations for this project. In the event that funds are not available for any reason, any contract resulting from this Bid may become void and of no force and effect.

9. TERMINATION FOR DEFAULT OR FOR THE CONVENIENCE OF THE CONTRACTING AGENCY

Performance under any contract resulting from this Bid may be terminated by the City whenever:

A. The contractor shall default in performance of its contract and shall fail to correct such default within the period specified by the contracting office in a notice specifying default; or
B. The contracting office shall determine that termination is in the better interest of the Office of Operations and/or of the City of Stamford.

Termination will be effected by delivery to the contractor of a notice to terminate, stating the date upon which the termination becomes effective. Under certain circumstances the City may be prepared to consider reimbursing the contractor for appropriate documented expenditures, in the event of such termination.

10. AMBIGUITY IN THE BID SPECIFICATION

Prior to submitting their bid, the contractor is responsible to bring to the City's attention any ambiguity in this Bid Specification. Not to do so shall result in the contractor forfeiting any claim for adjustment based on such ambiguity that should have been noted by a prudent contractor.

11. CONTRACT AGREEMENT

The selected bidder will be required to sign a formal written contract agreement with the City of Stamford. Refusal on the part of the bidder to sign this contract will result in forfeiture of their bid deposit.

12. INSURANCE REQUIREMENTS

The selected bidder will be required to deliver an insurance certificate in amounts and terms as noted in this bid document to the Risk Manager of the City of Stamford.

13. BID DEPOSIT

Bids must be accompanied with a bid bond or certified check, payable to the City of Stamford, in the amount of five percent (5%) of the bid price. The bond or check of the selected bidder shall be retained by the City until the bid is awarded and a contract is fully executed and all required insurance certificates are delivered to the City's Risk Manager. Bonds and checks received from the unsuccessful bidders, unless forfeited, will be returned within a reasonable time of proposal submission.

14. PERFORMANCE GUARANTEE

The selected bidder shall, prior to the signing of the contract, furnish the City a Letter of Credit or an executed Performance, Maintenance and Payment Bond issued by a surety company authorized to do business in the State of Connecticut, both subject to acceptance by the City's Risk Manager, and to be in force for the duration of the contract. The bond shall represent 100% of the contract price.

15. PAYMENT OF INVOICES

Invoices are subject to acceptance and approval by the City of Stamford in accordance with certification made by the Office of Operations on the basis of consistency with the contract.

16. INFORMATION ON BIDDERS' BACKGROUND

In addition to the specific information required to be submitted in direct response to this procurement, the City of Stamford reserves the right to request certain additional information from any/all bidders, such as Dunn & Bradstreet reports, certified financial statements, lists and details on equipment and other important and necessary information and documents that will serve the best interest of the City, in the opinion of the Purchasing Agent and/or Director of Operations, in determining the capabilities of a contractor.

17. SUB-CONTRACTING OR TRANSFER OF CONTRACT AFTER CONTRACT SIGNING

No portion of or the total awarded contract shall be sub-contracted or transferred to any other company or individual by the contractor without the prior written approval by the City of Stamford. The City has the right to disapprove of such sub-contracting or transfer if it feels that it is not in the best interest of the City.

18. NON-PERFORMANCE PENALTY

The City shall promptly notify the contractor, in writing, of any non-performance activity on the part of the contractor. The contractor shall be required to immediately comply with the request of the City. If the contractor fails to comply within 48 hours, the City has the right to terminate the contract and collect the performance bond and/or claim damages and proceed with other legal action against the contractor. Failure of the City to give such notice shall not compromise or diminish the City's rights to give such notice in the future.

Scope of Work

.
The City of Stamford Engineering Bureau is seeking competitive bids for the landfill capping project at Scofieldtown Yard and Park, located at 612 Scofieldtown Road. The project generally includes, but is not necessarily limited to, the following major elements:

Clearing and grubbing slopes; grading soil; installing access road around site; processing and distributing fill on slopes; installing geo membrane for landfill capping; furnishing and installing site drainage; grading soil and seeding above membrane; site improvements for public works area, including demolition of existing salt storage dome and installation of a new one; relocating existing truck scale; construction of site office and equipment storage area; construction of recycling transfer station and public park; and installation of fencing.

The entire scope of work is delineated in the specifications attached hereto.

For technical questions concerning this bid please contact:

Jeff Brown
City of Stamford
Engineering Bureau
888 Washington Boulevard
Stamford, CT 06901
203-977-4493 – Telephone
203-627-6352 – Cell
203-977-4137 - Fax
Jbrown2@stamfordct.gov

All written inquiries must be received on or before Thursday, October 7, 2014, at 3:00 p.m., and will be responded to through the Purchasing Department in the form of Addenda.

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SCOFIELD YARD & PARK LANDFILL CAPPING PROJECT

TECHNICAL SPECIFICATIONS

DIVISION 0 - BIDDING REQUIREMENTS, CONTRACT FORMS, AND CONDITIONS OF THE CONTRACT

Bid Proposal Form
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S-6442
Scofield Yard & Park Landfill Capping Project
Stamford, Connecticut

CITY OF STAMFORD, CONNECTICUT

GENERAL SPECIFICATIONS

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CITY OF STAMFORD, CONNECTICUT

GENERAL SPECIFICATIONS

1. BIDS:

Bids, as stated in the "BID FORM", will be compared on the basis of the sum of the quantities multiplied by respective unit prices, added to lump-sum prices.

In the event that there is a discrepancy in the bid form between the lump-sum or unit prices written in words and figures, the prices written in words shall govern.

The City agrees to examine and consider each bid submitted in consideration of the Bidder's Agreements, as hereinabove set forth in the Bid Form.

NOTE: Any/all reference to "he/him" shall be taken to mean "his/her/its".

2. OBLIGATION OF BIDDERS:

At the time of opening of bids, each bidder shall be presumed to have inspected the site, and to have read and made himself thoroughly familiar with the Plans and Contract Documents including all addenda. The failure or omission of any bidder to receive or examine any form, instrument or document shall in no way relieve any bidder from any obligation in respect to his bid.

Each bidder must fully inform themselves of the construction and labor conditions relating to the work, which is now or will be performed. Failure to do so will not relieve the successful bidder of his obligation to furnish all labor and materials necessary to carry out the provisions of the contract documents and to complete the contemplated work. Inasmuch as possible, the contractor must, in carrying out his work, employ such methods or means as will not cause any interruptions or interference with the work of any other contractor or the safety, security, schedules and operations of the existing facility inhabitants.

The successful bidder must furnish a field and office organization chart, Project schedule and equipment list to be used on the job to demonstrate that he has the capability to perform the work prescribed for this Project and shall furnish to the City such submission prior to contract award.

The Contractor shall supply a Superintendent, full time on the job. The Superintendent must be satisfactory to the City of Stamford. Failure to comply shall be cause for breach of contract.

The Contractor's normal sequence of operation in performing the work under the terms of this contract shall be varied at the direction of the City of Stamford, so that priorities can be given in critical areas such as schedule, right-of-way, clearance and other City commitments, either present or future.

The Contractor shall file an appeal to the Director of Operations if the sequence of operation in performing the work is varied by the City in a manner that is unacceptable to him.

The Contractor shall have no claim against the City for damages or extra compensation on account of delays in execution of the work or delays in making the construction site available to the Contractor.

3. CONTRACT DOCUMENTS:

Whenever the term "Contract Documents" is used herein, it shall include the Agreement, Information to Bidders, General Specifications, Bid Documents, Technical Specifications, Special Notes, Addenda, and Project Plans, including all modifications thereof incorporated in the documents before their execution.

4. DIRECTOR OF OPERATIONS:

The Director of Operations, of the City of Stamford, Connecticut, under whose authority all public works are performed. Hereinafter when the word "Engineer" is used, it is hereby interpreted to include the authority of the Director of Operations, as well as the City Engineer.

5. CITY ENGINEER:

The City Engineer will represent the City of Stamford, Connecticut, and shall have complete charge of all work involved. Hereinafter where the word "Engineer" appears it shall mean the City Engineer or his duly authorized representatives performing their usual duties, i.e. construction manager, clerk of the works, etc.

6. CONTRACTOR:

Party of the second part to the contract, acting directly or through his agent or employees.

7. SUB-CONTRACTOR:

Any individual, firm, partnership or corporation to whom the Contractor sub-lets or assigns any part or parts of this project covered by this contract.

8. NOTICE:

The term "notice" as used herein shall mean and include written notices.

Written notice shall be deemed to have been served, when deposited in a United States Mail Box to or at last known business address of the person, firm or corporation for whom intended, or to his or their or its duly authorized agent, representative or office, or enclosed in a postage prepaid wrapper or envelope addressed to such person or firm or corporation at his or their or its last known business address.

9. TIME IS OF THE ESSENCE:

Time is of the essence for this contract and as execution of the work may inconvenience property owners, vehicular traffic, pedestrians and adversely affect business in the area, it is essential that the work be pressed vigorously to completion. Also the cost of City administration and supervision of construction, will be increased as the time occupied in the work is lengthened, and the deprivation to the residents of the City of the needed improvement on herein contract may cause damages to the City.

In the event the Contractor fails to perform the work in a timely manner due to the Contractor's poor planning, financial status, errors in construction or any other reason directly attributed to the Contractor's circumstances, the City may institute default proceedings against the Contractor to recover damages and losses. Any payments due the Contractor may be withheld pending final determinations and the bonding company may be notified of impending actions that may be warranted for the lack in performance of the work on this contract.

If any delay is imposed on the Contractor by specific orders of the Engineer, i.e.; to stop the work (for reasons other than failure on the part of the Contractor to comply with the requirements of the Contract Documents), material or labor strikes, acts of God, etc., such delay will entitle the Contractor to an equivalent extension of time.

When extra or additional work is ordered by the Engineer, the Contractor will be allowed an extension of time expressed in days as determined by the City Engineer. The Contractor shall submit a written request for an extension of time, along with reasons for the request. A written response will be transmitted to the Contractor with a determination by the City as to whether or not an extension of time will be granted. This shall be done in accordance with the provisions of the Stamford Code, Article II, Purchasing, Section 23-18.4, Contracts.

10. COMMENCEMENT OF WORK:

The Contractor shall commence work on the day specified in the order by the Engineer, as the date of such commencement; and shall fully complete the work within the number of consecutive calendar days from said date as hereinafter specified as the period for completion of his contract, unless such period shall be extended as hereinafter provided by the City. **The anticipated "on site" start date is Nov. 1, 2014. The facilities/site must be in a condition to be used by the City of Stamford Highway Dept. Snow Removal Operations from Nov. 1, 2014 through Apr. 30, 2015 and Nov. 1, 2015 through Apr. 30, 2016 and the City of Stamford Solid Waste Dept. for Leaf Transfer from Nov. 15, 2014 through Dec. 31, 2014 and Nov. 15, 2015 through Dec. 31, 2015. The Project expected substantial completion date is Dec. 31, 2015.**

11. BLANK FORM FOR BID:

All bids must be written or typed upon the blank form "**BID FORM**" and must state the proposed price of each item of the work, both in words and in figures, and must be signed by the bidder with his business address.

The undersigned understands that information relative to subsurface and other conditions, natural phenomena, existing pipes and other structures (surface and/or subsurface) has been furnished

only for his information and convenience without any warranty of guarantee, express or implied, that the subsurface and/or other structures (surface and/or subsurface) actually encountered will be the same as these shown on the drawings or in any of the other contract documents and he agrees that he shall not use or be entitled to use any such information made available to him through the contract documents or otherwise or obtained by him in his own examination of the site, as a basis of or ground for any claim against the City, arising from or by reason of any variance which may exist between the aforesaid information made available to or acquired by him and the subsurface and/or other conditions, natural phenomena, existing pipes and other structures (surface and/or subsurface) actually encountered during the construction work, and he has made due allowance therefore in this bid.

12. WORKING HOURS AND HOLIDAYS:

The Contractor shall perform no work on the site during the City of Stamford holidays, without specific written approval of the Owner. The Contractor shall be aware of the City of Stamford Code for Noise and the limits it may impose on his work plans. If any work on the site is required beyond the hours of 7 AM -4:00 PM Monday – Friday. The Contractor must make arrangements for a member of the Engineering Bureau or Inspection/Testing staff to be present and compensated at their current rate of pay for that day/hour beyond their normal work schedule.

THE OFFICIAL CITY OF STAMFORD HOLIDAYS ARE:

New Year's Day	Labor Day
Martin Luther King Day	Columbus Day
Lincoln's Birthday	Veteran's Day
Washington's Birthday	Thanksgiving Day
Good Friday	Day Following Thanksgiving Day
Memorial Day	Christmas Eve - 12 Noon to day's End
Independence Day	Christmas Day

13. GUARANTEE MAINTENANCE BOND:

The Contractor shall secure a maintenance bond with a company which shall have been approved by the Director of Legal Affairs of the City of Stamford, guaranteeing his work in all phases of construction for a period of two (2) years from the date of acceptance by the City which shall also cover all damages due to trench settlement.

The face value of the maintenance bond shall be as follows: 20% of the base bid of contracts up to and including $50,000.00 and in no way less than $5,000.00.

Contracts in amount above $50,000.00, the face value of the maintenance bond shall be on the basis of 10% of the base bid submitted. He shall leave the work in perfect order at completion, and neither the final certificate of payment nor any other provision of the contract shall relieve the Contractor of the responsibility for negligence, for faulty materials or workmanship within the extent and period as herein provided. Upon written notice he shall remedy all defects due thereto and pay all expenses for any damage to other work resulting there from.

14. ADDITIONAL OR SUBSTITUTE BOND:

If at any time the City becomes dissatisfied with the performance bond as issued by the present surety or sureties, or if for any other reason such bond shall cease to be adequate surety to the City, the Contractor shall within five (5) days after notice from the City to do so, substitute an acceptable bond in such form and sum and signed by such other sureties as may be satisfactory to the City.

The premium on such bonds shall be paid by the Contractor. No further payment shall be deemed due nor shall be made until new sureties shall have qualified.

15. POWER OF ATTORNEY:

Attorneys-in-fact who sign contract bonds must file with each bond a certified copy of their power of attorney to sign said bond.

16. QUALIFICATIONS FOR EMPLOYMENT:

No person under the age of sixteen (16) years and no person currently serving sentences in a penal or Correctional institution shall be employed to perform any work on the project under this contract.

No person whose age or physical condition is such as to make his employment dangerous to his health or safety or to the health and safety of others shall be employed to perform any work on the project under this contract. Provided that this sentence shall not operate against the employment of physically handicapped persons otherwise employed where such persons may be safely assigned to work, which they can ably perform.

There shall be no discrimination because of race, creed, color or political affiliation in employment of persons for work on the project under this contract.

17. PAYMENT OF EMPLOYEES:

The Contractor and each of his subcontractors shall pay the prevailing wage rate to each of his trade classification employees engaged in the work on the project under this contract in full (less deductions made mandatory by law) in a timely and routine manner.

18. BANNED ACTIVITIES AND ITEMS;

The following items and activities are strictly prohibited from occurring at any time on the worksite. The immediate and permanent removal of personnel caught or suspected of engaging in these activities will be enforced by the owner.

- Possession or use of illegal drugs
- Possession or use of alcohol or tobacco products
- Possession or use of firearms, weapons of any type and fireworks

- Fighting or loud abusive language

If tradesmen are working at the facility while it is in occupied the following restrictions also apply

- Playing radios or other electronic devices which produce noise
- Must have attended a three hour safe environments course and be “cleared” by a firm that checks on criminal backgrounds
- Must not initiate any contact (physical or verbal) with staff, students or members of the public.

19. ACCIDENT PREVENTION:

The Contractor and all Subcontractors must submit their Written Safety Program to the Owner, a minimum of two days before entering the worksite. Precautions shall be exercised at all times for the protection of all persons (including employees) and property.

The safety provisions of applicable laws, building and construction codes shall be observed.

Reference is hereby made to Occupational Safety and Health Administration standards as described in OSHA 2206, 1983 or latest edition or revision thereof

Machinery, equipment and all hazards shall be guarded or eliminated in accordance with the safety provisions of the manual of "Accident Prevention in Construction", published by the Associated General Contractors of America, to the extent that such provisions are not in contravention of applicable laws.

20. INSPECTION:

The Engineer or his authorized representative shall be permitted to inspect the work, materials, payrolls, and records of personnel, invoices of material and other relevant data and records of this contract.

21. PAYMENTS:

The City's terms of payment are Net 30 Days after approval of invoice. No invoice will be paid until acceptance of goods ordered. By the fifth (5th) day of each month application for payment must be submitted by the Contractor to the City's designated field representative, for verification and approval of quantities and costs incurred during said pay period. Only upon approval by designated representative will payment be forwarded for processing.

The City shall retain five per centum (5%) of each estimate until final completion and acceptance of all work covered by this contract.

22. "OR EQUAL CLAUSES":

Whenever in this contract or specifications, a particular brand or make of material, device or equipment is shown or specified, such brand, make of material, device or equipment should be regarded merely as a standard unless otherwise specified.

If three or more brands, makes of material, devices or equipment are shown or specified, each should be regarded as the equal of the others.

When in the opinion of the Engineer, or his authorized agent, any other brand, make of material, device or equipment is recognized as equal to that specified, considering quality, workmanship and economy of operation, and suitable for the purpose intended, it will be accepted.

In the opinion of the Engineer and the City's duly authorized agents, all material and workmanship shall in every respect be in accordance with what is in conformity with approved modern practice.

Whenever the plans, drawings, specifications, other contract documents, or the quality of the work, admit of doubt as to what is permissible, the interpretation will be made by the Engineer, as to which is in accordance with approved modern practice, in order to meet the particular requirements of the contract.

In all cases, new material shall be used unless this provision is waived with a special written notice by the Engineer.

23. INSPECTION AND TESTS:

All material and workmanship (if not otherwise designated) shall be subject to inspection, examination and tests, by the Engineer, or his duly authorized representatives, at any and at all times during the manufacture and/or construction, and at any and all places where such manufacture or construction is carried on.

Without additional charge, the Contractor shall furnish promptly all reasonable facilities, labor and material necessary to make tests so required, safe and convenient.

Special full size and performance tests shall be conducted as described in the specifications.

If at any time before final acceptance of the entire work, the Engineer considers necessary or advisable any examination of any portion of the work already completed, by removing or tearing out the same, the Contractor shall upon request, furnish promptly all necessary facilities, labor and materials.

If such work is found to be defective in any material respect, due to material or faulty construction by the Contractor, or any subcontractor, or if any work shall be covered over without approval of the engineer (whether or not the same shall be defective) the Contractor shall be liable for the expense of such examination and of satisfactory reconstruction.

If, however, such approval and consent shall have been given and if such work is found to meet the requirements of this contract, the Contractor shall be recompensed for the extent of such examination and reconstruction in the manner herein provided for the payment of the cost of "EXTRA WORK."

24. COSTS AND TESTS:

The selection of Bureau Laboratories, and/or agencies for the inspection and tests of supplies, materials or equipment shall be subject to the direction of the Engineer.

If inspection, tests, analysis of the materials or equipment, should disclose that said material or equipment requires rejection, then the cost of said inspection, test analysis shall be borne by the Contractor and said cost shall be deducted from the Contractor's current estimate by the Engineer. If supplies, material or equipment shall be found acceptable, the cost of said inspection, tests or analysis shall be borne by the City.

25. PROTECTION OF WORK AND PROPERTY:

The Contractor shall at all times safely guard the City's property from injury or loss, in connection with this contract.

He shall at all times safely guard and protect his own work and that of adjacent property from damage.

The Contractor shall replace and make good any such damage, loss or injury. All passageways, guard fences, lights and other facilities required for protection by local conditions must be provided and maintained.

26. POWER OF CONTRACTOR TO ACT IN AN EMERGENCY:

In case of an emergency, which threatens loss or injury of property and/or safety of life, the Contractor shall be allowed to act without previous instructions from the Engineer, as he sees fit.

He shall notify the Engineer immediately thereafter of any compensation claimed by the Contractor due to such extra work, and shall submit same to the Engineer for approval. When the Contractor has not taken action, but has notified the Engineer of an emergency threatening injury to persons or damage to the work, or any adjoining property, the Contractor shall act as instructed or authorized by the Engineer to prevent such threatened injury or damage.

27. CERTIFICATE OF COMPLETION:

Upon completion of all work whatsoever required, the Engineer shall file a written certificate with the Director of Finance and the Contractor, for the entire amount of work performed and compensation earned by the Contractor, including extra work and compensation thereof.

28. FINAL PAYMENT:

Within thirty days of filing a certificate of completion, the City shall pay to the Contractor the amount therein stated, less all prior payments and advances whatsoever to or for the account of the Contractor. All prior estimates and payments, including those relating to extra work, shall be subject to correction by this present payment, which throughout this contract is called the FINAL PAYMENT.

29. ACCEPTANCE OF FINAL PAYMENT CONSTITUTES RELEASE:

The acceptance by the Contractor of the final payment, shall be and shall operate as a release to the City of all claims and of all liability to the contract or for all things done or furnished in connection with this work, and for every act and neglect of the City and others relating to or arising out of this work, accepting the Contractor's claim for interest upon the final payment, if the payment is improperly delayed.

No payment, however, final or otherwise, shall release the Contractor or his sureties from any obligation under this contract or of the performance bond.

30. SUB-SURFACE STRUCTURES:

All sub-surface structures and public utility lines have been located as far as possible, as indicated on the plans and information obtained from the respective utilities.

The City does not assume the responsibility for the accuracy of this information.

31. SUB-SURFACE CONDITIONS:

Bidders are notified that it is obligatory for them to obtain all the information they require as to the existing physical conditions relative to the work and in particular to sub-surface conditions---NOR SHALL THE CITY BE HELD LIABLE FOR ANY ADDITIONAL COST TO THE CONSTRUCTION WHICH MAY RESULT DUE TO THESE CONDITIONS, and each bidder in bidding must rely exclusively upon his own investigation and that he makes this bid with the full knowledge of the kind, quality and quantity of work required.

The undersigned understands that information relative to subsurface and other conditions, natural phenomena, existing pipes and other structures (surface and/or subsurface) has been furnished only for his information and convenience without any warranty of guarantee, express or implied, that the subsurface and/or other structures actually encountered will be the same as these shown on the drawings or in any of the other contract documents and he agrees that he shall not use or be entitled to use any such information made available to him through the contract documents or otherwise or obtained by him in his own examination of the site, as a basis of or ground for any claim against the City, arising from or by reason of any variance which may exist between the aforesaid information made available to or acquired by him and the subsurface and/or other conditions, natural phenomena, existing pipes and other structures (surface and/or subsurface) actually encountered during the construction work, and he has made due allowance therefore in this bid.

32. CONTRACTOR'S TITLE TO MATERIALS:

No materials or supplies for the work shall be purchased by the Contractor or sub-contractor, subject to any chattel mortgage or under any conditional sale or other agreement for which interest is retained by the seller.

33. SUPERINTENDENCE BY CONTRACTOR:

The Contractor shall employ a project superintendent who shall be present full time at the site of the work and who shall have full authority to act for the Contractor.

It is understood that such representative shall be acceptable to the City and shall be one whose experience and length of service in this particular kind of work warrants his ability to perform the duties entailed to the satisfaction of the Engineer, and who can continue in that capacity for the particular job involved unless he ceases to be on the Contractor's payroll.

The Engineer reserves the right of investigation to satisfy the City that the appointed superintendent is properly qualified to carry out the obligations entailed to perform the work herein contemplated in the plans and specifications and directions.

34. REPRESENTATIONS OF CONTRACTORS:

The Contractor represents and warrants:

a). That he is financially solvent and that he is experienced in and competent to perform the type of work, or to furnish plant and equipment materials and supplies.

b). That he is familiar with all Federal, State and Municipal laws, ordinances and regulations, which in any way may affect the work of those employed therein.

c). That he has carefully examined the plans and specifications and the site of the work, and that from his own investigation he has satisfied himself about the nature and location of the work, character, quality and quantity of the surface and sub-surface materials likely to be encountered, as well as the character of equipment and other facilities needed for the performance of the work, the general local conditions and all other conditions which may in any way affect the work.

35. PATENT RIGHT:

As part of his obligation hereunder and without any additional compensation, the Contractor will pay for all patent fees or royalties required in respect to the work or any part thereof, and will fully indemnify the City for any loss on account of infringement of any patent rights.

36. PERMITS AND REGULATIONS:

The Contractor shall procure and pay for all permits and licenses necessary for the execution of his work.

The Contractor shall comply with all laws, ordinances, rules and regulations relating to the performance of the work.

37. CORRECTION OF WORK:

All work, all material, whether incorporated in the work or not, all processes of manufacture and all methods of construction, shall be at all time and places subject to the inspection of the Engineer, who shall be the final judge of the quality and suitability of the work, materials, processes of manufacture and methods of construction for the purpose for which they are used.

Should they fail to meet the approval of the Engineer they shall be forthwith reconstructed, made good, replaced and corrected, as the case may be, by the Contractor, at his own expense.

Rejected material shall immediately be removed from the site.

Acceptance of material and workmanship by the Inspectors shall not relieve the Contractor from his obligation to supply other materials and workmanship when so ordered by the Engineer.

If, in the opinion of the Engineer, it is undesirable to replace any defective or damaged material, or to reconstruct or correct any portion of the work injured or not performed in accordance with the contract, the compensation to be paid to the Contractor hereunder, shall be reduced by such amount which the Engineer deems equitable.

The Contractor expressly warrants that his work shall be free from any defects in material or workmanship, and agrees to correct any such defects which may appear within the maintenance period, following final completion of work.

Neither acceptance of the completed work, nor payment thereof, shall operate to release the Contractor or his sureties from any obligation under or upon this contract or the performance bond.

38. STATEMENT SHOWING AMOUNT DUE FOR WAGES, MATERIAL AND SUPPLIES:

With each application for payment under this contract, the Contractor and every subcontractor shall deliver to the City a written verified statement in a form satisfactory to the City, showing in detail the amounts then due and unpaid by such Contractor or subcontractor, to all tradesmen for daily or weekly wages, men employed by him under the contract for performance of work at the site thereof, or to other persons for material and equipment delivered at the site of the work.

The term "tradesmen" as used herein, shall include foremen, mechanics and apprentices.

39. CITY RIGHT TO WITHHOLD PAYMENTS:

The City may withhold from the Contractor as much of any approved payment due him, as the City deems necessary.

1st. To assure the payment of just claims due and unpaid of any person supplying labor or materials for the work.

2nd. To protect the City from loss due to defective work not remedied.

Or

3rd. To protect the City from loss due to injury to persons or damage to work or property of other Contractors, subcontractors, or others caused by the act or neglect of the Contractor or any of his subcontractors.

The City shall have the right, as agent for the Contractor, to apply any such amounts so withheld in such manner as the City may deem proper, to satisfy such claims or to secure such protection.

Distribution of such money shall be considered as payments for the amount of the Contractor.

40. CITY RIGHT TO STOP WORK OR TERMINATE CONTRACT:

If the Contractor shall be adjudged bankrupt, an assignment shall be made for the benefit of creditors. A receiver or liquidator shall be appointed for the Contractor and for any of his property. The Contractor shall be dismissed within twenty (20) days after such appointment. The proceedings in connection therewith shall not be stayed within the said twenty (20) days. If the Contractor shall refuse or fail after notice or warning from the Engineer, to supply enough properly skilled workmen or proper materials, or if the Contractor shall fail to prosecute the work or any part thereof with such diligence as will insure its completion within the period herein specified (or duly authorized extension thereof) or shall fail to complete the work within said period, or if the Contractor shall fail to make prompt payment to persons supplying labor or materials for the work, or if the Contractor shall fail or refuse to regard laws, ordinances or the instructions of the Engineer or otherwise be guilty of a substantial violation of any provision of this contract, then in any such event, the City without prejudice to any other right or remedy, may give seven (7) days' notice to the Contractor, to terminate the employment of the Contractor. The Contractor shall lose the right to proceed either for the entire work or (at the option of the City) for any portion thereof on which delays shall have occurred. The City may as it deems expedient take possession of the work and complete it by contract or otherwise.

In such cases, the Contractor shall not be entitled to receive any further payment until the work is finished.

If the unpaid balance of the compensation to be paid the Contractor hereunder, shall exceed the expense of so completing the work (including compensation for additional managerial administrative and inspection services and any damages for delay), such excess shall be paid to the Contractor.

If such expense shall exceed such unpaid balance, the Contractor and his sureties shall be liable to the City for such excess.

If the right of the Contractor to proceed with the work is so terminated, the City may take possession of and utilize in completing the work, such materials, appliances, supplies, plant and equipment as may be on the site of the work, and necessary therefore.

If the work shall be stopped by order of the Court or any other public authority, for a period of three (3) months, without act or fault of the Contractor or any of his agents, servants, employees, or subcontractors, the Contractor may upon ten (10) days' notice to the City of Stamford, discontinue his performance of the work and/or terminate the contract.

41. USES OF PREMISES AND REMOVAL OF DEBRIS:

The Contractor undertakes at his own expense:

a). To take every precaution against injuries to persons or damage to property.

b). To store his apparatus, materials, supplies and equipment in such orderly fashion at the site of the work as will not unduly interfere with the progress of his work.

c). To place upon the work area or any part thereof, only such loads as are consistent with the safety of that portion of the work.

d). To frequently clean up all refuse, rubbish, scrap material and debris caused by his operations, so that the site of the work shall at all times present a neat, orderly and workmanlike appearance. Failure to comply with this article within 24 hours of notification may result in the Owner having the work performed by outside sources at the Contractor's expense. These expenses will be deducted from the regular monthly periodic estimate.

e). To remove before final payment all surplus materials, false work, temporary structures, (including foundations thereof), plant of any description and debris of every nature resulting from his operation, and to put the site in a neat and orderly condition.

f). To effect all cutting, fitting or patching of his work required to make the same conform to the plans and specifications, and with the consent of the Engineer, to cut or otherwise alter the work of any other Contractor.

42. ALL WORK SUBJECT TO CONTROL OF THE ENGINEER:

In the performance of the work, the Contractor shall abide by all orders, directions and requirements of the Engineer and shall perform all duties to the satisfaction of the Engineer, and at such time and places, by such methods and in such manner and sequence as the Engineer may require.

The Engineer shall determine the amount, quantity, acceptability and fitness of all parts of the work, shall interpret the plans, specifications, contract and any extra work orders, and shall decide all other questions in connection with the work.

The Contractor shall employ no plant, equipment, materials, methods or men to which the Engineer objects, and shall remove no plant materials, equipment or other facilities from the site of the work, without the Engineer`s permission. Upon request, the Engineer shall confirm in writing any oral order, direction requirement or determination.

43. CITY ENGINEER, CONTROL NOT LIMITED:

The enumeration herein or elsewhere in the contract of particular instances in which the opinion, judgment, discretion or determination of the Engineer, shall control or in which work shall be performed to his or their satisfaction as subject to his or their approval or inspection, shall not imply that only matters similar to those enumerated shall be governed and performed, but without exception all the work shall be governed and so performed.

44. PROVISIONS REQUIRED BY LAW DEEMED INSERTED:

Each and every provision of law and clause required by law to be inserted in this contract, shall be deemed to be inserted herein, and the contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not correctly inserted, then upon the application of either party, the contract shall forthwith be physically amended to make such insertion.

45. SUBLETTING, SUCCESSOR AND ASSIGNS:

The Contractor shall not sublet any part of the work under this contract, nor assign any moneys due him hereunder without first obtaining the written consent of the City.

46. DEFINITIONS:

Wherever the words defined in this section or pronouns used in their stead occur in the specifications, they shall have the meanings herein given.

AS DIRECTED, AS REQUIRED, ETC.

Wherever in the specifications, or on the drawings the words "As Directed", "As Ordered", "As Requested", "As Required", "As Permitted", or words of like import are used, it shall be understood that the Direction, Order, Request, Requirement, or Permission of the Engineer is intended. Similarly, the words "Approved", "Accepted", "Satisfactory", and words of like import shall mean Approved by, Acceptable to, or Satisfactory to the Engineer.

ELEVATION

The figures given on the drawings or in the other contract documents after the word "Elevation" or abbreviation of it shall mean the Distance in Feet above the Datum Adopted by the Engineer.

NOTE: Unless otherwise stated elsewhere in the contract documents and/or on the contract drawings, vertical elevation datum for this project is based upon NEW City Datum, NGVD (ele. 0.00 = mean water).

ROCK

The word "Rock" wherever used as the name of any excavated material or material to be excavated, shall mean only boulders or solid ledge rock which, in the opinion of the Engineer, requires, for its removal, drilling and blasting, wedging, sledging, barring or breaking up with a power operated tool. No soft or disintegrated rock which can be removed with a hand pick or power-operated (CAT 235 or equivalent) excavator or shovel, no loose, shaken or previously blasted rock or broken stone in rock fillings or elsewhere, and no rock exterior to the maximum limits of measurement allowed, which may fall into the excavation, will be measured or allowed as "Rocks".

EARTH

The word "Earth", wherever used as the name of an excavated material or material to be excavated, shall mean all kinds of material other than rock as above defined.

47. ABBREVIATIONS:

Where any of the following abbreviations are used in the Specifications, they shall have the meaning set forth opposite each.

AASHO	American Association of State Highway Officials
ACI	American Concrete Institute
AISC	American Institute of Steel Construction
ASA	American Standard Association
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
NEC	National Electrical Code, Latest Edition

48. HANDLING AND DISTRIBUTION:

The Contractor shall handle, haul and distribute all materials and all surplus materials on the different portions of the work, as necessary or required; shall provide suitable and adequate storage room for materials and equipment during the progress of the work, and shall be responsible for the protection, loss of, or damage to materials and equipment furnished by him, until the final completion and acceptance of the work.

Storage and Demurrage charges by Transportation Companies and Vendors shall be borne by the Contractor.

49. MATERIALS:

Samples - Inspection - Approval, unless otherwise expressly provided on the Drawings or in any of the other contract documents, only new material and equipment shall be incorporated in the work. All materials and equipment furnished by the Contractor to be incorporated in the work shall be subject to the inspection and approval of the Engineer. No material shall be processed or fabricated for the work or delivered to the work site without prior approval of the Engineer.

As soon as possible after execution of the Agreement, the Contractor shall submit to the Engineer the names and addresses of the manufacturers and suppliers of all materials and equipment he proposes to incorporate into the work. When shop and working drawings are required as specified below, the Contractor shall submit prior to the submission of such drawings, data in sufficient detail to enable the Engineer to determine whether the manufacturer and/or supplier have the ability to furnish a product meeting the specifications. As requested, the Contractor shall also submit data relating to the materials and equipment he proposes to incorporate into the work in sufficient detail to enable the Engineer to identify and evaluate the particular product and to determine whether it confirms to the Contract Requirements. Such data shall be submitted in a manner similar to that specified for submission of shop and working drawings.

Facilities and labor for the storage, handling and inspection of all materials and equipment shall be furnished by the Contractor. Defective materials and equipment shall be removed immediately from the site of the work.

If the Engineer so requires, either prior to or after commencement of the work, the Contractor shall submit additional samples of materials for such special tests as the Engineer deems necessary to demonstrate that they conform to the specifications. Such samples, including concrete test cylinders, shall be furnished, taken, stored, placed and

shopped by the approved molds for making concrete test cylinders. Except as otherwise expressly specified, with technical specifications, the City shall make arrangements and pay for the tests.

All samples shall be packed so as to reach their destination in good condition, and shall be labeled to indicate the material represented. The name of the building or work and location for which the material is intended and the name of the contractor submitting the sample. To ensure consideration of samples, the Contractor shall notify the Engineer by letter that the samples have been shipped and shall properly describe the samples in the letter. The letter of notification shall be sent separate from and should not be enclosed with the samples.

The Contractor shall submit data and samples, or place his orders, sufficiently early to permit consideration, inspection, testing and approval before the materials and equipment are needed for incorporation in the work. The consequence of his failure to do so shall be the Contractor's sole responsibility.

When required, the Contractor shall furnish to the Engineer triplicate sworn copies of manufacturer's shop or mill tests (or reports from independent test laboratories) relative to materials, equipment, performance rating and concrete data.

50. WATCHMAN:

If it becomes necessary to supply watchmen during non-regular working hours, they shall be employed until (in the opinion of the Engineer) their services are no longer required. The Contractor shall employ and pay a satisfactory, sober, able-bodied watchman who shall be in attendance upon the work at all times, (regardless of the hour) whenever work by the regular employees stops.

51. MAINTENANCE OF TRAFFIC:

The Contractor shall conduct his operations in such a manner so that he does not impose unnecessary hardship upon the residents along the route of the work.

Streets may be closed to traffic only upon written order of the Traffic Engineer. Traffic shall be maintained within the project area except where it is found impracticable, or seriously interferes with the Contractor's operations. If permanent repairs are not completed immediately, the pavement surface along the line of work shall be maintained in a condition comparable to the adjacent road surface.

People living or having business within the barricaded zone shall be permitted to use the highway for auto traffic if possible.

The Contractor shall protect all phases of the work from damage due to traffic, etc., and provide necessary watchmen, signalmen and (if so ordered by the Engineer) police officers.

No direct payment for maintenance of traffic will be made, but shall be considered as included in the base bid submitted.

52. DRIVEWAYS AND PROPERTY ENTRANCES:

Excavated materials and equipment shall be placed in such position as not to unnecessarily impede travel on the streets, or access to driveways. A sufficiently clear space for

pedestrian travel shall be maintained on the sidewalks, and all property entrances and driveways shall be kept clear, where possible.

Where necessary, bridges shall be constructed and maintained for residents. Before closing any driveway or entrance, the Contractor shall give the owner or resident of the property involved, due notice of such temporary closing. When this is not practicable and an emergency arises, the Contractor shall, on the order of the Engineer, provide a satisfactory place to house temporarily, any motor vehicle, which may be prevented from being housed at night.

No direct payment will be allowed for this work or condition, but shall be considered as included in the base bid submitted.

53. DUST:

The Contractor shall at all times during the execution of this contract, control the nuisance of flying dust, by water sprinkling or by application of oil, or a method satisfactory to the Engineer.

54. PRESERVATION OF TREES:

Trees and shrubs on the site of the work shall be protected during the entire period of the contract, and if injured by the Contractor or his employees, shall be replaced, unless it is covered by the bid items, at his expense before the completion of the contract.

55. INSPECTION OF WORK AWAY FROM THE SITE:

If work to be done away from the construction site is to be inspected on behalf of the City during its fabrication, manufacture, or testing, or before shipment, the Contractor shall give notice to the Engineer of the place and time where such fabrication, manufacture, testing or shipping is to be done. Such notice shall be in writing and delivered to the Engineer in ample time so that the necessary arrangements for the inspection can be made.

56. CONTRACTOR'S SHOP AND WORKING DRAWINGS:

The Contractor shall submit for approval (in reproducible form unless otherwise specified) shop and working drawings of concrete reinforcement, structural details, piping layout, wiring, materials fabricated for the contract and materials and equipment for which such drawings are specifically requested.

Such drawings shall show the principal dimensions, weight, structural and operating features, space required, clearances, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the drawing, when it is customary to do so. When the dimensions are of particular importance, or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct for the contract.

When so specified or if considered by the Engineer to be acceptable, manufacturer's specifications, catalog data, descriptive matter, illustrations, etc., may be submitted for approval in place of shop and working drawings. In such case, requirements shall be as specified for shop and working drawings, insofar as applicable, except that the submission shall be in quadruplicate.

The Contractor shall be responsible for the prompt and timely submittal of all shop and working drawings so that there shall be no delay to the work due to the absence of such drawings.

No material or equipment shall be purchased or fabricated for the contract until the required shop and working drawings have been submitted as herein above provided and approved as conforming to the contract requirements. All such materials and equipment and the work involved in their installation or incorporated into the work shall then be as shown in and represented by said drawings.

Until the necessary approval has been given, the Contractor shall not proceed with any portion of the work such as the construction of foundations, the design or details of which are dependent upon the design or details of work, materials, equipment or other features for which approval is required.

All shop and working drawings shall be submitted to the Engineer by and/or through the Contractor, who shall be responsible for obtaining shop and working drawings from his subcontractors and returning approved drawings to them. Unless otherwise approved, all shop and working drawings shall be prepared on standard size, 24 inch by 36 inch sheets, except those which are made by changing existing standard shop or working drawings. All drawings shall be clearly marked with the names of the City, Contractor, and building, equipment or structure to which the drawing applies, and shall be accompanied by a letter of transmittal giving a list of the drawing number and the names mentioned above.

Only drawings which have been checked and corrected by the fabricator should be submitted to the Contractor by his subcontractors and vendors. Prior to submitting drawings to the Engineer, the Contractor shall check thoroughly all such drawings to satisfy himself that the subject matter thereof conforms to the drawings and specifications in all respects. All drawings which are correct shall be marked with the date, checker's name and indication of the Contractor's approval, and then shall be submitted to the Engineer. Other drawings shall be returned for correction.

The approval of shop and working drawings, etc., will be general only and shall not relieve or in any respect diminish the responsibility of the Contractor for details of design, dimensions, etc., necessary for proper fitting and construction of the work as required in the contract and for achieving the result and performance specified hereunder.

Should the Contractor submit for approval, equipment that requires modifications to the structures, piping, layout, etc., detailed on the drawings, he shall also submit for approval, details of the proposed modifications. If such equipment and modifications are approved, the Contractor, at no additional cost to the City, shall do all work necessary to make such modifications.

The marked-up reproducible of the shop and working drawings or one mark-up copy of catalog cuts will be returned to the Contractor. The Contractor shall furnish additional copies of such drawings or catalog cuts when so requested.

57. OCCUPYING PRIVATE LAND:

The Contractor shall not (except after written consent from the proper parties) enter or occupy with men, tools, materials, or equipment, any land outside the right-of-way or property of the City. A copy of the written consent shall be given to the Engineer.

58. INTERFERENCE WITH AND PROTECTION OF STREETS:

The Contractor shall not close or obstruct any portion of a street, road or private way without obtaining permits therefore from the proper authorities. If any street, road or private way shall be rendered unsafe by the Contractor's operations, he shall make such repairs or provide such temporary ways or guards as shall be acceptable to the Engineer and to the proper authorities.

Streets, roads, private ways and walks not closed shall be maintained passable and safe by the Contractor, who shall assume and have full responsibility for the adequacy and safety of provisions made therefore.

The Contractor shall, at least 24 hours in advance, notify the Police and Fire Departments in writing, with a copy to the Engineer, if the closure of a street or road is necessary. He shall cooperate with the Police Department in the establishment of alternate routes and shall provide adequate detour signs, plainly marked and well-lighted, in order to minimize confusion.

59. STORAGE OF MATERIALS AND EQUIPMENT:

All excavated materials, construction equipment and materials and equipment to be incorporated in the work shall be placed so as not to injure any part of the work or existing facilities and so that free access can be had at all times to all parts of the work and to all Public Utility installations in the vicinity of the work. Materials and equipment shall be kept neatly piled and compactly stored in such locations as will cause a minimum of inconvenience to public travel and adjoining owners, tenants and occupants.

60. INSUFFICIENCY OF SAFETY PRECAUTIONS:

If at any time, in the sole judgment of the Engineer, the work is not properly lighted, barricaded, or in any other respect safe in regard to public travel, persons on or about the work, or public or private property, the Engineer shall have the right to order such safeguards to be erected and such precautions to be taken as he deems advisable and the Contractor shall comply promptly with such orders. If, under such circumstances, the Contractor does not or cannot immediately put the work and the safeguards into proper and approved condition, or if the Contractor or his representative is not upon the site, so that he can be notified immediately of the insufficiency of safety precautions, the Engineer may put the work into such a condition that it shall be, in his opinion, in all respects safe. The Contractor shall pay all costs and expenses incurred by the Engineer or City in so doing. Such action of the Engineer, or his failure to take such action, shall in no way relieve or diminish the responsibility of the Contractor for any and all costs, expenses, losses, liability, claims, suits, proceedings, judgments, awards or damages resulting from, by reason of or in connection with any failure to take safety precautions or the insufficiency of the safety precautions taken by him or by the Engineer acting under authority of this article or for failure to comply with the provisions of any State or Federal Occupational Safety and Health Laws, Rules or Regulations.

61. SANITARY REGULATIONS:

When deemed necessary by the Engineer, the Contractor shall provide suitable sanitary facilities for the use of those employed on the work. Such facilities shall be made available when the first employees arrive on the site of the work, shall be properly secluded from public observation and shall be constructed and maintained during the progress of the work in suitable numbers and at such points and in such manner as may be required or approved.

The Contractor shall maintain the sanitary facilities in a satisfactory and sanitary condition at all times and shall enforce their use. He shall rigorously prohibit the committing of nuisances on the site of the work, on the lands of the City, or on adjacent property.

The City and the Engineer shall have the right to inspect such facilities at all times to determine whether or not they are being properly and adequately maintained.

62. DIMENSIONS OF EXISTING STRUCTURES:

Where the dimensions and locations of existing structures are of importance in the installation or connection of any part of the work, the Contractor shall verify such dimensions and locations in the field before the fabrication of any material or equipment which is dependent on the correctness of such information.

63. WORK TO CONFORM:

During its progress, and on its completion, the work shall conform truly to the lines, levels and grades indicated on the drawings or given by the Engineer and shall be built in a thoroughly substantial and workmanlike manner, in strict accordance with the drawings, specifications and other contract documents and the directions given from time to time by the Engineer.

64. COMPUTATION OF QUANTITIES:

For estimating quantities in which the computation of areas by Geometric methods would be comparatively laborious, it is agreed that the Planimeter shall be considered an instrument adapted to the measurement of such areas.

It is further agreed that the computation of the Volume Prismoids shall be by the method of average end areas.

65. PLANNING AND PROGRESS SCHEDULES:

Before award of the Contract and from time to time during its progress, as the Engineer may request, the Contractor shall submit to the Engineer a written narrative of the methods he plans to use in doing the work and the various steps he intends to take.

Also the Contractor shall prepare and submit to the Engineer a written schedule, which encompasses all the activities necessary to perform and successfully complete the contractual work. This schedule shall include the respective original and remaining durations, % completion, dates for the early / late start, early / late finish, and total float. In addition the Contractor will issue a separate report that shows each activity predecessors /successors and restraints. The “critical path” activities must also be highlighted. The Contractor shall update the schedule and submit each schedule to the Engineer for review, approval and change when necessary during the progress of the work.

66. PRECAUTIONS DURING ADVERSE WEATHER:

During adverse weather and against the possibility thereof, the Contractor shall take all necessary precautions so that the work may be properly done and satisfactory in all respects. When required, protection shall be provided by the use of plastic sheets, tarpaulins, wood and building-paper shelters or other approved means.

The Engineer may suspend construction operations at any time when, if in his sole judgment, the conditions are unsuitable or the proper precautions are not being taken, whatever the weather may be.

67. AS-BUILT DRAWINGS:

The Contractor shall be responsible for maintaining a set of as-built drawings during the course of the work for examination by the Engineer.

The Contractor shall submit to the Engineer a reproducible set of as-built drawings at the completion of the work and in any case prior to or along with his request for final payment. As built information required shall be in accordance with, but not necessarily limited to, the provisions of City of Stamford Technical Specification for Survey, Line and Grade.

68. SCOPE OF WORK:

The intent of the contract is to complete the work or improvements in full compliance with the plans, specifications, technical specifications, special notes, etc.

A. Quantities

The unit bid prices shall be applied to the applicable quantities actually used and accepted in the performance of this project. Quantities have been established using the best information available for accuracy. In some instances, however, quantities may have been provided for some items in order to establish a unit price in the eventuality that the item of work may occur during the construction of the project.

Should the actual quantities constructed vary from those estimated, whether higher or lower, the Contractor is made aware that the applicable item will be paid for based upon his unit bid price bid for that item. Exceptions to this article are noted below in section C, Change in Project Scope.

Increases in the estimated quantities shall be documented and paid for through the contingency item of the contract. Partially used or unused items may be consolidated during the project and transferred, via change order, into the contingency item if so required.

B. Cost Plus Items:

If the City orders the performance of any work not covered by the drawings or specifications, and for which no unit price or lump sum basis can be agreed upon, then such extra work shall be done on a Cost-Plus percentage basis of payment as follows:

1.0 Direct Labor And Foreman Costs - For all labor including equipment operators, and foremen in direct charge of the specific operation, the Contractor shall receive the rate of wage actually paid as shown by his certified payroll, which shall be at least the current local minimum prevailing wage rate, per hour, per position, in accordance with the current State of Connecticut,

Labor Department Minimum Rates & Classifications for Heavy Construction. Compensation shall be for each hour that said labor and foreman are actually engaged in such work, including such overtime as provided by existing laws and regulations. In addition the contractor shall receive for each hour worked, the actual costs paid to, or in behalf of workmen, by reason of allowances, health and welfare benefits, pension fund benefits or other benefits, when such amounts are required by collective bargaining agreement or other employment contract generally applicable to the classes of labor employed on the work. All personnel above the grade of foreman are excluded from receiving compensation under this section.

An amount equal to 15 percent (10% overhead & 5% profit) of the total sums as specified above (1.0) will also be paid the contractor.

1.1 Other Labor Costs - The Contractor shall also be allowed to add to such direct labor and foremen costs, the following items:

Social Security Tax at the percentage legally required; Unemployment Ins., at the percentage legally required; Workmen's Compensation lnsurance at policy percentage rate; Property/liability damage insurance premiums;

An amount equal to 6 percent of the total sums as specified above (1.1) will also be paid the contractor.

1.2 Materials - For all materials used, the Contractor shall receive the actual cost of such materials, including freight and delivery charges, as shown by original receipted bills to which shall be added a sum equal to fifteen (15) percent.

1.3 Equipment Rental - For machinery, trucks, or equipment, exclusive of operator's hire, and except small tools and equipment for which no rental is allowed, which it may be deemed necessary to use, the City will allow the Contractor the cost of renting such machinery, trucks, or equipment, which shall include fuel and lubricants, as are actually used in the performance of the work, but to which no percentage shall be added. Equipment rental costs will be based upon the "Rental Rate Blue Book" including Rate Adjustment Tables and amendments as published by Dataquest, Inc., San Jose, California or a lower rate if so submitted by the Contractor, and must be approved by the City prior to any work being performed.

1.4 Sub-Contracts - Cost-Plus work may be performed by a subcontractor only when (a) the Contractor has obtained approval of the subcontractor by the City and (b) the work has been performed by the subcontractor in strict compliance with the terms of the contract. In such event, the Contractor shall receive the cost of any such sub-contract to which shall be added a sum equal to ten (10) percent.

1.5 Superintendence - The foregoing payments shall be received by the Contractor as payment in full for all work done on a Cost Plus basis, and shall be accepted to cover all general superintendence, use of small tools and equipment for which no rental is allowed, job and general overhead, bonding, expenses, and anticipated profit.

2.0 The cost of the work done each day shall be submitted to the Engineer in a satisfactory form, on the succeeding day and shall be approved by him or adjusted accordingly.

3.0 Monthly payments of all charges for extra work, whether priced on the Cost Plus basis or an agreed-upon basis, shall upon completion, and approval, be requested with the subsequent monthly progress billing.

C. Change of Project Scope

In the event that the overall scope of the project is increased or decreased by 25% or more, either party to the contract may request a revised contract consideration to the stipulated bid unit prices that may be affected by the change. After agreement is reached by the City and contractor on revised unit prices, a change order will be issued reflecting these changes. The re-negotiated unit prices will be based on the original contract unit prices with additions or subtractions indicated so as to justify the new unit price to the satisfaction of the City. The revised unit prices will be applied only to that portion of the project in which the scope has been changed, in accordance with this article, and shall not be applied to any of the quantities of the original bid. An example of such a change may be the addition to or deletion of the originally stated project areas.

All of the above requirements shall be carried out in accordance with the provisions of the Stamford Code, Article II, Purchasing, Section 23-18.4, Contracts.

69. FIELD OFFICE **(WAIVED)**

The contractor shall furnish, for the duration of the work, a construction field office for the Engineer's use. The office shall conform to the requirements Conn-Dot Form 814, 1988, Section, 9.69.01 Description, and 9.69.03 for Construction Field Office-Type "B". This requirement may be waived by the Engineer for special circumstances, i.e.: short duration projects, etc.

70. COORDINATION OF PLANS/SPECIFICATIONS

Any requirement on the plans or in these Specifications, Special Notes/Provisions shall be equally binding on the Contractor.

In case of conflict, the plans shall take precedence over the Specifications. Special Notes/Provisions shall take precedence over plans and Specifications.

71. NO PAYMENT

Unless otherwise provided for by a specific Contract Item, no separate payment shall be made for any of the requirements as described in the above General Specifications, but shall be deemed included in the total bid price for all the work in this Contract.

72. NOISE

The Contractor will be required to limit noise operations pursuant to City of Stamford Charter Chapter 164 -1 to and including Chapter 164 -13.

SECTION 01000

WORK COVERED BY CONTRACT DOCUMENTS

PART 1 - GENERAL

1.1 PROJECT TITLE

A. The project is entitled "Scofieldtown Park Landfill Closure." The landfill is located in Stamford, Connecticut. It is to be completed and ready for use by the OWNER within the Contract Time specified in the **C.O.S. General Specifications Section 10: Commencement of Work** of the Contract Documents.

1.2 THE PROJECT DESCRIPTION

A. The Base Contract includes installation of the following:
Final Cover System components:
1. Landfill Cap System (soils/geomembranes) pay items 1 through 53
2. Stormwater Control Structures pay items LA-1 through LA-6

B. Possible Add Alternates are as follows:
1. Landscaping of Site; includes line item LA-7
2. Salt Barn & Support Shed/Office Foundation & Superstructure; line item SB-1
3. Temporary Irrigation System; line item LA-9
4. 5 ft wide Asphalt pathway along Rockrimmon Rd; line item10a
5. 5 ft wide Asphalt pathway along Scofieldtown Rd; line item10b
6. 5 ft wide Asphalt pathway along Access Rd; line item10c
7. Improvements to Scofieldtown Park Entryway; line item LA-11

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01001

OWNER AND REGULATORY AUTHORITY

PART 1 - GENERAL

1.1 OWNER

The OWNER is the City of Stamford (Stamford), Connecticut.

A. Stamford has the administrative authority for the facility and site where the work is being performed. The authorized representative for Stamford acts in matters involving revoking, altering, enlarging or relaxing any requirement of the Contract Documents.

B. The Owner's Representative is Mr. Jeff Brown, Engineer/Construction Manager, City of Stamford, 888 Washington Boulevard, 7th Floor, Stamford, CT 06901. Phones (203) 627-6352 (cell) & (203) 977-4493 (desk); email jbrown2@ci.stamford.ct.us.

1.2 PROPERTY OWNER

The current property owner is the City of Stamford.

1.3 REGULATORY AUTHORITY

The Regulatory Authority is the Connecticut Department of Energy and Environmental Protection (CTDEEP).

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01002

ENGINEER/CONSTRUCTION QUALITY CONTROL

PART 1 - GENERAL

1.1 THE ENGINEER

A. The Engineer or their accredited representative is referred to in the Contract Documents as "ENGINEER" or "ENGINEERS" or by pronouns which imply them.
   1. The Engineer will not make interpretations or decisions directly to the CONTRACTOR. All interpretations or decisions will be conveyed through the Construction Administrator.
   2. As the authorized agent of Stamford, the ENGINEER is responsible for review of shop drawings, materials, and equipment intended for the work, in accordance with the "General Conditions", and the "Supplementary Conditions".

B. Wherever the ENGINEER is mentioned in the documents in connection with an administrative function, it shall include the Construction Administrator in that function except for shop drawings.

C. Refer to the project Construction Quality Assurance Plan for guidance on construction quality assurance roles and responsibilities. Refer to Specification Section 01400 for other quality control requirements.

PART 2 – PRODUCTS
Not used.

PART 3 – EXECUTION
For Base Contract items: Mr. Carl Stopper, P.E., V.P. TRC Windsor Remediation Practice Manager 21 Griffin Road North, Windsor, CT 06905; phones T: 860.298.6231 F: 860.298.6399 C: 860.798.4272; email: cstopper@trcsolutions.com

For Landscape items: Mr. Aris Stalis, ASLA, LEED AP Aris Land Studio 1450 Barnum Avenue, Suite 201 Bridgeport, CT 06610; email; Aris@ArisLS.com ; phone;203.606.3130

For Salt Barn Support Shed/Office items: Mr. Kevin Chamberlain, P.E. SECB DeStefano & Chamberlain, Inc. 50 Thorpe Street Fairfield, CT 06824; email: kevinc@dcstrucural.com; phone; (203) 254-7131

END OF SECTION

SECTION 01003

CONSTRUCTION ADMINISTRATOR

PART 1 - GENERAL

1.1 THE CONSTRUCTION ADMINISTRATOR

A. The Construction Administrator is referred to in the Contract Documents as "Construction Administrator" or "Construction Manager" or by pronouns which imply it. All communications concerning the project will be directed through the Construction Administrator or a designated representative(s).

B. As information to the CONTRACTOR, the Construction Administrator's status is defined as follows:
   1. The Construction Administrator is the OWNER'S Agent who will, among other things, monitor the General Contractor's performance, scheduling and construction, process shop drawings, material, and equipment submittals, review and process periodic billings, review and recommend cost changes.
   2. The Construction Administrator will process all requests for information, interpretations and decisions regarding the meaning and intent of the Contract Documents, consulting with appropriate parties prior to rendering the interpretations or decisions to the CONTRACTOR. All such requests and replies shall be in writing.

C. Limitations on Construction Administrator's Authority and Responsibilities.
   1. Construction Administrator will not supervise, direct, control, or have authority over or be responsible for CONTRACTOR'S means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work. Construction Administrator will not be responsible for CONTRACTOR'S failure to perform the Work in accordance with the Contract Documents.
   2. Construction Administrator will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
   3. Construction Administrator shall not authorize any deviation from the Contract Documents or substitution of materials or equipment, unless authorized by the OWNER.
   4. Construction Administrator shall not undertake any of the responsibilities of CONTRACTOR, subcontractors or CONTRACTOR'S superintendent.
   5. Construction Administrator shall not advise on, issue directions relative to or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction unless such advice or directions are specifically required by the Contract Documents.
   6. Construction Administrator shall not advise on, issue directions regarding or assume control over safety precautions and programs in connection with the Work.
   7. Construction Administrator shall not accept Shop Drawing or Sample submittals from anyone other than the CONTRACTOR.
   8. Construction Administrator shall not participate in specialized field or laboratory tests or inspections conducted by others except as specifically authorized by the ENGINEER or OWNER.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

The Construction Administer is; Mr. Carl Stopper, P.E., V.P. TRC Windsor Remediation Practice Manager 21 Griffin Road North, Windsor, CT 06905; phones T: 860.298.6231 F: 860.298.6399 C: 860.798.4272; email: cstopper@trcsolutions.com

END OF SECTION

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Contract Documents and general provisions of the Contract, including general and Supplementary Conditions and other Technical specifications, apply to this section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. The Project is entitled, "Scofieldtown Park Landfill Closure". The existing facility, as shown on the Contract Drawings, shall be razed, regraded, capped and redeveloped. The work involves mobilization and establishing temporary facilities, preparation of the site, establishing sediment and erosion controls, establishing water/stormwater management measures, demolition and abandonment activities, preparing the waste grades, constructing the surface cap and drainage layers, placing cover material and topsoil, constructing drainage structures, and installing indicated improvements and landscaping.

B. The CONTRACTOR shall include in his bid, all items required in order to carry out the intent of the Work as described, shown, and implied in the Contract Documents. This shall include, but is not limited to, site-wide fugitive dust suppression vehicle washing, street sweeping, traffic controls, noise controls, sediment and erosion controls, water/stormwater management measures, security measures, and health and safety measures.

C. It shall be the CONTRACTOR'S responsibility upon discovery to immediately notify the OWNER in writing, of errors, omissions, discrepancies, and instances of non-compliance with applicable codes and regulations within the documents. Any additional costs arising from the CONTRACTOR'S failure to provide such notification shall be borne by the CONTRACTOR.

1.3 WORK SEQUENCE

GENERAL NOTE: The overall anticipated order of construction activities is given below. The list of activities is not intended to be a critical path, nor be inclusive of all required activities.

A. Prior to mobilization, the CONTRACTOR shall provide OWNER with all required preliminary submittals, including laboratory analytical data for materials and soils to be brought onsite for the construction of the landfill cap, utility clearances and location reports, and personnel qualification (e.g., current OSHA HAZWOPER certifications).

B. The CONTRACTOR shall perform a site wide survey to confirm existing grades.

C. The CONTRACTOR shall mobilize all equipment, labor, tools, materials, and incidentals to the site. Temporary facilities shall include a construction trailer, sanitary facilities, materials, equipment, and security fencing as required.

D. The CONTRACTOR shall prepare this site for construction by installing applicable sediment and erosion controls, and temporary water/stormwater management measures, as shown on the Contract Drawings and referenced in the Contract Documents. Install new storm drain pipe diverting flow from the culvert so that it no longer enters the existing pond, as shown in the Contract Drawings. Maintain existing pond, outlet structure, and discharge pipe in the required configuration and condition until final phases of project when the pond is no longer needed as a temporary sediment basin.

E. The CONTRACTOR shall perform clearing, grubbing, stripping, and chipping, as described in applicable portions of the Contract Drawings.

F. The CONTRACTOR shall perform demolition and abandonment activities, as required. In-place abandonment of the existing concrete pipe discharging from the existing pond shall be deferred until after the site is stabilized and the existing pond has been converted into a fully functioning stormwater quality basin.

G. The CONTRACTOR shall complete the subgrade preparation (waste relocation, regrading, and compaction). Other materials (e.g., demolition debris, boulders) shall be incorporated into the subgrade as required. Provide survey of regraded waste surface.

H. The CONTRACTOR shall furnish, place, and compact 6 inches of subbase soil in accordance with the provisions of the Contract Documents. The CONTRACTOR shall furnish and install the nonwoven geotextile, geomembrane, and geocomposite drainage layer (with interceptor pipes) in accordance with the provisions of the Contract Documents. The CONTRACTOR shall provide a final as-built survey of the limits of the liner showing topography and spot elevations, prepared and sealed by a Connecticut licensed surveyor. Copies of all field notes shall accompany the as-built survey. Refer to “Special Considerations for Steep Slopes” under Paragraph 1.4.

I. The CONTRACTOR shall furnish, place, and compact final cover material and topsoil where indicated. Refer to “Special Considerations for Steep Slopes” under Paragraph 1.4.

J. The CONTRACTOR shall construct storm-drainage systems in accordance with the provisions of the Contract Documents. The CONTRACTOR shall provide a final as-built survey of the storm-drainage structures showing topography and spot elevations, prepared and sealed by a Connecticut licensed surveyor. Copies of all field notes shall accompany the as-built survey.

K. The CONTRACTOR shall install paving and specified site improvements, including retaining walls, passive gas vent wells, groundwater monitoring wells, and other features and structures as specified.

L. The CONTRACTOR shall place surface erosion control materials, turf reinforcement mat, jute matting and rip rap in accordance with the provisions of the Contract Documents. Vegetation shall be established by applying the flexible growth media mixed with a specified grass seed

mixture to the indicated areas. The CONTRACTOR shall ensure that vegetation is established by maintaining sediment and erosion controls and water as necessary until the work is accepted by the OWNER. The CONTRACTOR shall provide a final as-built survey of the final surface grade showing topography and spot elevations, prepared and sealed by a Connecticut licensed surveyor. Copies of all field notes shall accompany the as-built survey.

M. The CONTRACTOR shall complete final site cleanup and restoration activities.

1.4 MISCELLANEOUS PROVISIONS

A. Examination of the Site:
1. It is not the intent of the Contract Documents to show all existing conditions. All CONTRACTORS are required to attend the Pre-Bid Conference prior to submitting their Bid proposal. This is the only opportunity to visit and examine the site with the OWNER.
2. CONTRACTORS should investigate and satisfy themselves as to the conditions affecting the work, including but not limited to, those bearing upon transportation, handling, and storage of materials, availability of labor, water, electric power, uncertainties of weather, roads or similar physical conditions of the ground, and facilities needed preliminary to and during the prosecution of the work. Any failure by the CONTRACTOR to acquaint himself with the available information shall not relieve him from the responsibility for estimating properly the difficulty and cost of successfully performing the work.

B. Decontamination of Vehicles
1. The CONTRACTOR shall be responsible for decontaminating vehicles used on waste surfaces or otherwise contacting the waste. In particular, vehicles and equipment which contacts the waste material shall be washed in a designated area prior to leaving the site.

C. Special Considerations for Steep Slopes (3H:1V)
1. The CONTRACTOR shall push subbase and cover soil material from the base of steep slopes to the top during deployment. Limit placement of subbase or cover soil to strips of no less than one acre each day and install applicable geosynthetics and/or hydroseeding over such areas as soon as possible to prevent washouts. The CONTRACTOR shall not be paid for repair of washouts due to improper sequencing of the work.

1.5 CONTRACTOR USE OF PREMISES

A. Reserved.

B. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the work is indicated.
1. The CONTRACTOR shall confine his operations, including storage or materials, supplies, equipment, and incidentals to the areas specified in the Contract Documents.
2. Existing public access roads, drives, walks, and parking areas are to be kept free and clear at all times. Only designated areas shall be used for parking and storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

3. The CONTRACTOR shall be responsible for keeping the work area clean and orderly.
4. CONTRACTOR'S daily access to the site shall be as indicated on the Contract Documents. Parking for the CONTRACTOR'S employees shall be limited to an area designed by the OWNER and the CONTRACTOR may be required to provide identification stickers for all vehicles.
5. Special precautions shall be taken to protect all drainage systems near the work area. Prevent any and all sediment, debris, or other materials from getting into these systems. Should any sediment, debris, or other materials get into these systems, or if any damage occurs to them, the CONTRACTOR shall immediately contact the OWNER. The CONTRACTOR shall be fully responsible for all costs associated with additional cleaning and repairs caused by neglecting to protect the drainage systems.
6. No signs, other than those approved by the OWNER, shall be visible on the premises.

PART 2 – PRODUCTS
Not used.

PART 3 – EXECUTION
Not used

END OF SECTION

SECTION 01015

OCCUPANCY REQUIREMENTS

PART 1 - GENERAL

1.1 FULL OWNER OCCUPANCY DURING CONSTRUCTION

A. The OWNER will occupy the site during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate OWNER usage. Perform the Work so as not to interfere with the OWNER'S operations.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01019

CONTRACT CONSIDERATIONS

PART 1 - GENERAL

1.1 ALLOWANCES

A. Potential Hazardous/Regulated Waste Contingency – Allowance; see Bid Form Line Item 53.

1.2 MEASUREMENT AND PAYMENT – GENERAL

A. Lump Sum Price and Unit Price Schedules, refer to and are the same pay items listed in the Bid Form. They constitute all of the pay items for the completion of the Work. No direct or separate payment will be made for providing miscellaneous temporary or accessory works, plant, services, CONTRACTOR'S or CONTRACTOR'S field offices, layout surveys, job signs, sanitary requirements, testing, safety devices, approval and record drawings, water supplies, power, maintaining traffic, removal of waste, watchmen, bonds, insurance, and all other requirements of the General Conditions and Supplementary Conditions. Compensation for all such services, things and materials shall be included in the prices stipulated for the lump sum and unit price pay items listed on the bid form.

B. Each lump sum and unit bid price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR'S overhead and profit for each separately identified item

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01027

APPLICATION FOR PAYMENT

PART 1 - GENERAL

1.1 SCHEDULE OF VALUES

Submit the "Schedule of Values" to the Construction Administrator at the earliest possible date but no later than (20) twenty Calendar Days after the Contract Start Date.

A. Format and Content: Use the Bid Form as a guide to establish the format for the "Schedule of Values". Provide at least one line item for each of line item on the Bid Form on electronic media printout.

1.

B. Identification: Project identification on the Schedule of Values shall include, but not be limited to, the following:

1. OWNER
2. Project Number
3. Project Name
4. Project Location
5. CONTRACTOR'S name and address.

C. Arrange the "Schedule of Values" in tabular format as required by the OWNER, containing separate columns including, but not limited to, the following Items:

1. Item Number.
2. Description of Work with Related Specification Section or Division Number.
3. Scheduled Values broken down by description number, type material, units of each material.
4. Name of subcontractor.
5. Name of manufacturer or fabricator.
6. Name of supplier.
7. Retainage.
8. Contract sum in sufficient detail.

D. Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

2.

E. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Break principal subcontract amounts down into several line items.

3.

F. Round amounts to nearest whole dollar; the total shall equal the Contract Sum.

4.

G. Unit-Cost Allowances: Show the line-item value of unit-cost allowances, as a product of the unit cost, multiplied by the measured quantity. Estimate quantities from the best indication in the Contract Documents.

5.

H. General Conditions: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete. Include the total cost and proportionate share of general overhead and profit margin for each item.

6.

1. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at the CONTRACTOR'S option.

1.2 APPLICATIONS FOR PAYMENT – GENERAL

Each Application for Payment shall be consistent with previous applications and payments as certified by the ENGINEER and Construction Administrator and paid for by the OWNER. The initial "Application for Payment", the "Application for Payment", at time of "Substantial Completion", and the final "Application for Payment", involve additional requirements.

A. Payment-Application Terms: The OWNER will process monthly progress payments. The CONTRACTOR may submit applications for payment on a monthly basis.

7.

B. Payment-Application Forms: Use the "Application for Payment" form as required by the OWNER. Present the required information on electronic media printout or approved OWNER Form, multiple pages should be used if required.

8.

C. For each item, provide a column including but not limited to the following items:

1. Item Number.
2. Description of Work and Related Specification Section or Division.
3. Scheduled Value, break down by units of material and units of labor.
4. Work completed from previous application.
5. Work completed this period.
6. Materials presently stored.
7. Total completed and stored to date of application,
8. Percentage of Completion.
9. Balance to Finish.
10. Retainage.

D. Application Preparation: Complete every entry on the form. Include execution by a person authorized to sign legal documents on behalf of the CONTRACTOR. The Construction Administrator will return incomplete applications without action.

1. Entries shall match data on the "Schedule of Values".
2. Include amounts of Change Orders issued prior to the last day of the construction period covered by the application.

E. Transmittal: Submit 4 signed and notarized original copies of each Application for Payment to the Construction Administrator by a method ensuring receipt. One copy shall be complete, including waivers of lien and similar attachments, when required.
   1. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to the ENGINEER.

F. Applications for Payment: Administrative actions and submittals, that must precede or coincide with submittal of the first Application for Payment and all subsequent Application for Payments including, but not limited to, the following items:
   1. List of subcontractors and suppliers' name, FEIN/Social Security numbers, and Connecticut Tax Registration Numbers.
   2. List of principal suppliers and fabricators.
   3. Schedule of Values.
   4. CONTRACTOR'S Construction Schedule (preliminary if not final).
   5. Schedule of principal products.
   6. Submittal Schedule (preliminary if not final).
   7. List of CONTRACTOR'S staff assignments.
   8. List of CONTRACTOR'S principal consultants.
   9. Copies of all applicable permits.
   10. Copies of authorizations and licenses from governing authorities for performance of the Work.
   11. Initial as-built survey and damage report, if required.

1.3 APPLICATION FOR PAYMENT AT SUBSTANTIAL COMPLETION

Following issuance of the Certificate of Substantial Completion, submit an Application for Payment form Use the form as required by the OWNER. Present the required information on electronic media printout.

A. This application shall reflect Certificates of Partial Substantial Completion issued previously for OWNER occupancy of designated portions of the Work.

9.

B. Administrative actions and submittals that shall precede or coincide with this application include, but are not limited to, the following:
   1. Occupancy permits and similar approvals.
   2. Warranties (guarantees) and maintenance agreements.
   3. Test/adjust/balance records.
   4. Maintenance instructions.
   5. Meter readings.
   6. Startup performance reports.
   7. Changeover information related to OWNER'S occupancy, use, operation, and maintenance,
   8. Final cleaning.
   9. Application for reduction of retainage and consent of surety.
   10. Advice on shifting insurance coverage.
   11. Final progress photographs.
   12. List of incomplete Work, recognized as exceptions to Engineer's Certificate of Substantial Completion.

1.4 FINAL PAYMENT APPLICATION

A. Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include, but are not limited, to the following:
   C. Completion of Project Closeout requirements.
   D. Completion of list of items remaining to be completed as indicated on the attachment to the Certificate of Substantial Completion.
   E. Ensure that unsettled claims will be settled.
   F. Ensure that incomplete Work is not accepted and will be completed without undue delay.
   G. Transmittal of required Project construction records to the OWNER.
   H. Certified final as-built and topographic survey.
   I. Proof that taxes, fees, and similar obligations were paid.
   J. Removal of temporary facilities and services.
   K. Removal of surplus materials, rubbish, and similar elements.
   L. Change of locks to OWNER'S access.
   M. The requirements of the General Conditions and Supplementary Conditions for Final Acceptance, Final Completion, Final Inspection, and Final Payment.
   N. Completion of "Building CONTRACTOR Reporting Form" as supplied by the OWNER, for all CONTRACTORS, Subcontractors, Vendors, Suppliers, etc. who work on the Contract. The form includes the following information:
   O. CONTRACTOR/Subcontractor name.
   P. FEIN/Social Security Numbers.
   Q. Connecticut Tax Registration Numbers.
   R. Type of work.
   S. Name of business and address.
   T. Remittance address.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01035

MODIFICATION PROCEDURES

PART 1 - GENERAL

10. 1.1 SUMMARY
11.

A. This Section specifies administrative and procedural requirements for handling and processing contract modifications.

1.2 MINOR CHANGES IN THE WORK

A. The ENGINEER, through the Construction Administrator, will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or Contract Time, on the "Supplemental Instructions" form as required by the OWNER.

1.3 PROPOSAL REQUEST

A. ENGINEER/OWNER-Initiated Requests For Proposals: The ENGINEER or OWNER will issue a detailed description of proposed changes in the Work via the Construction Administrator that will require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications. Such requests shall be on a "Proposal Request" form as required by the OWNER.

12.

B. "Proposal Request" is issued for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.

13.

C. Within Fourteen (14) Calendar Days of receipt of a "Proposal Request", submit a "Change Order Proposal" with the required information necessary to execute the change to the Construction Administrator for the ENGINEER'S/OWNER'S review.

14.

D. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
   1. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
   2. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.
   3. The OWNER is tax exempt. All CONTRACTOR and Subcontractor services provided under your contract may not be exempt from taxes. The Department of Revenue Services can guide you as to which services are exempt and which are not. Please contact the State of Connecticut, Department of Revenue Services at 1-800-382-9463 or 566-7033.
   4. Dollar values shown on the Schedule of Values shall not be the governing (or deciding) final amounts for change orders involving either additional charges or deletions.

15.

1.4 REQUESTS FOR INFORMATION

U. In the event that the CONTRACTOR or subcontractor, at any tier, determines that some portion of the drawings, specifications, or other Contract Documents requires clarification or interpretation by the ENGINEER, the CONTRACTOR shall submit a "Request for Information" in writing to the ENGINEER via Construction Administrator. "Requests for Information" may only be submitted by the CONTRACTOR and shall only be submitted on the "Request for Information" forms as required by the OWNER. In the "Request for Information", the CONTRACTOR shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed from the ENGINEER.

1. In the "Request for Information", the CONTRACTOR shall set forth an interpretation or understanding of the requirement along with reasons why such an understanding was reached.
2. The OWNER acknowledges that this is a complex project. Based upon the OWNER'S past experience with projects of similar complexity, the OWNER anticipates that there will probably be some "Requests for Information" on this project.
3. The ENGINEER will review all "Requests for Information" to determine whether they are "Requests for Information" within the meaning of this term. If it is determined that the document is not a "Request for Information", it will be returned to the CONTRACTOR, unreviewed as to content, for resubmittal on the proper form and in the proper manner.
4. A "Requests for Information Response" shall be issued within seven (7) Calendar Days of receipt of the request from the CONTRACTOR unless the OWNER determines that a longer time is necessary to provide an adequate response. If a longer time is determined necessary by the OWNER, the OWNER will, within seven (7) Calendar Days of receipt of the request, notify the CONTRACTOR of the anticipated response time. If the CONTRACTOR submits a "Request for Information" on an activity with seven (7) Calendar Days or less of float on the current project schedule, the CONTRACTOR shall not be entitled to any time extension due to the time it takes the ENGINEER to respond to the request provided that the ENGINEER responds within the seven (7) Calendar Days set forth above.
5. A "Requests for Information Response" from ENGINEER will not change any requirement of the Contract Documents. In the event the CONTRACTOR believes that the "Requests for Information Response" will cause a change to the requirements of the Contract Document, the CONTRACTOR shall immediately give written notice to the Construction Administrator stating that the CONTRACTOR believes the "Requests for Information Response" will result in "Change Order" and the CONTRACTOR intends to submit a "Change Order Proposal" request. Failure to give such written notice immediately shall waive the CONTRACTOR'S right to seek additional time or cost under the requirement these Requirements.

16.

1.5 CHANGE ORDER PROPOSAL

A. When either a "Request for Information" from the CONTRACTOR or a "Proposal Request" from the ENGINEER or OWNER results in conditions that may require modifications to the Contract, the CONTRACTOR may propose changes by submitting a request for a "Change Order Proposal" to the ENGINEER via the Construction Administrator on forms as required by the OWNER. These forms shall also include "Change Order Proposal Worksheets" as required by the OWNER.

1. Include statements outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
2. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities as directed by Article 13 of the General Conditions of the Contract for Construction.
3. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
4. Comply with requirements in Section 01631 Equals and Substitutions if the proposed change requires an equal or substitution of one product or system for a product or system specified.

17.

B. The State of Connecticut construction contract has the following tax exemptions:
1. Purchasing of materials which will be physically incorporated and become a permanent part of the project.
2. Tools, supplies and equipment used in fulfilling the construction contract are not exempt.
3. Services that are resold by the CONTRACTOR are exempt, i.e. if a General CONTRACTOR hires a plumber, carpenter or electrician, a resale certificate may be issued to the subcontractor because these services are considered to be integral and inseparable component parts of the building contract

18.

C. "Change Order Request" Forms: Use "Change Order Proposal" and "Change Order Proposal Worksheets" forms as required by OWNER.

19.

D. "Change Order Proposal" cannot be submitted without either: a prior submission of a "Request for Information" from the CONTRACTOR or as a response to a "Proposal Request" submitted by the ENGINEER or OWNER.

20.

E. Any "Change Order Request" submitted without a prior submittal of a "Request for Information" or as a response to a "Proposal Request" will be immediately rejected and returned to the CONTRACTOR.

21.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. "Construction Change Directive": When the OWNER and the CONTRACTOR disagree on the terms of a "Change Order Proposal" resulting from either a "Request for Information" or "Proposal Request", then the ENGINEER through the Construction Administrator may issue a "Construction Change Directive" on a "Construction Change Directive" as authorized by the OWNER on the form required by the OWNER. The "Construction Change Directive" instructs the CONTRACTOR to proceed with a change in the Work, for subsequent inclusion in a "Change Order".
1. The "Construction Change Directive" contains a complete description of the change in the Work. It also designates the method to be followed to determine change in the Contract Sum or Contract Time.

22.

B. Documentation: The CONTRACTOR shall maintain detailed records on a time and material basis of work required by the "Construction Change Directive".

1. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.
2. The final value shall be negotiated based on the supporting data to determine the value of the work.

23.

1.7 CHANGE ORDER PROCEDURES

A. Upon the OWNER'S approval of a CONTRACTOR'S "Change Order Proposal", the Construction Administrator will issue a "Change Order" for signatures of the ENGINEER, OWNER and the CONTRACTOR on "Change Order" form as required by the OWNER.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01040

COORDINATION

PART 1 - GENERAL

24. 1.1 CONSTRUCTION ADMINISTRATOR

25.

V. The Construction Administrator is identified in Section 01003 Construction Administrator.

W. Construction Mobilization:

1. Cooperate with the Construction Administrator in the allocation of mobilization areas of the site, for field offices and sheds, for OWNER facility access, traffic, and parking facilities.
2. During Construction, coordinate use of site and facilities through the Construction Administrator.
3. Comply with Construction Administrators procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
4. Comply with instructions of the Construction Administrator for use of temporary utilities and construction facilities.

5. Coordinate field engineering layout as specified in Section 01050 “Field Engineering” for work under the instructions of the Construction Administrator.

26. 1.2 CONSTRUCTION OPERATIONS
27.

A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.
   1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
   3. Make provisions to accommodate items scheduled for later installation.

28.

29. 1.3 SPECIAL PROCEDURES
30.

A. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
   31. 1. Prepare similar memoranda for the Construction Administrator, OWNER and separate CONTRACTORS where coordination of their work is required.

32.

33. 1.4 ADMINISTRATIVE PROCEDURES
34.

A. Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1. Preparation of schedules.
   2. Installation and removal of temporary facilities.
   3. Delivery and processing of submittals.
   4. Progress meetings.
   5. Project closeout activities.

35.

36. 1.5 GENERAL COORDINATION PROVISIONS

A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed and coordinate such inspections with the Construction Administrator and authorities having jurisdictions. If unsatisfactory conditions exist notify the Construction Administrator immediately. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. The CONTRACTOR shall coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01045

CUTTING AND PATCHING

PART 1 - GENERAL

A. All cutting, coring and rough patching shall be performed by the CONTRACTOR or subcontractor requiring the opening. Finish patching shall be the responsibility of the CONTRACTOR and shall be performed by the trade associated with the application of the particular finish.

B. Provide cutting, coring, fitting and patching, including attendant excavation and backfill required to complete the Work, or to:
   1. Remove and replace defective Work or Work not conforming to requirements of the Contract Documents.
   2. Remove samples of installed Work as specified or required for testing.
   3. Remove all constructions required to provide for specified alterations or addition to existing work.
   4. Uncover Work to provide for ENGINEER'S observation of covered Work or observation by regulatory agencies having jurisdiction.
   5. Connect to completed Work that was not accomplished in the proper sequence.
   6. Remove or relocate existing utilities and pipes which obstruct the Work in locations where connections must be made.
   7. Make connections or alterations to existing or new facilities.

C. Replace, patch and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials in such a manner as to not void required or existing warranties.

D. Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to fullest extent possible. If identical materials are unavailable or cannot be used, use materials whose installed performance will equal or surpass that of existing materials.

E. Perform all cutting and coring in such a manner as to limit the extent of patching.

F. Core drill all holes to be cut through concrete and masonry walls, slabs or arches, unless otherwise approved.

G. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed before cutting.

H. Report unsatisfactory or questionable conditions to ENGINEER in writing. Do not proceed with work until the ENGINEER has provided further instructions.

I. Provide temporary support as required to maintain structural integrity of Project, to protect adjacent Work from damage during cutting, and to support the work to be cut.

J. Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that will be exposed during cutting and patching operations.
   1. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
   2. Do not cut existing pipe, conduit or ductwork serving facilities scheduled to be removed or relocated until provisions have been made to bypass them.

K. Cut existing construction using methods least likely to damage elements retained or adjoining construction, and that will provide proper surfaces to receive installation or repair.
   1. In general, use hand or small power tools designed for sawing or grinding, not hammering and chopping.
   2. Cut through concrete and masonry using a concrete wall saw with diamond saw blades.
      6. Provide for control, on both sides of walls, of slurry generated by sawing.

L. Patch construction by filling, repairing, refinishing, closing-up and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified, in other Sections of these Specifications.

M. See also General Conditions.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01050

FIELD ENGINEERING

PART 1 - GENERAL

N. Provide field engineering services to establish and record grades, lines and elevations.

O. The CONTRACTOR shall retain a Professional Engineer or Land Surveyor registered by the State of Connecticut acceptable to the CONTRACTOR and the OWNER to lay out the site work and installations and to establish and record the necessary elevations, at no additional cost to the City.

P. The CONTRACTOR shall forward a letter from his Land Surveyor or Professional Engineer stating that the control information furnished by the OWNER, if any, is accurate or shall identify inaccuracies, if they exist. Such letter shall be submitted prior to the start of any construction activities. The CONTRACTOR shall not take advantage of errors, which may be included in the control information. Stakes and markings shall be preserved.

Q. The CONTRACTOR shall:
1. Provide civil, structural or other professional engineering services specified, or required to execute CONTRACTOR'S construction methods.
2. Develop and make all detail surveys and measurements needed for construction including slope stakes, batter boards, piling layouts and all other working lines, elevations and cut sheets.
3. Keep a transit and leveling instrument on the Site at all times and a skilled instrument man available whenever necessary for layout of the Work.
4. Provide all material required for bench marks, control points, batter boards, grade stakes, and other items.
5. Be solely responsible for all locations, dimensions and levels, and for all surveying done at the site. No data other than written orders of the ENGINEER shall justify departure from the dimensions and levels required by the Contract Documents.
6. Rectify all Work improperly installed because of not maintaining, not protecting or removing without authorization such established points, stakes, marks and monuments.
7. Provide such facilities and assistance as may be necessary for ENGINEER to check line and grade points placed by CONTRACTOR. CONTRACTOR shall not do any excavation or embankment work until all cross-sectioning necessary for determining pay quantities has been completed and checked by ENGINEER.
8. CONTRACTOR shall establish two (2) permanent benchmarks and thee (3) survey control points located within and near the perimeter of the landfill in positions unlikely to be disturbed by vehicular traffic or construction operations.
9. CONTRACTOR shall take measures to protect site reference and survey control points prior to starting site work, and must preserve permanent reference points during construction. Site reference points may not be relocated without prior written notice to OWNER.

10. The OWNER shall be immediately notified of loss, damage or destruction of any reference point, or relocation required because of changes in grades or other reasons. CONTRACTOR shall replace disturbed survey control points based on original survey control at no extra cost.
11. X, Y, and Z coordinated of benchmarks and survey control points shall be determined (and recorded) with a maximum permissible error of 0.10 feet (±) in any coordinate direction. All X and Y coordinates are to be referred to the Connecticut State coordinate system (NAD 27). All Z coordinates are to be referred to nearest USGS benchmark with an accuracy of 0.10 feet (±) (NGVD 29).
12. CONTRACTOR shall reference survey and data reference points to permanent benchmarks and record locations of survey control points, with horizontal and vertical data, on Project Record Documents.

R. Employ and retain at the Site a field engineer with experience and capability of performing all engineering tasks required of the CONTRACTOR. Tasks included are:
1. Providing daily construction reports as specified in Section 01300.
2. Furnish all required lines and grades for construction operations.
3. Check all formwork, reinforcing, inserts, structural steel, bolts, sleeves, piping, other materials and equipment.
4. Maintain field office files and drawings, Record Drawings, and coordinate engineering services with Subcontractors. Prepare layout and coordination drawings for construction operations.
5. Check and coordinate Work for conflicts and interferences and immediately advise ENGINEER of all discrepancies noted.
6. Cooperate with ENGINEER in field inspections as required.

S. Records: Maintain a complete, accurate log of all control and survey work as it progresses.

T. On completion of the project, prepare a Certified Final As-built and Topographic Survey showing all dimensions, locations, angles and elevations of construction. The certified survey shall be prepared at a scale of 1”=40’ and be signed by a Land Surveyor licensed in the State of Connecticut. Contractor shall provide three (3) sets of signed and sealed final survey plans and one CD with the electronic version of the final survey plans prepared in Autocad (latest version) with site features on separate layers as appropriate. Detail of mapping shall include, but not be limited to, two (2) foot and ten (10) foot contour intervals of the entire capped landfill, including all stormwater basins, landfill access roads, all stormwater drainage swales, downchutes and other drainage improvements including all appropriate invert elevations.

U. Submittals:
1. Submit name and address of surveyor or ENGINEER to ENGINEER.
2. On request of ENGINEER, submit documentation to verify accuracy of field engineering work.
3. When requested by ENGINEER, submit certificate signed by registered engineer or surveyor certifying that elevations and locations of Work are in conformance with Contract Documents. Explain all deviations.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01095

REFERENCE STANDARDS & DEFINITIONS

PART 1 - GENERAL

V. For products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

W. References to standard specifications and codes refer to the editions current at the bid due date. An exception is, buildings exceeding the threshold limit must be in substantial compliance with the requirements of the effective code at the time of receipt of completed application to the Office of State Building Inspector (OSBI). References include their addenda and errata, if any, and shall be considered a part of these specifications as if they were printed herein in full.

X. The manufacturers' standard warranties or guarantees shall apply when their products are used on this project.

Y. Flame Spread Ratings - all materials that are required or obligated to meet specified standards shall be submitted to the owner for their records as part of the shop drawing submittal process for their construction records.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.1 PRE-CONSTRUCTION CONFERENCE

Z. The CONTRACTOR shall attend a Pre-construction Conference before starting construction, as scheduled by the Construction Administrator convenient to the OWNER, the Construction Administrator, Engineer, and CONTRACTOR. This meeting shall take place within fourteen (14) Calendar Days after the written Notice to Proceed and before the Contract Start Date. Hold the conference at the Project Site or another convenient location as directed by the Construction Administrator. The Construction Administrator shall conduct the Pre-construction Conference to review the CONTRACTOR and Subcontractor responsibilities and personnel assignments.

AA. Attendees: Authorized representatives of the Construction Administrator, OWNER, Engineer, and their consultants; the CONTRACTOR and its superintendent; major subcontractors; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

BB. Agenda: Discuss items of significance that could affect progress, including the following:

7. Tentative construction schedule.
8. Critical work sequencing.
9. Progress meeting schedule.
10. Designation of responsible personnel.
11. Subcontractors.
12. Procedures for processing field decisions and Change Orders.
13. Procedures for processing Applications for Payment.
14. Distribution of Contract Documents.
15. Insurance in force.
16. Schedule of values.
17. Submittal of Shop Drawings, Product Data, and Samples.
18. Preparation of Record Documents.
19. Use of the premises.
20. Parking availability.
21. Office, work, and storage areas.
22. Equipment deliveries and priorities.
23. Safety procedures.
24. First aid.
25. Security.
26. Housekeeping.
27. Working hours.

1.2 PROGRESS MEETINGS

CC. The Construction Administrator will conduct Progress Meetings, bi-weekly, at the Project Site or at regular intervals as agreed upon at the Pre-construction Conference. The Construction Administrator will notify the OWNER, the ENGINEER, the Regulatory Authority, and the CONTRACTOR of the scheduled Progress Meeting dates. Coordinate dates of Progress Meetings with preparation of Application for Payment requests.

DD. Attendees: In addition to representatives of the CONTRACTOR, Construction Administrator, OWNER and the ENGINEER, subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities may be requested to attend these meetings on an as needed basis. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work. The CONTRACTOR shall include the site superintendent as a minimum.

EE. Agenda: Progress Meetings shall review and correct or approve minutes of the previous Progress Meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.

1. Construction Schedule: Review progress since the last Progress Meeting. Determine where each activity is in relation to the required CONTRACTOR'S "Construction Schedule" and whether each activity is on time or ahead or behind Schedule. Determine how Work that is behind Schedule will be expedited; secure commitments from parties involved to do so. Discuss whether Schedule revisions are required to insure that current and subsequent activities will be completed within the Contract Time. Determine if any Change Orders are needed, the status of existing Change Orders, and alterations to the project schedule due to Change Orders.
2. Review the present and future needs of each entity present

FF. Reporting: The Construction Administrator will distribute minutes of the meeting to each party present, promptly and before the next scheduled meeting, and to parties who should have been present.

GG. A schedule of regular Project Meetings will be established at the Pre-construction Conference.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01205

BASE BID PAYMENT ITEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes measurement and payment paragraphs for the following:
   1. Payment items (lump sum and unit price) for the final closure construction.
   2. Bidders must submit a complete bid.
      a. Bidders may be disqualified for submitting more than one proposal in accordance with Instructions to Bidders.
   3. Successful Bids will include the lowest responsible, responsive bidder.
   4. The Owner also reserves the right to reject all Bids.

B. Related Sections include the following:
   1. Division 1 through 16 Sections for detailed procedural, material, and installation requirements associated with the Work of each payment item.

1.3 DEFINITIONS

A. Approximate Quantities: Quantities for Contract Unit Price payment items provided for Contractor's information only. No guarantees are made as to the quantities of the listed elements.

B. Bid: The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

C. Payment Items: The Owner's distribution of the Contract Sum for each Bid through listed work items.
   1. Each payment item description includes an anticipated scope of services. However, not all materials, labor, equipment, or services required to complete the Work are guaranteed to be listed or specified.
   2. Include costs associated with items of work required to complete the defined scope of services within the appropriately specified payment item.
   3. Payment items in the Contractor's bid shall include all necessary labor, equipment, tools, material, plus cost for delivery, installation, applicable taxes, overhead, and profit.

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 BASE BID PAYMENT ITEMS

A. Payment Item No. 1 – Mobilization/Demobilization and Incidental Construction
   1. Work associated with this item will be paid for at the Contract Lump Sum price for site mobilization and demobilization; insurance and bonds; administrative and general conditions and general requirements; temporary security fencing; temporary facilities; field surveys including progress surveys, as-built survey, and other survey services as required

during the course of the project; erosion and sediment control and stormwater management not covered in other bid items; and incidental materials, equipment, tools and labor not covered by other bid items required to complete the Work.

B. Payment Item No. 2 – Street Sweeping and Dust Control

1. Work associated with this item will be paid for at the Contract unit price per month of active construction for street sweeping and dust control as described in the Contract Documents. Furnishing and installing any required equipment and devices (e.g., water tanker) to ensure adequate water for dust control during all applicable phases of construction is included. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

C. Payment Item No. 3 – Clearing and Grubbing

1. Work associated with this item will be paid for at the Contract Lump Sum price for clearing, grubbing, stripping and chipping, as described in Specification Section 02110 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

D. Payment Item No. 4 – Construction Entrances/Anti-Tracking Pads

1. Work associated with this item will be paid for at the Contract Lump Sum price for furnishing and installing construction entrances/anti-tracking pads, including stone and filter fabric, as shown on the Contract Drawings and described in the Specification Section 02112 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

E. Payment Item No. 5 – Subgrade Preparation

1. Work associated with this item will be paid for at the Contract Lump Sum for subgrade preparation as described in Specification Section 02225 and any other applicable portions of the Contract Documents, to the lines and grades shown on the Contract Drawings. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

F. Payment Item No. 6 – Silt Fence with Hay Bales

1. Work associated with this item will be paid for at the Contract unit price per linear foot for furnishing and installing silt fence with hay bales as shown on the Contract Drawings and described in Specification Section 02112 and any other applicable portions of the Contract Documents, along with an allowance for additional silt fencing with hay bales as may be required. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

G. Payment Item No. 7 – Silt Fence

1. Work associated with this item will be paid for at the Contract unit price per linear foot for furnishing and installing silt fence without hay bales as shown on the Contract Drawings and described in Specification Section 02112 and any other applicable portions of the Contract Documents, along with an allowance for additional silt fencing without hay bales

as may be required. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

H. Payment Item No. 8 – Demolition and Abandonment

1. Work associated with this item will be paid for at the Contract Lump Sum price for demolition and abandonment work as described in Specification Section 02050 and any other applicable portions of the Contract Documents, including, but not limited to, demolition of existing buildings, retaining walls, and fencing, plus abandonment of specified monitoring wells. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item. This Item does not include demolition and abandonment work associated with Item No. 34 (existing drain pipe abandonment) or existing salt shed (unless specified otherwise).

I. Payment Item No. 9 – Landfill Cap Subbase Material - Import

1. Work associated with this item will be paid for at the Contract unit price per in-place cubic yard to furnish and deliver cap subbase material from approved offsite source(s) as described in Specification Section 02226 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item. Testing to document the suitability of the material is included in the Item. Cap subbase material from onsite sources is covered separately (see Item No. 26).

J. Payment Item No. 10 – Landfill Cap Subbase Installation

1. Work associated with this item will be paid for at the Contract Lump Sum price to place, compact, test, and otherwise install approved cap subbase material from either onsite or offsite source(s) as shown on the Contract Drawings, and as described in Specification Section 02226 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

K. Payment Item No. 11 – Cap Geosynthetics - Installed

1. Work associated with this item will be paid for at the Contract lump sum price for furnishing, installing, and testing woven and non-woven geotextile, geomembrane, and geocomposite associated with construction of the landfill cap as shown on the Contract Drawings, and as described in Specification Sections 06643 and 06644, and any other applicable portions of the Contract Documents. Testing of the geosynthetics in conjunction with other materials (e.g., interface friction angles) is included in this Item. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item. Turf reinforcement mat (TRM) for the Green Armor System is covered separately (see Item No. 42).

L. Payment Item No. 12 – Interceptor Piping and Materials - Installed

1. Work associated with this item will be paid for at the Contract Lump Sum price for furnishing and installing perforated HDPE interceptor piping, pipe fittings, and cleanouts and specified bedding (pea stone or AASHTO #57 stone) as shown on the Contract

Drawings and as described in Specification Section 02630 and any other applicable portions of the Contract Documents. Excavation, backfilling, and compaction are included. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

M. Payment Item No. 13 – 15" HDPE Drainage Pipe - Installed

1. Work associated with this item will be paid for at the Contract unit price per linear foot for furnishing and installing 15" diameter HDPE drainage pipe and approved sand bedding as shown on the Contract Drawings and as described in Specification Section 02630 and any other applicable portions of the Contract Documents. Excavation, backfilling, and compaction are included. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

N. Payment Item No. 14 – 18" HDPE Drainage Pipe - Installed

1. Work associated with this item will be paid for at the Contract unit price per linear foot for furnishing and installing 18" diameter HDPE drainage pipe and approved sand bedding as shown on the Contract Drawings and as described in Specification Section 02630 and any other applicable portions of the Contract Documents. Excavation, backfilling, and compaction are included. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

O. Payment Item No. 15 – 24" HDPE Drainage Pipe - Installed

1. Work associated with this item will be paid for at the Contract unit price per linear foot for furnishing and installing 24" diameter HDPE drainage pipe and approved sand bedding as shown on the Contract Drawings and as described in Specification Section 02630 and any other applicable portions of the Contract Documents. Excavation, backfilling, and compaction are included. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

P. Payment Item No. 16 – 30" HDPE Drainage Pipe - Installed

1. Work associated with this item will be paid for at the Contract unit price per linear foot for furnishing and installing 30" diameter HDPE drainage pipe and approved sand bedding as shown on the Contract Drawings and as described in Specification Section 02630 and any other applicable portions of the Contract Documents. Excavation, backfilling, and compaction are included. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

Q. Payment Item No. 17 – 36" HDPE Drainage Pipe - Installed

1. Work associated with this item will be paid for at the Contract unit price per linear foot for furnishing and installing 36" diameter HDPE drainage pipe and approved sand bedding as shown on the Contract Drawings and as described in Specification Section 02630 and any other applicable portions of the Contract Documents. Excavation, backfilling, and compaction are included. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

R. Payment Item No. 18 – 48" HDPE Drainage Pipe - Installed

1. Work associated with this item will be paid for at the Contract unit price per linear foot for furnishing and installing 48” diameter HDPE drainage pipe and approved sand bedding as shown on the Contract Drawings and as described in Specification Section 02630 and any other applicable portions of the Contract Documents. Excavation, backfilling, and compaction are included. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

S. Payment Item No. 19 – 30” HDPE Flared End Section - Installed

1. Work associated with this item will be paid for at the Contract unit price per each for furnishing and installing 30” HDPE flared end sections as shown on the Contract Drawings and as described in Specification Section 02630 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

T. Payment Item No. 20 – 36” HDPE Flared End Section - Installed

1. Work associated with this item will be paid for at the Contract unit price per each for furnishing and installing 36” HDPE flared end sections as shown on the Contract Drawings and as described in Specification Section 02630 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

U. Payment Item No. 21 – 36” RCP Wing Type Endwall - Installed

1. Work associated with this item will be paid for at the Contract unit price per each for furnishing and installing 36” RCP Wing Type Endwall as shown on the Contract Drawings and as described in Specification Section 02630 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

V. Payment Item No. 22 – 48” RCP Wing Type Endwall - Installed

1. Work associated with this item will be paid for at the Contract unit price per each for furnishing and installing 48” RCP Wing Type Endwall as shown on the Contract Drawings and as described in Specification Section 02630 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

W. Payment Item No. 23 – Gabion Mattress Splash Pads and Flow Diffusers - Installed

1. Work associated with this item will be paid for at the Contract unit Lump Sum price for furnishing and installing gabion mattress splash pads and flow diffusers as shown on the Contract Drawings. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

X. Payment Item No. 24 – Vegetative Support Soil – Soil Material Import

1. Work associated with this item will be paid for at the Contract unit price per in-place cubic yard to furnish and deliver approved Vegetative Support Soil material from approved offsite source(s) as described in Specification Section 02227 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item. Testing to

document the suitability of the material is included in the Item. Vegetative Support Soil material from onsite sources is covered separately (see Item No. 26).

Y. Payment Item No. 25 – Vegetative Support Soil – Installation/Placement

1. Work associated with this item will be paid for at the Contract Lump Sum price to place, compact, test, and otherwise install approved Vegetative Support Soil material from either onsite or offsite source(s) as shown on the Contract Drawings and described in Specification Section 02227, and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

Z. Payment Item No. 26 – Material Screening – Cap Subbase and Vegetative Support Soil – On-Site Sources

1. Work associated with this item will be paid for at the Contract Lump Sum price to furnish approved cap subbase and vegetative support soil from onsite source(s) as described in Specification Section 02226 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item. Screening and testing of the material to document the suitability of the material is included in the Item.

AA. Payment Item No. 27 – Crushed Stone Access Road – Installed

1. Work associated with this item will be paid for at the Contract Lump Sum price to furnish and install crushed stone access road, including stone from approved offsite source(s) as described in Specification Section 02230, geotextile as described in Section 06645, and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item. Testing to document the suitability of the material is included in the Item.

BB. Payment Item No. 28 – Asphalt Area – Processed Aggregate Pavement Base – Purchase/Deliver

1. Work associated with this item will be paid for at the Contract unit price per in-place cubic yard to furnish and deliver processed aggregate material as described in Specification Section 02514 and any other applicable portions of the Contract Documents, for areas to be paved in the Base Bid.. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item. Testing to document the suitability of the material is included in the Item.

CC. Payment Item No. 29 – Asphalt Area – Processed Aggregate Pavement Base – Installation/Placement

1. Work associated with this item will be paid for at the Contract unit price per in-place cubic yard to place compact, test, and otherwise install processed aggregate material as shown on the Contract Drawings and as described in Specification Section 02514 and any other applicable portions of the Contract Documents, for areas to be paved in the Base Bid. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

DD. Payment Item No. 30 – Asphalt Area – CTDOT Subbase Material – Purchase/Deliver

1. Work associated with this item will be paid for at the Contract unit price per in-place cubic yard to furnish and deliver CDOT paving subbase material as described in Specification Section 02514 and any other applicable portions of the Contract Documents, for areas to be paved in the Base Bid. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item. Testing to document the suitability of the material is included in the Item.

EE. Payment Item No. 31 – Asphalt Area – CTDOT Subbase Material – Installation/Placement

1. Work associated with this item will be paid for at the Contract unit price per in-place cubic yard to place compact, test, and otherwise install CDOT paving subbase material as shown on the Contract Drawings, and as described in Specification Section 02514 and any other applicable portions of the Contract Documents, for areas to be paved in the Base Bid. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

FF. Payment Item No. 32 – Asphalt Paving – Bituminous Concrete - Installed

1. Work associated with this item will be paid for at the Contract unit price per square foot to furnish and install base bid asphalt pavement (1-1/2" Class 2 CTDOT over 1-1/2" Class 1 CTDOT bituminous pavement) as shown on the Contract Drawings and described in Specification Section 02514 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item. Paving for the future recycling area is not included this Item.

GG. Payment Item No. 33 – Asphalt Curbing – Bituminous Concrete Curbing - Installed

1. Work associated with this item will be paid for at the Contract unit price per linear foot to furnish and install base bid asphalt curbing as shown on the Contract Drawings and described in Specification Section 02514 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item. Curbing for the future recycling area is not included this Item.

HH. Payment Item No. 34 – Pipe Abandonment (Existing Pond Drain Line)

1. Work associated with this item will be paid for at the Contract Lump Sum price to abandon the existing pond drain line shown on the Contract Drawings by grouting as described in Specification Section 02050 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

II. Payment Item No. 35 – Pre-Cast Concrete Manholes – 4' Diameter - Installed

1. Work associated with this item will be paid for at the Contract unit price per each to furnish and install 4-foot diameter, pre-cast concrete manholes as shown on the Contract Drawings and as described in Specification Section 02630 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

JJ. Payment Item No. 36 – Pre-Cast Concrete Manholes – 5' Diameter - Installed

1. Work associated with this item will be paid for at the Contract unit price per each to furnish and install 5-foot diameter, pre-cast concrete manholes as shown on the Contract Drawings and as described in Specification Section 02630 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

KK. Payment Item No. 37 – Pre-Cast Concrete Manholes – 6' Diameter - Installed

1. Work associated with this item will be paid for at the Contract unit price per each to furnish and install 6-foot diameter, pre-cast concrete manholes as shown on the Contract Drawings and as described in Specification Section 02630 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

LL. Payment Item No. 38 – Pre-Cast Concrete Manholes – 7' Diameter - Installed

1. Work associated with this item will be paid for at the Contract unit price per each to furnish and install 7-foot diameter, pre-cast concrete manholes as shown on the Contract Drawings and as described in Specification Section 02630 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

MM. Payment Item No. 39 – Pre-Cast Concrete Catch Basins – Single Type C and Type C-L - Installed

1. Work associated with this item will be paid for at the Contract unit price per each to furnish and install Type C and Type C-L pre-cast concrete catch basins as shown on the Contract Drawings and as described in Specification Section 02630 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

NN. Payment Item No. 40 – Pre-Cast Concrete Catch Basins – Double Type C-L - Installed

1. Work associated with this item will be paid for at the Contract unit price per each to furnish and install double Type C-L pre-cast concrete catch basins as shown on the Contract Drawings and as described in Specification Section 02630 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

OO. Payment Item No. 41 – Hydrodynamic Separators - Installed

1. Work associated with this item will be paid for at the Contract Lump Sum price for furnishing and installing hydrodynamic separators as shown on the Contract Drawings and as described in Specification Section 02630 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

PP. Payment Item No. 42 – Green Armor System - Installed

1. Work associated with this item will be paid for at the Contract unit price per square yard to furnish and install Green Armor System where shown on the Contract Drawings and as described in applicable portions of the Contract Documents, including Specification Sections 06642, 02630, and 02900. Green Armor System shall be defined to consist of turf

reinforcing mat (TRM) infilled by hydroseeding using flexible growth medium (FGM) including required amendments. Seed mixture shall be as specified by area. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

QQ. Payment Item No. 43 – Fiber Filtration Tubes - Installed

1. Work associated with this item will be paid for at the Contract unit price per linear foot to furnish and install fiber filtration tubes as shown on the Contract Drawings and as described in Specification Section 02112 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

RR. Payment Item No. 44 – Hydroseeding with Flexible Growth Medium - Installed

1. Work associated with this item will be paid for at the Contract unit price per square yard to furnish and install hydroseeding with flexible growth medium (FGM) and turf establishment in indicated areas (exclusive of those covered under Item No. 44, Green Armor System) including all applicable components (flexible growth media, seed and soil amendments) as shown on the Contract Drawings and as described in Specification Section 02900 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

SS. Payment Item No. 45 – Modified Riprap – Installation/Placement

1. Work associated with this item will be paid for at the Contract unit price per in-place cubic yard to furnish and install modified riprap as shown on the Contract Drawings and as described in Specification Section 02271 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

TT. Payment Item No. 46 –Soil-Filled Modified Riprap – Installation/Placement

1. Work associated with this item will be paid for at the Contract unit price per in-place cubic yard to furnish and install soil-filled modified riprap as shown on the Contract Drawings and as described in Specification Section 02271 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

UU. Payment Item No. 47 – Bioretention Basin Outlet Structures and Basin Construction - Installed

1. Work associated with this item will be paid for at the Contract Lump Sum price to furnish and install bioretention basins (above the geosynthetic materials) with pre-cast concrete outlet structures and appurtenances as shown on the Contract Drawings and described in Specification Section 02630 and any other applicable portions of the Contract Documents. Furnishing, delivering, and installing bioretention basin media as described in Specification Section 02630 is included in this Item. Installing and establishing bioretention basin plantings as shown on Drawing L-1. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

VV. Payment Item No. 48 – Landfill Gas Passive Vent Wells - Installed

1. Work associated with this item will be paid for at the Contract unit price per each to furnish and install landfill gas passive vent wells as shown on the Contract Drawings and described in Specification Section 02610 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

WW. Payment Item No. 49 – Overburden Groundwater Monitoring Wells - Installed

1. Work associated with this item will be paid for at the Contract unit price per each to furnish and install overburden monitoring wells up to twenty (20) feet deep as shown on the Contract Drawings and described in Specification Section 02730 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

XX. Payment Item No. 50 – Bedrock Groundwater Monitoring Wells - Installed

1. Work associated with this item will be paid for at the Contract unit price per each to furnish and install bedrock monitoring wells up to sixty (60) feet deep as shown on the Contract Drawings and described in Specification Section 02730 and any other applicable portions of the Contract Documents. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

YY. Payment Item No. 51 – Maintenance of Temporary Sedimentation Basin During Construction

1. Work associated with this item will be paid for at the Contract Lump Sum price to maintain the temporary sedimentation basins during the project as described in the Contract Drawings. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item.

ZZ. Payment Item No. 52 – Site Improvements

1. Work associated with this item will be paid for at the Contract Lump Sum price to install the base bid site improvements associated with the new Leaf Transfer Area, including, but not limited to, truck scale with access ramp, relocating existing field trailer, and furnishing and installing concrete barriers. Incidental materials, equipment, tools, and labor not covered by other bid items but required to complete the Work are included in this Item. Installation of asphalt paving and curbing is not included in this Item (see Item Nos. 32 and 33) nor is fencing around the public works area.

AAA. Payment Item No. 53 –Potential Hazardous/Regulated Waste Contingency

1. This item provides a not-to-exceed allowance as a contingency for testing, handling, transportation, and disposal of hazardous waste and regulated waste, as may be potentially encountered during project activities, in accordance with applicable federal, State, and local regulations. Sample collection and laboratory analysis for materials characterization as required for waste handling and/or disposal is included in this item. Associated health and safety provisions are included in this item, including, but not limited to, exposure assessments, hazard analysis, and monitoring; PPE upgrades; and, decontamination of equipment and personnel. Proper offsite disposal of waste and spent PPE is included in this item. Waste covered under this item may include RCRA or TSCA-regulated hazardous waste, or Connecticut regulated waste including, but not limited to, asbestos containing materials (ACM). Incidental materials, equipment, tools, and labor not covered by other bid

items but required to complete the Work are included in this Item. Payment to be made on basis of actual, documented time and materials.

END OF SECTION

SECTION 01206

PAYMENT ITEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes measurement and payment paragraphs for the following:
1. Payment items (lump sum and unit price) for supplemental construction items associated with the landfill closure.
2. Bidders must submit a complete bid.
   a. Bidders may be disqualified for submitting more than one proposal in accordance with Instructions to Bidders.
3. Successful Bids will include the lowest responsible, responsive bidder.
4. The Owner also reserves the right to reject all Bids.

B. Related Sections include the following:
1. Division 1 through 16 Sections for detailed procedural, material, and installation requirements associated with the Work of each payment item.

1.3 DEFINITIONS

A. Approximate Quantities: Quantities for Contract Unit Price payment items provided for Contractor's information only. No guarantees are made as to the quantities of the listed elements.

B. Bid: The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

C. Payment Items: The Owner's distribution of the Contract Sum for each Bid through listed work items.
1. Each payment item description includes an anticipated scope of services. However, not all materials, labor, equipment, or services required to complete the Work are guaranteed to be listed or specified.

2. Include costs associated with items of work required to complete the defined scope of services within the appropriately specified payment item.
3. Payment items in the Contractor's bid shall include all necessary labor, equipment, tools, material, plus cost for delivery, installation, applicable taxes, overhead, and profit.

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 BASED BID PAYMENT ITEMS

A. Payment Item No. LA-1 – Utilities

1. Work associated with this item will be paid for at the Contract Lump Sum price for furnishing and installing electrical and water utility services as denoted in the plans and specifications. Work includes installation of electrical conduit and associated conductors, electrical meter and panel, water service, tap, water meter, backflow preventer, copper and pvc piping trenching, excavation and backfill, 24" x 24" concrete handhole boxes, fees to utility companies, inspections and all work and materials necessary, and all work incidental thereto, in accordance with the plans and specifications, to the satisfaction of the City of Stamford.

B. Payment Item No. LA-2 – Concrete Three-Rail Fence

1. The quantity of Concrete Three-Rail Fence to be paid for under this item shall be the number of **LINEAR FEET** of Concrete Three-Rail Fence furnished and placed in accordance with the plans and specifications, to the satisfaction of the City of Stamford. The price bid for Concrete Three-Rail Fence shall be a unit price per **LINEAR FOOT** and shall include the cost of all labor, material and equipment to furnish and install Concrete Three-Rail Fence including excavation, concrete footings and all incidental expenses necessary to complete the work in accordance with the plans and specifications, to the satisfaction of the City of Stamford.

C. Payment Item No. LA-3 – Steel Vehicle Gate

1. Work associated with this item will be paid for at the Contract price for EACH Steel Vehicle Gate. The quantity of T Steel Vehicle Gate to be paid for shall be the number of **EACH** size (including both leaves of double gates and gate posts) furnished and erected complete in accordance with the plans, specifications, and directions of the Engineer, including concrete footings, excavation and backfill, and gate stops.

D. Payment Item No. LA-4 – 16' Light Duty Gate

1. Work associated with this item will be paid for at the Contract price for EACH 16' Light Duty Gate. The quantity of 16' Light Duty Gate to be paid for shall be the number of **EACH** size (including both leaves of double gates and gate posts) furnished and erected complete in accordance with the plans, specifications, and directions of the Engineer, including concrete footings, excavation and backfill, and gate stops.

E. Payment Item No. LA-5 – Light Pole Foundation

1. Work associated with this item will be paid for at the Contract Unit Price for EACH Light Pole Foundation installed as described on drawing L-2. The Price for Each Light Pole Foundation shall include excavation, concrete and backfill as described in Contract Documents and as per the directions of the Engineer, to the satisfaction of the City of Stamford.

F. Payment Item No. LA-6 – Soil Mixture

1. Work associated with this item will be paid for at the Contract Lump Sum price for furnishing and installing Soil Mixture as described in contract drawing L-2, Soil Management Plan, and specification 02705, Manufactured Topsoil as denoted in the plans and specifications. Work includes furnishing, mixing, testing, and installation of materials, all work and materials necessary, and all work incidental thereto, in accordance with the plans and specifications, to the satisfaction of the City of Stamford. Manufactured Topsoil shall be installed in lieu of Topsoil identified in Contract documents.

G. Payment Item No. LA-7 – Planting Plan

1. Work associated with this item will be paid for at the Contract Lump Sum price for furnishing and installing trees, shrubs, perennials, plants, seed mixes and other noted plant material Plant Schedule and Seed Mix Description per the Planting Plan, Sheet L-1 of the Contract drawings. Work shall include the cost of furnishing plants, mycorrhizal inoculant, slow-release fertilizer tablets, compost, shrub beds, and perennial or groundcover beds, and irrigation bags (for trees), inspecting, planting, staking, anchoring, watering, replacing, and maintaining all plant material and all work incidental thereto, in accordance with the plans and specifications, to the satisfaction of the City of Stamford.

H. Payment Item No. LA-8 –Three-Rail Timber Fence

1. The quantity of Three-Rail Timber Fence to be paid for under this item shall be the **credit given as Deduct Alternate 1** for the number of **LINEAR FEET** of Concrete Three-Rail Fence furnished and placed in accordance with the plans and specifications, to the satisfaction of the City of Stamford. **Less** the price bid for Three-Rail Timber Fence shall be a unit price per **LINEAR FOOT** and shall include the cost of all labor, material and equipment to furnish and install Three-Rail Timber Fence including excavation, and all incidental expenses necessary to complete the work in accordance with the plans and specifications, to the satisfaction of the City of Stamford. **The net price shall be a credit given to the Owner for the acceptance of timber vs concrete fencing**

I. Payment Item No. LA-9 – Temporary Irrigation System

1. Work associated with this item will be paid for at the Contract Lump Sum price for furnishing and installing Temporary Irrigation System in areas as denoted on Sheet L-2, and as per specifications for Temporary Irrigation. Work shall include the cost of furnishing materials, excavation and backfill, controller conductors, programming of system, inspection of system, connections to new water service and all work incidental thereto, in accordance with the plans and specifications, to the satisfaction of the City of Stamford.

J. Payment Item No. LA-10 –5’ Wide Asphalt Path

1. The quantity of 5’ Wide Asphalt Path to be paid for under this item shall be the number of **LINEAR FEET** of 5’ Wide Asphalt Path furnished and placed in accordance with the

plans and specifications, to the satisfaction of the City of Stamford. The price bid for 5' Wide Asphalt Path shall be a unit price per **LINEAR FOOT** and shall include the cost of all labor, material and equipment to furnish and install 5' Wide Asphalt Path including excavation, asphalt, base material and all incidental expenses necessary to complete the work in accordance with the plans and specifications, to the satisfaction of the City of Stamford.

K. Payment Item No. LA-11 – Scofieldtown Park Entry

1. Work associated with this item will be paid for at the Contract Lump Sum price for furnishing and installing Scofieldtown Park Entry, as identified in Detail No. 1, sheet L-3 of Contract docuemtns. Work shall include the cost of furnishing materials, excavation and backfill, supplemental manufactured topsoil, plantings, stone wall and columns, turf seed, granite curb and all work incidental thereto, in accordance with the plans and specifications, to the satisfaction of the City of Stamford. .

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY

HH. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including but not limited to the following:
1. Submittal schedule.
2. Shop Drawings.
3. Product Data.
4. Samples.
5. Quality assurance submittals.
6. Proposed "Substitutions Request" form.
7. Warrantee samples.
8. Coordination Drawings.
9. O & M Manuals.
10. Health and Safety Plan. CONTRACTOR shall prepare a Health and Safety Plan to address potential hazards to the on-site personnel and the surrounding community.

1.2 ADMINISTRATIVE SUBMITTALS

II. Refer to other Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:
1. Permits.
2. Applications for Payment.
3. Performance and payment bonds.
4. CONTRACTOR'S construction schedule.
5. Daily construction reports.
6. Construction Photographs.
7. Insurance certificates.
8. List of subcontractors.
9. Subcontractors/Suppliers FEIN #'s and Connecticut tax registration #.

1.3 DEFINITIONS

JJ. Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended and as identified in the Specification Division 2 through 16.
1. Preparation of Coordination Drawings is specified in Division 1 Section "Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.

KK. Field samples are full-size physical examples erected on-site to illustrate finishes, coatings, or finish materials. Field samples are used to establish the standard by which the Work will be judged.

LL. Mockups are full-size assemblies for review of construction, coordination, testing, or operation; they are not Samples.

1.4 SUBMITTAL PROCEDURES

MM. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

NN. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals. and related activities that requires sequential activity.

OO. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.

PP. The ENGINEER reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.

QQ. The ENGINEER reserves the right to reject incomplete submitted packages.

RR. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.
1. Allow (2) two weeks for initial review. Allow additional time if the ENGINEER must delay processing to permit coordination with subsequent submittals.
2. If an intermediate submittal is necessary, process the same as the initial submittal.
3. Allow (2) two weeks for reprocessing each submittal.
4. No extension of Contract Time will be authorized because of failure to transmit submittals to the ENGINEER sufficiently in advance of the Work to permit processing.

1.5 SUBMITTAL PREPARATION

SS. Place a permanent label, title block or 8-1/2 inches x 11 inches cover page approved by the ENGINEER, on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
1. The minimum number of copies required for each submittal shall be at a minimum 4 copies or as determined otherwise at the pre-construction conference or by the Construction Administrator.
2. Provide a space approximately 4 inches by 5 inches on the label, beside the title block or on the cover page on Shop Drawings to record the CONTRACTOR'S review and approval markings and the action taken.
3. Include the following information on the label for processing and recording action taken.
   a. Project Name and State of Connecticut Project Number.

b. Date.
c. Name and address of the ENGINEER, Construction Administrator, and Owner Representative.
d. Name and address of the CONTRACTOR.
e. Name and address of the subcontractor.
f. Name and address of the supplier.
g. Name of the manufacturer.
h. Number and title of appropriate Specification Section.
i. Drawing number and detail references, as appropriate.
j. Indicate either initial or resubmittal.
k. Indicate deviations from Contract Documents.
l. Indicate if "equal" or "substitution".

1.6 SUBMITTAL TRANSMITTAL

TT. Package each submittal appropriately for transmittal and handling. Transmit each submittal from the CONTRACTOR to the ENGINEER using a transmittal form. Copy the Construction Administrator on the transmittal. The ENGINEER will return all submittals to the CONTRACTOR after action is taken with a complete copy of the submittal package and one complete copy of the submittal package. The ENGINEER will not accept submittals received from sources other than the CONTRACTOR.

1. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including variations and limitations. Include CONTRACTOR'S certification that information complies with Contract Document requirements.

1.7 SUBMITTAL SCHEDULE

UU. After development and review by the Owner and ENGINEER acceptance of the CONTRACTOR'S Construction Schedule prepare a complete schedule of submittals. Submit the schedule to the Construction Administrator within 30 days of Contract Award.

VV. Coordinate Submittal Schedule with the list of subcontracts, Schedule of Values, and the list of products as well as the CONTRACTOR'S Construction Schedule

WW. Prepare the schedule in chronological order. Provide the following information:

1. Schedule date for the initial submittal.
2. Related section number.
3. Submittal category (Shop Drawings, Product Data, or Samples).
4. Name of Subcontractor.
5. Description of the part of Work covered.
6. Scheduled date for resubmittal.
7. Scheduled date for the ENGINEER'S final release of approval.

1.7 DISTRIBUTION

XX. Following response to the initial submittal, print and distribute copies to the Construction Administrator, ENGINEER, OWNER, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.
1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.

1.8 SCHEDULE UPDATING

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

1.9 DAILY CONSTRUCTION REPORTS

ZZ. Prepare a daily construction report recording the following information concerning events at the site, and submit duplicate copies to the Construction Administrator at weekly intervals:
1. List of subcontractors at the site.
2. Approximate count of personnel at the site.
3. Breakdown of employees by trade.
4. High and low temperatures, general weather conditions.
5. Accidents and unusual events or safety violations.
6. Meetings and significant decisions.
7. Stoppages, delays, shortages, and losses.
8. Meter readings and similar recordings.
9. List of equipment on site and identify if idle or in use.
10. Location of all areas in which construction was done,
11. Materials and equipment received,
12. Work, inspections and tests performed,
13. Orders and requests of governing authorities.
14. Change Orders received, start and end dates,
15. Services connected, disconnected.
16. Equipment or system tests and startups,
17. Partial Completion’s, occupancies,
18. Substantial Completion’s authorized,
19. Equals or Substitutions approved or rejected.

1.10 SHOP DRAWINGS

AAA. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.

BBB. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings. Include the following information:

1. Dimensions.
2. Identification of products and materials included by sheet and detail number.
3. Compliance with specified standards.
4. Notation of coordination requirements.
5. Notation of dimensions established by field measurement.
6. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 36 by 48 inches.
7. Submit one (1) reproducible media and seven (7) prints as directed by the Construction Administrator. The CONTRACTOR'S submittal shall identify the specification section and/or drawing number applicable to the submittal.
8. Details shall be large scale and/or full size.

CCC. The CONTRACTOR shall review the Shop Drawings, stamp with this approval, and submit them with reasonable promptness and in orderly sequence so as to cause no delay in his Work or in the Work of any subcontractor. Shop Drawings shall be properly identified as specified for item, material, workmanship, and project number. At the submission, the CONTRACTOR shall inform the ENGINEER, in writing of any deviation in the shop drawings from the requirements of the Contract Documents.

DDD. The ENGINEER will review and comment on shop drawings with reasonable promptness so as to cause no delay, but only for conformance with the design concept of the project and with the information given in the Contract Documents. Refer to Article 5 of General Conditions. Shop Drawings received by the ENGINEER that indicate insufficient study of drawings and specifications, illegible portions or gross errors, will be rejected outright. Such rejections shall not constitute an acceptable reason for granting the CONTRACTOR additional time to perform the work.

EEE. The CONTRACTOR shall make any corrections required by the ENGINEER and shall resubmit the required number of corrected copies of shop drawings until fully reviewed.

FFF. Upon final review submit four (4) additional prints, same as submitted, to the Construction Administrator for his use.

GGG. The ENGINEER'S review and comments on shop drawings shall not relieve the CONTRACTOR of responsibility for any deviation from the requirements of the Contract Documents.

HHH. Only final reviewed shop drawings are to be used on the project site.

III. The Work installed shall be reviewed in accordance with the shop drawings and the drawings and specifications. Final Review of the shop drawings by the ENGINEER shall constitute acceptance by the City and the ENGINEER of a variation or departure that is clearly identified. Final reviewed shop drawings shall not replace or be used as a vehicle to issue or incorporate change orders.

1.11 PRODUCT DATA

JJJ. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, schedules, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.

KKK. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:

1. Manufacturer's printed recommendations.
2. Compliance with trade association standards.
3. Compliance with recognized testing agency standards.
4. Application of testing agency labels and seals.
5. Notation of dimensions verified by field measurement.
6. Notation of coordination requirements.

LLL. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.

MMM. Preliminary Submittal: Submit a preliminary single copy of Product Data where selection of options is required.

NNN. Submittals: Submit 4 copies of each required submittal; submit 5 copies where required for maintenance manuals. The ENGINEER will retain one and will return the other marked with action taken and corrections or modifications required.

1. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.

OOO. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.

1. Do not proceed with installation until a copy of Product Data is in the Installer's possession.
2. Do not permit use of unmarked copies of Product Data in connection with construction.

1.12 SAMPLES

PPP. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.

QQQ. Store, mount or display Samples on site in the manner to facilitate review of qualities indicated. Prepare Samples to match the ENGINEER'S sample. Include the following:

1. Specification Section number and reference.
2. Generic description of the Sample.
3. Sample source.
4. Product name or name of the manufacturer.
5. Compliance with recognized standards.

6. Availability and delivery time.

RRR. Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.

1. Where variation in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least three (3) multiple units that show approximate limits of the variations.
2. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
3. Refer to other Sections for Samples to be returned to the CONTRACTOR for incorporation in the Work. Such Samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample submittals.
4. Samples not incorporated into the Work, or otherwise designated as the OWNER'S property, are the property of the CONTRACTOR and shall be removed from the site prior to substantial completion.

SSS. Preliminary Submittals: Submit a full set of choices where Samples are submitted for selection of color, pattern, texture, or similar characteristics from a range of standard choices, unless otherwise noted in specification section.

1. The ENGINEER will review and return preliminary submittals with the Engineer's notation, indicating selection and other action.

TTT. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit three (3) sets. The ENGINEER will return one set marked with the action taken.

UUU. Maintain sets of Samples, as returned, at the Project Site, for quality comparisons throughout the course of construction.

1. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
2. Sample sets may be used to obtain final acceptance of the construction associated with each set.

VVV. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.

1. Field samples are full-size examples erected on-site to illustrate finishes, coatings, or finish materials and to establish the Project standard.

1.13 QUALITY ASSURANCE SUBMITTALS

WWW. Submit quality-control submittals, including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.

XXX. Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.
1. Signature: Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.

YYY. Inspection and Test Reports: Requirements for submittal of inspection and test reports from independent testing agencies are specified in Division 1 Section "Quality Control."

1.14 ENGINEER'S ACTION

ZZZ. Except for submittals for the record or information, where action and return is required, the ENGINEER will review each submittal, mark to indicate action taken, and return promptly.
1. Compliance with specified characteristics is the CONTRACTOR'S responsibility.

AAAA. Action Stamp: The ENGINEER will stamp each submittal with a uniform, action stamp. The ENGINEER will mark the stamp appropriately to indicate the action taken, as follows:
1. Final Unrestricted Release: When the ENGINEER marks a submittal "Approved for fabrication," the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
2. Final-But-Restricted Release: When the ENGINEER marks a submittal "Incorporate Notations," the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Submit corrected copies for record. Final payment depends on that compliance.
3. Returned for Resubmittal: When the ENGINEER marks a submittal "Rejected, or Revise and Resubmit," do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.
4. Do not use, or allow others to use, submittals marked "Rejected, or Revise and Resubmit" at the Project Site or elsewhere where Work is in progress.
5. Other Action: Where a submittal is for information or record purposes or special processing or other activity, the ENGINEER will return the submittal marked "Action Not Required."

BBBB. Unsolicited Submittals: The ENGINEER will discard unsolicited submittals without action.

1.15 CUTTING AND PATCHING

CCCC. Submit a written request to ENGINEER well in advance of executing any cutting or alteration which affects:
1. Design function or intent of Project.
2. Work of OWNER or any other CONTRACTOR.
3. Structural value or integrity of any element of the Project.
4. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
5. Efficiency, operational life, maintenance or safety of operational elements.
6. Visual qualities of sight-exposed elements.

DDDD. Request shall include:

1. Identification of Project.
2. Description of affected Work of CONTRACTOR and work of others.
3. Necessity for cutting.
4. Effect on work of OWNER or any other CONTRACTOR, or on structural or weatherproof integrity of Project.
5. Description of proposed Work, describing:
   a. Scope of cutting and patching.
   b. Trades who will be executing the work.
   c. Products proposed to be used.
   d. Extent of refinishing.
   e. Schedule of operations.
6. Alternatives to cutting and patching, if any.
7. Designation of party responsible for cost of cutting and patching, when applicable,
8. Written permission of any other CONTRACTOR whose work will be affected.

EEEE. Should conditions of Work, or schedule, indicate a change of materials or methods, submit written recommendation to ENGINEER, including:

1. Conditions indicating change.
2. Recommendations for alternative materials or methods.
3. Submittals as required for substitutions.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01310

CONSTRUCTION SCHEDULES

PART 1 - GENERAL

1.1 DEFINITIONS

FFFF. Construction Schedule: A method of planning and scheduling a construction project utilizing a horizontal bar chart with a separate bar for each major portion of the Work or operation to make the schedule an effective tool for planning and monitoring the progress of the work.

1.2 FORMAT

GGGG. Format: Utilize a horizontal bar chart (gantt) with a separate bar for each major portion of the Work or operation, identifying first work day of each week.

HHHH. Program: Use Microsoft Project, latest version, or approved equal.

IIII. Sequence of Listings: Utilize the Table of Contents of this Project Manual and the chronological order of the start of each item of work.

JJJJ. Scale and Spacing: Provide space for notations and revisions.

KKKK. Sheet Size: To be coordinated with Construction Administrator.

1.3 QUALITY ASSURANCE

The Contractor's Consultant: Retain a consultant to provide planning, evaluating, and reporting by CPM scheduling.

LLLL. In-House Option: The OWNER may waive the requirement to retain a consultant if the CONTRACTOR can demonstrate that:

1. The CONTRACTOR has the computer equipment required to produce construction schedules.
2. The CONTRACTOR employs skilled personnel with experience in construction scheduling and reporting techniques.

MMMM. Program: Use Microsoft Project compatible, latest version, or approved equal.

NNNN. Standards: Comply with procedures contained in the Associated General Contractors (AGC's) "Construction Planning & Scheduling."

1.4 CONTENT

OOOO. Show complete sequence of construction by activity, with dates beginning and completion of each element of construction.

PPPP. Identify each item by specification section number.

QQQQ. Identify work of separate phases other and other logically grouped activities.

RRRR. Show accumulated percentages of completion of each item, and total percentage of Work completed, as of the first day of each month.

SSSS. Provide separate schedule of submittal dates for shop drawings, product data, and samples, OWNER furnished products and any products identified as under Allowances, and dates reviewed submittals will be required from ENGINEER. Indicate decision dates for selection of finishes.

TTTT. Indicate delivery dates for OWNER furnished products and any products identified as under Allowances.

UUUU. Coordinate content with Schedule of Values specified in Section 01027.

1.5 SUBMITTALS AND REVISIONS TO SCHEDULES

VVVV. Indicate progress of each activity to date of submittal, and projected completion date of each activity.

WWWW. Identify activities modified since previous submittal, major changes in scope, other identifiable changes.

XXXX. Provide narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect.

YYYY. An initial bar graph (gantt) schedule is to be prepared by the General CONTRACTOR and submitted to the Construction Administrator within seven (7) calendar days of award of contract. This schedule is to cover all items of work from the start of the project up to the completion of the project. After review, resubmit required revised data within five (5) calendar days. This schedule must be revised monthly and when the actual schedule of significant items varies more than one (1) week from the proposed schedule.

ZZZZ. Submit revised Construction Schedules each Application for Payment.

AAAAA. Submit four (4) copies of the Construction Schedule to the Construction Administrator.

1.6 DISTRIBUTION

BBBBB. Distribute copies of the Construction Schedules to Construction Administrator, ENGINEER, OWNER, Subcontractors, suppliers, and other concerned parties.

CCCCC. Instruct recipients to promptly report, in writing, problem anticipated by projections indicated in schedules.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01320

HEALTH, SAFETY, AND EMERGENCY RESPONSE

PART I - GENERAL

1.1 SUMMARY

A. This specification describes certain minimum health, safety, and emergency response requirements to be used during the Scofieldtown Park Landfill Closure project. The specification describes the required development, implementation, and enforcement of the Site Safety and Health Plan (SSHP) by the CONTRACTOR. The Health, Safety, and Emergency Response Specification also details key health and safety personnel and their responsibilities, hazard assessment, employee training requirements, personal protective equipment (PPE), on-site personnel medical surveillance programs, and specific site health and safety operating procedures.

B. The submission of a Bid shall constitute that the CONTRACTOR certifies that he is experienced and qualified to anticipate and meet the safety and health requirements of this project.

1.2 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced The publications are referred to in the text by the basis designation only.

1. Code of Federal Regulations (CFR)
   - a. 29 CFR 1000 Air Contaminants (PELs)
   - b. 29 CFR 1910 Occupational Safety and Health Standards
   - c. 29 CFR 1910.1200 Hazard Communication
   - d. 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response
   - e. 29 CFR 1910.132 Subpart I, Personal Protective Equipment
   - f. 29 CFR 1910.146 Permit-Required Confined Spaces
   - g. 29 CFR 1910.147 Control of Hazardous Energy
   - h. 29 CFR 1926 Safety and Health Regulations for Construction
   - i. 29 CFR 1926 Subpart P Excavations
   - j. 29 CFR 1926 Subpart T Demolition
   - k. 29 CFR 1926 Subpart V Tagout and Lockout Procedures
   - l. 29 CFR 1926.65 Hazardous Waste Operations and Emergency Response
   - m. 40 CFR 171-179 General Information, Regulations, and Definitions
   - n. 49 CFR 172 Hazardous Materials, Tables, and Hazardous Materials Communications Regulations
   - o. 40 CFR 178 Shipping Container Specification
   - p. 40 CFR 261 Identification and Listing of Hazardous Waste
   - q. 40 CFR 262 Generators of Hazardous Waste
   - r. 40 CFR 263 Transporters of Hazardous Waste

2. Connecticut Council on Soil and Water Conservation (CCSWC)
   a. CCSWC GSESC — Connecticut Guidelines for Soil Erosion and Sediment Control, latest edition
3. Connecticut General Statutes (CGS)
   a. CGS 29-401 - CGS 29-415 — State of Connecticut Demolition Code
4. National Fire Protection Association (NFPA)
   a. NFPA 70 — National Electrical Code
   b. NFPA 241 — Safeguarding Construction, Alteration, and Demolition Operations
5. Regulations of Connecticut State Agencies (RCSA)
   a. RCSA 22a-4499(c) — Connecticut Department of Energy and Environmental Protection (CTDEEP) Hazardous Waste Management
   b. RCSA 22a-209 — Connecticut Department of Energy and Environmental Protection (CTDEEP) Solid Waste Management
   c. RCSA 22a-430 — Connecticut Department of Energy and Environmental Protection (CTDEEP) Water Pollution Control
   d. RCSA 22a-6k — Connecticut Department of Energy and Environmental Protection (CTDEEP) Water Pollution Control
6. State of Connecticut
   a. CTDPH 20-441 — Refresher Training
7. State of Connecticut Department of Transportation (CTDOT)
   a. CTDOT OEMCA — On-Site Environmental Mitigation for Construction Activities, CTDOT Office of Environmental Planning, latest edition
   b. FORM 814 — State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges and Incidental Construction, Form 814, latest edition

1.3 REQUIREMENTS

A. The CONTRACTOR shall perform work in compliance with all Federal, State and Local regulations and requirements and be responsible for obtaining and payment of fees for all permits and approvals required to perform the work. Applicable regulations and requirements may include, but are not limited to:

1. Federal Regulations
   a. Environmental Protection Agency (EPA) requirements for the management of hazardous waste including 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, and 40 CFR 268.
   b. Department of Transportation (DOT) requirements for the transportation of waste including 49 CFR 171, 49 CFR 172, and 49 CFR 173.
   c. OSHA requirements for safety and health protection including 29 CFR 1910 and 29 CFR 1926.
   d. NFPA 241, standards for fire protection during the work.
   e. ANSI A10.6, safety requirements for demolition operations.
2. State of Connecticut Regulations
   a. Connecticut Department of Environmental Protection (CTDEP)

1) Waste Management Bureau – requirements for hazardous, Connecticut-regulated and solid waste management, transport and disposal including RCSA 22a-449(c) and RCSA 22a-209.
2) Water Management Bureau – requirements for control of wastewater discharges and use of Best Management Practices (BMPs) to protect surface and groundwater including RCSA 22a-430 and 22a-6k.
3) Air Management Bureau – requirements for control of fugitive dust and visible emissions and permitting of sources exceeding state limits.

b. Connecticut Department of Public Health (CTDPH)
   1) Requirements for management of asbestos abatement projects.

c. State Fire Marshal's Office
   1) Requirements for licensing of demolition contractors and compliance with the State Demolition Code (CGS 29-401 through 29-415).

d. Connecticut Department of Transportation (CTDOT)
   1) Requirements for environmental mitigation for construction activities (CTDOT OEMCA).

e. Connecticut Council on Soil and Water Conservation (CCSWC)
   1) Requirements for soil erosion and sediment control (CCSWC GSESC).

3. City of Stamford Regulations
   1) Fire Department – requirements for fire protection during work.

1.4 SUBMITTALS

A. Submit to the OWNER the following a minimum of thirty (30) days prior to the start of work:

1. Site Safety and Health Plan (SSHP)
   a. Submit a site and project specific SSHP, prepared by a qualified Certified Industrial Hygienist, for review and approval. Conform to the requirements of Federal, State and Local laws, rules, and regulations. Work cannot proceed until the Safety Plan has been approved. The SSHP shall include:
      1) Identification and evaluation of the hazards and risks associated with the required activities for each site being studies, including exposure hazards and precautionary measures to be followed by workers for all hazards.
      2) Identification of supervisory personnel and alternates responsible for site safety/response operations. Name and title of person responsible for administering plan.
      3) Determination of levels of personal protection to be worn for various site operations.
      4) List of equipment with adequate nomenclature by item, that will be used at the job site, and the date and location where this equipment can be inspected.
      5) Establishment of applicable work zones (e.g., exclusion area, contamination reduction area, and support area).
      6) Establishment of decontamination methods and procedures.
      7) Determination of the number of people required to enter the contamination zones, if required, during the initial entries and subsequent operations.
      8) Establishment of emergency procedures, such as: escape routes, fire protection, signals for withdrawing work parties from site, emergency communications, wind indicators, and procedures for evacuation of injured workers.

9) Identification and arrangements with nearest medical facility for emergency medical care for both routine-type injuries and toxicological problems. Submit name, location, and telephone number of this medical facility.
10) Establishment of air and personnel monitoring procedures.
11) Establishment of procedures for handling potentially contaminated materials.
12) Identification of medical monitoring program, including respirator medical qualification examination for each individual at the work site.
13) Certification for each person entering the reduction or exclusion zones that the person is fit for duty at hazardous waste sites, and adequate medical screening tests have been obtained which address the contaminants associated with the specific hazardous waste site.
14) Identification of training plan to be instituted, including contents of 29 CFR 1910.1200 and 29 CFR 1910.134; training contents; and instructor with appropriate training certification. Training plan shall also include counseling to each employee to exposure hazards.
15) Establishment of a respiratory protection program conforming to 29 CFR 1910.134 and ANSI Z882.
16) Establishment of a hazard communication program (29 CFR 1910.1200).
17) 29 CFR 1910.
18) 29 CFR 1926.
19) 29 CFR 1926 Subpart T, demolition measures, and Subpart P, excavation measures.
20) 29 CFR 1926 Subpart V, tagout and lockout procedures. Provide positive means of locking out equipment so that equipment cannot be accidentally started during maintenance or release or stored energy.
21) SDS, Safety Data Sheets, for all hazardous materials brought on-site.
22) NFPA 241.
23) Work in confined spaces. Submit a Confined Space Entry Procedure (CSEP) for approval. CSEP shall identify the name and qualifications of the person responsible for testing the confined space work environment. Allow a minimum of 5 working days prior to beginning this work for obtaining approval and any required permits.
    a) Entry into a confined or enclosed space by personnel for any purpose, including hot work, shall be prohibited until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended.
        i) Confined Space. Refers to a space which by design has limited openings for entry and exit; unfavorable natural ventilation which could contain or produce dangerous air contaminants, or which is not intended for continuous occupancy. Confined spaces include, but are not limited to, storage tanks, process vessels, pits, silos, vats, degreasers, reaction vessels, boilers, ventilation and exhaust ducts, sewers, tunnels, underground utility vaults, and pipelines.
        ii) Qualified Person. A person designated by the CONTRACTOR, in writing, as capable by education or specialized training, of anticipating, recognizing, and evaluating employee exposure to hazardous substances or other unsafe conditions in a confined space. This person shall be

capable of specifying necessary control and protective action to ensure worker safety.

b) Daily Confined Space Entry Permit shall be completed by the qualified person. The permit shall be posted in a conspicuous place close to the confined space entrance with a copy to the SSHO.

c) Submit to SSHO a letter of certification for the qualified person. The letter shall state the qualified person's name and qualifications and delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions.

24) Accident Prevention Program

a) With respect to hazardous materials, the accident prevention program shall include provisions to deal with hazardous material. The plan shall consist of:

i) An index of hazardous materials to be introduced to the site;

ii) Plan for protecting personnel and property during the transport, storage and use of the materials;

iii) Procedures for spill response and disposal including a list of spill response materials stored on site;

iv) Safety Data Sheets for all hazardous materials brought on-site. Post Safety Data Sheets at the work site for readily available access by all employees.

v) Approved labeling system to identify contents on all containers on site;

vi) Personnel training plan.

25) Hazardous Noise

a) Provide a written hearing protection program which will include: hazardous noise signs, as directed, wherever equipment and work procedures produce sound levels greater than 84 dBA or 140 db peak sound level.

26) Fire Protection

a) Submit a written fire protection program describing the materials and methods to be used to provide protection against fire during the project. Coordinate activities with the City of Stamford Fire Department.

27) Spill Response Program and Emergency Response Plan (see applicable requirements herein).

28) Certification that all CONTRACTOR employees are trained in accordance with this specification.

29) Provide a copy of the CONTRACTOR'S Heat or Cold Stress Monitoring Program.

30) List of all CONTRACTOR and SUBCONTRACTOR personnel proposed to enter the site.

31) Site security plan (see applicable requirements described herein).

32) Safety logs documenting any toolbox training sessions, first aid injuries, hazardous material spills, recordable injuries and near-miss incidents are to be maintained by each CONTRACTOR and submitted to the OWNER.

33) Training logs, including, but not limited to, records of confined space training, and hazard communication training, as applicable, and site-specific safety hazard awareness training are to be maintained by each CONTRACTOR and available on site for review by the OWNER.

34) All accident reports and documentation of corrective actions taken shall be submitted to the OWNER.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

3.1 GENERAL RESPONSIBILITIES

A. Key Personnel: The CONTRACTOR shall provide, at a minimum, resumes of key personnel involved in all phases of construction. This chart shall include senior level management, Project Manager, Site Safety and Health officer (SSHO), field supervisor, and foreman personnel.

B. Site Safety and Health Officer (SSHO). The CONTRACTOR shall employ or contract a qualified individual (e.g., a Certified Industrial Hygienist, safety engineer, etc.) to function as the SSHO for the project. That individual shall be responsible to the CONTRACTOR and have the authority and knowledge necessary to implement the SSHP and verify compliance with applicable safety and health requirements.

C. At a minimum, the SSHO shall have the following responsibilities and authority to perform the following functions:
   1. Visit the site as needed to ensure that the SSHP is being implemented, ensure that daily tailgate safety meetings are being conducted by the Field Supervisor/Site Foreman, and provide any necessary training to on-site personnel.
   2. Have the authority to enforce the SSHP and stop operations if safety and health of personnel may be jeopardized.
   3. Effect evacuation of the site if necessary.
   4. Evaluate monitoring data to make field decisions regarding safety and health.
   5. Respond and visit the site within 24 hours of notification from the ENGINEER or OWNER regarding health and safety violations and concerns.

D. The SSHO shall meet the following minimum qualifications:
   1. Possess a sound working knowledge of State and Federal occupational safety and health regulations, hazardous waste management, and asbestos and lead abatement regulations.
   2. Have formal educational training in occupational safety and health.
   3. Have a minimum of four (4) years experience in the environmental and health and safety services field, chemical industry, or chemical waste disposal industry more than 50% of which must be in the area of industrial hygiene and/or environmental safety.

E. CONTRACTOR shall conduct and attend safety briefings prior to initiating any new site activity, and a safety meeting held prior to each shift to ensure that employees are appraised of the requirements of the safety and health plan and that they are being followed.

3.2 HAZARD ASSESSMENT

A. The CONTRACTOR shall perform and provide a hazard assessment for each location and operation to be performed. The hazard assessment shall be based on the best information

available regarding contaminants and conditions present at the site as well as the practices and tools to be applied in the operation and shall include, but not be limited to, the following:

1. A preliminary evaluation of the site's characteristics
2. An evaluation of the known (including the use of Chemical Safety Data Sheets) or suspected contaminants and conditions that may pose inhalation, skin absorption/contract, or ingestion hazards.
3. As evaluation of known or potential safety hazards associated with each task.
4. An overview of the site including descriptions of the operations and tasks to be performed. Include the following:
   a) Size and location of the site.
   b) Description of the operation and tasks to be performed.
   c) Approximate duration of the operation and each task.
   d) Site topography and special features (e.g., structures, tanks, etc.).
   e) Known or suspected pathways of contaminant dispersion pertinent to the operation and tasks performed.
   f) Site accessibility.
   g) Safety and health hazards expected on the site.

B. Site hazards to be evaluated shall include, but are not limited to, fires, explosions, oxygen deficiency, methane, hydrogen sulfide, caving of excavation, potential contaminants, leachate, potential hazardous materials and pathogens. The CONTRACTOR shall review site documentation available from the OWNER in developing such hazard assessments. However, CONTRACTOR is advised that no responsibility is assumed by the ENGINEER or OWNER for subsurface conditions other than at the locations, and at that time, the explorations that were made.

3.3 EMPLOYEE TRAINING

A. The Site Safety and Health Officer (SSHO) shall meet requirements specified. In addition, any employees who have been designated as responsible for responding to on-site emergencies shall have received appropriate training to how to respond to such expected potential emergencies prior to the start of site operations.

B. The CONTRACTOR shall provide site specific training and perform daily safety briefings (tailgate safety meetings) that will provide an awareness of planned operations, the site specific SSHP, the form and warning properties of potential hazards, work zones, locations of emergency/safety equipment, local emergency response procedures, site characteristics, levels or protection, communications, decontamination procedures, emergency facilities and signals, and evacuation procedures. The CONTRACTOR shall provide written certification of completed training for all employees designated to engage in on-site activities. Such certifications shall be endorsed by the SSHO and be incorporated into the SSHP for the project.

C. Site workers who are in repeated close proximity to excavated contaminated or hazardous materials shall be trained in health and safety procedures according to the OSHA 29 CFR 1910.120. OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) standard training consisting of a minimum of 40 hours of off-site training and a minimum of 24 hours of actual field experience under the direct supervision of a trained experienced supervisor

is required for all site workers prior to any work on the site. Current annual HAZWOPER refresher training is also required as appropriate. Site workers without the 24 hours of actual field training required by this standard may receive the actual field experience on this project under the direct supervision of a trained experienced supervisor. The CONTRACTOR shall provide a full-time trained experienced supervisor that has an additional 8 hours of supervisory training in accordance with 40 CFR 1910.120(e)(4). Copies of written certificate documenting all HAZWOPER training shall be provided to the OWNER and ENGINEER prior to the start of the project.

D. The CONTRACTOR shall provide written certification of completed training and/or acquired experience for all employees designated to engage in on-site activities and shall be supplied prior to the start of site operations. Such certification shall be endorsed by a member of top level management, a corporate officer, or the health and safety program manager and shall be incorporated into the SSHP for the project. Employees who have not received the required training prior to the start of site operations are not to engage in site operations until such training has been completed.

E. The CONTRACTOR shall include in the SSHP a summary of the hazardous materials safety and health training program and a list of elements and topics covered.

3.4 PERSONNEL PROTECTION

A. The CONTRACTOR shall apply engineering and/or work practice controls as a means of protecting personnel in performance of site-specific tasks. Engineering controls shall be implemented to reduce and maintain employee exposure at or below safe levels for those tasks demonstrating known or suspected hazards. Work practice controls shall be applied when engineering controls are impractical and shall be incorporated in site-specific standard operating procedures (SOPs) for personnel precautions and routine operations.

1. Personal Protective Equipment and Levels of Protection
   a. The CONTRACTOR shall use personal protective equipment (PPE) only when engineering and/or work practice controls have been deemed impractical or insufficient to protect employees during site operations.
   b. The CONTRACTOR shall select PPE based on an evaluation of performance, characteristics, site specific tasks, and known or suspected hazards, and shall assemble the PPE into levels of protection (LOP) or ensembles appropriate for the site.
   c. The CONTRACTOR shall include in the SSHP a list of components for each protective ensemble, and LOP selected for each task, the rational for each task-specific selection, and any contaminant action levels to be followed in LOP decision making.
   d. The CONTRACTOR shall include a description of their respiratory protection program and the method of respirator fit testing employed.
   e. The CONTRACTOR shall only make use of NIOSHA/MSHA approved respiratory protective equipment.
   f. The CONTRACTOR shall establish a PPE program addressing the following elements:
      1) Site hazards

2) PPE selection
3) PPE use
4) Duration of site operations
5) PPE maintenance and storage
6) PPE decontamination
7) PPE training and proper fit
8) Donning and doffing procedures
9) PPE inspection
10) PPE in-use monitoring
11) Evaluation of program effectiveness
12) Heat stress and temperature limitations

3.5 MEDICAL SURVEILLANCE

A. Medical Surveillance Program
1. The CONTRACTOR shall establish and implement a medical surveillance program (MSP) for employees engaged in on-site operation in accordance with 29 CFR 1910, which shall be incorporated into the SSHP for the project.
2. The MSP program shall include physical examinations administered by a board certified physician familiar with internal or occupational medicine. The CONTRACTOR shall include the name and business address of the administering physician in the SSHP.
3. The CONTRACTOR shall include the components of both the MSP program and the physical examination in the SSHP.
4. the CONTRACTOR shall address the need for personal exposure monitoring and post exposure medical screening in the SSHP and include a description of those provisions.

B. Retention of Medical Records
1. The CONTRACTOR shall retain all medical records and personnel exposure monitoring data for an appropriate period as described in Subpart C of 29 CFR 1910.20 of the Occupational Safety and Health Administration.

C. Personnel Certification
1. the CONTRACTOR shall provide written certification of medical fitness for work of all employees designated to engage in on-site operations prior to the start of those operations.
2. Such certification shall be endorsed by a member of top level management, a corporate officer, or the health and safety program manager, and shall be incorporated into the SSHP.

D. Employee Heat and Cold Stress Monitoring
1. As dictated by seasonal conditions, the CONTRACTOR shall implement an employee heat or cold stress monitoring program during the site operations and shall incorporate the program into the site SSHP.
2. The program shall include employee awareness of the signs and symptoms of heat or cold stress, preventive measures, and employee parameters to be monitored.
3. The CONTRACTOR shall maintain a daily heat or cold stress log on all employees on-site engaging in field activities and shall describe the log in the SSHP.

3.6 SITE CONTROL

A. The CONTRACTOR shall be responsible for conducting operations at the site in a manner as to reduce the possibility of contact with any contaminants present and to prevent the removal of contaminants by personnel or equipment leaving the site.

B. The CONTRACTOR shall delineate the work zones in which specific operations or tasks will occur and shall institute specific site entry and decontamination procedures for designated control points.

C. The CONTRACTOR shall keep a daily log of site activities, including personnel visiting site, affiliation, date, arrival time, departure time, and purpose of the visit. Site visitors shall sign in on the site log and be escorted by the CONTRACTOR or ENGINEER (suitable PPE required).

D. The CONTRACTOR shall provide the OWNER with a list of all CONTRACTOR and SUBCONTRACTOR personnel authorized to enter the site prior to start of operations, updating the list as necessary.

E. The CONTRACTOR shall provide and implement a plan for site security including prevention of unauthorized entry onto the site and prevention of vandalism. The site shall be secured at all times and access controlled by the CONTRACTOR.

3.7 SITE STANDARD OPERATING PROCEDURES

A. The CONTRACTOR shall be responsible for the development and implementation of all necessary SOPs for site operations. The SOPs shall be incorporated into the SSHP.

3.8 SPILL PREVENTION AND RESPONSE

A. The CONTRACTOR shall use appropriate equipment, vehicles and operating practices to prevent spillage or leakage of hazardous or contaminated materials from occurring as a result of site work.

B. The CONTRACTOR shall have a licensed emergency spill response cleanup contractor under contract for this project for immediate use as needed. Documentation of such a contract shall be provided to the OWNER'S prior to the start of construction activities.

C. In the event of a spill, the CONTRACTOR shall immediately notify the OWNER and ENGINEER.

D. If the CONTRACTOR'S personnel have been trained in spill response and can do so without causing himself undo danger, the personnel shall take whatever actions are possible, given existing conditions and available equipment, to control or clean up any spilled liquids.

E. The CONTRACTOR shall provide the SSHO, OWNER, and spill cleanup contractor with all available information needed to respond to the spill, including but not limited to, the name and quantity of material involved and the nature and extent of any related injuries.

F. The CONTRACTOR shall follow any emergency instructions provided by the SSHO.

G. The SSHO shall be responsible for reporting regulated spills to all appropriate authorities. A written record of any such spill reports to regulatory authorities must be provided to the OWNER within 24 hours of the report. That written record shall contain the information identified below.

1) Name of person making report and relationship to person causing the discharge.
2) Time and date of discharge.
3) Probable source of discharge.
4) Location of discharge, both geographic and with respect to bodies of water.
5) Type of discharge.
6) Possible health or fire hazards resulting from discharge.
7) Amount of material discharged.
8) Actions taken to clean up and remove the discharge.
9) Personnel presently at the scene.
10) Other government agencies that have been or will be notified.

3.9 CONTINGENCY PLANNING

A. The CONTRACTOR shall develop and implement an Emergency Response Plan (ERP) to handle anticipated on-site emergencies prior to start of site operations. The ERP shall be incorporated into the SSHP as a separate section of that document and shall be periodically reviewed and amended to keep it current with new or changing site conditions or information.

3.10 DEFICIENCIES

A. The ENGINEER or OWNER may stop any operation that the CONTRACTOR has been directed to correct and has not corrected. The ENGINEER or OWNER will stop any CONTRACTOR operations that pose an imminent or immediate health or safety hazard to life or property, and which may include, but is not limited to, CONTRACTOR employees, facility personnel, other on-site personnel, public, or the environment. If the CONTRACTOR does not comply with the stoppage and immediately correct a health or safety deficiency, then the ENGINEER or OWNER may retain the services of another CONTRACTOR to correct the deficiency. All liability and expenses resulting from such work stoppages and deficiency correction shall be the responsibility of the CONTRACTOR.

END OF SECTION

SECTION 01380

CONSTRUCTION PHOTOGRAPHS

PART 1 - GENERAL

DDDDD. On the date the work is begun and every thirty (30) days thereafter (until the work is at least 95 percent complete), the CONTRACTOR shall take photographs of the construction.

EEEEE. Take a minimum of (24) 4x6 color photographs each time. Note on each photograph the date the picture was taken, the project number, the subject matter and the direction of the view. Deliver photographs to the Construction Administrator. The photographs are to be delivered in 8 1/2-inch x 11-inch sleeved clear pages for binding in a 3-ring binder.

FFFFF. As photographs are a record of the work progress, they shall be taken each month, whether or not they show work done during the preceding month. Deliver photographs to the Construction Administrator within 10 days of their taking.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 - GENERAL

1.1 INDEPENDENT TESTING AGENCIES

A. CONTRACTOR shall select and employ and pay for independent testing agencies, approved by OWNER, to perform all required analyses on proposed materials and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction. All field tests, inspections, sampling and testing required by the individual specification sections will be performed by an independent testing agency retained by the CONTRACTOR. The CONTRACTOR shall inform the Construction Administrator 48 hours in advance of areas ready for field testing as applicable. Costs for these services are included in the Contract Sum. In addition to tests required to be performed by the CONTRACTOR'S testing laboratory, the OWNER reserves the right to hire their own testing laboratory and conduct any and all tests appropriate or necessary to check conformance of the Work with the Contract Documents.

B. Materials for this project will be tested and construction operations inspected as the work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered nor shall it obligate the City for final acceptance.

1.2 RETESTING

A. The CONTRACTOR is responsible for field retesting where results of inspections, tests, or other quality-control services provide unsatisfactory results and indicate noncompliance with Contract Document requirements.
   1. The cost of retesting construction, revised or replaced by the CONTRACTOR, is the CONTRACTOR'S responsibility where required tests performed on original construction indicated noncompliance with Contract Document requirements.
   2. The OWNER will issue a deduct change order to cover all costs incurred related to all re-tests/re-inspection due to non-compliance to the Contract Documents, including but not limited to the OWNER'S costs and the ENGINEER'S costs.

1.3 ASSOCIATED SERVICES

A. CONTRACTOR shall cooperate with agencies performing required inspections, field tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to, the following:

1. Provide access to the Work.
2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
3. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
4. Provide facilities for storage and curing of test samples.
5. Deliver samples to testing laboratories, if requested by OWNER.
6. Provide an approved design mix proposed for use for material mixes that require control by the testing agency.
7. Provide security and protection of samples and test equipment at the Project Site.

1.4 DUTIES OF THE TESTING AGENCY

A. The independent field testing agency engaged by the CONTRACTOR to perform inspections, sampling, and testing of materials and construction specified in individual Sections shall cooperate with the Construction Administrator, ENGINEER and CONTRACTOR in performance of the testing agency's duties. The testing agency shall provide qualified personnel promptly to perform required inspections and tests.

1. The field testing agency shall notify the OWNER, the Construction Administrator and the CONTRACTOR promptly of any irregularities or deficiencies observed in the Work during performance of its services.
2. The field testing agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract documents or approve or accept any portion of the Work.
3. The field testing agency shall not perform any duties of the CONTRACTOR.
4. The field testing agency shall perform specified inspections, sampling and testing of materials and methods of construction and ascertain compliance with requirements of the Contract Documents.
5. The field testing agency shall perform additional tests and services as required to assure compliance with the Contract Documents.

1.5 PAYMENT

A. OWNER will pay for the services of the CONTRACTOR'S independent testing agency laboratory, to perform at the OWNER'S discretion, additional inspections, tests and other services beyond those required by the Specifications, in which case the OWNER will issue a credit change order to cover the cost associated with these tests. The OWNER will not pay for additional testing in the following cases.

1. When the CONTRACTOR notifies the Construction Administrator and/or Testing Agency less than 24 hours before the expected time of testing.
2. When the CONTRACTOR requires testing for his own convenience.
3. When the CONTRACTOR schedules a test and is not ready for the required test.

1.6 REPORTS

A. Reports of test that are part of the submittal requirements which indicate compliance or non-compliance with the specified standard.

1.7 NOT USED

1.8 SUBMITTALS

GGGGG. The CONTRACTOR shall submit the name and qualifications of any independent testing agencies to be used on this project for approval by the OWNER.

HHHHH. Unless the CONTRACTOR is responsible for this service, the independent testing agency shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the Construction Administrator. If the CONTRACTOR is responsible for the service, submit a certified written report, in duplicate, of each inspection, test, or similar service through the CONTRACTOR.

IIIII. Submit additional copies of each written report directly to the governing authority, when the authority so directs.

JJJJJ. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making the inspection or test.
6. Designation of the Work and test method.
7. Identification of product and Specification Section,
8. Complete inspection or test data.
9. Test results and an interpretation of test results.
10. Ambient conditions at the time of sample taking and testing.
11. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on re-testing.

1.9 QUALITY ASSURANCE

KKKKK. Qualifications for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, that are pre-qualified as complying with the National Voluntary Laboratory Accreditation Program and that specialize in the types of inspections and tests to be performed.

1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state where the Project is located.
2. Where applicable, meet “Recommended Requirements for Independent Laboratory Qualification”, latest edition, published by American Council of Independent Laboratories and the basic requirements of ASTM E 329, “Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction”.
3. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during most recent tour of inspection; with memorandum of remedies of any deficiencies reported by inspection.

4. Testing Equipment:
   a. Calibrated at maximum 12 month intervals by devices of accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.
   b. Submit copy of certificate of calibration, made by accredited calibration agency.

1.10 REPAIR AND PROTECTION

LLLLL. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes.

MMMMM. Protect constructions exposed by or for quality-control service activities, and protect repaired construction.

NNNNN. Repair and protection is CONTRACTOR'S responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

PART 2 – PRODUCTS
Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01505

TEMPORARY ELECTRICITY AND LIGHTING

PART 1 - GENERAL

OOOOO. Power and lighting may be taken from the power company's nearest pole with temporary poles, if needed, to extend the line to the Project. If permanent power lines have been installed before beginning the Project, then temporary lines can be brought in from the last pole.

PPPPP. Provide service required for construction with branch wiring and distribution boxes located to provide power and lighting by construction-type extension cords. Meter shall be provided and installed by the CONTRACTOR.

QQQQQ. All costs of temporary power and light shall be paid by the CONTRACTOR.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01515

TEMPORARY TELEPHONE

PART 1 - GENERAL

RRRRR. General Contractor shall provide telephone service in his office and a separate telephone in the OWNER'S Field Office, if provided. It is preferred the CONTRACTOR use a cellular phone. Local calls will be paid by the CONTRACTOR and toll calls by the respective users.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01520

TEMPORARY WATER

PART 1 - GENERAL

SSSSS. Water may be available on site from existing water service to the Public Works Facility and/or fire hydrant along Rock Rimmon Road. The City of Stamford makes no representation as to the quantity of water available, which shall be the sole responsibility of the Contractor to determine. The Contractor shall be responsible for furnishing and installing any connections, meters, valves, backflow preventers, piping and appurtenances necessary to supply potable water for the project and for dust control. The Contractor shall be responsible for obtaining all permits and paying all fees and usage charges required by the water company. All cost for water for the project shall be paid by the Contractor.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01525

TEMPORARY SANITARY FACILITIES

PART 1 - GENERAL

TTTTT. The CONTRACTOR shall provide, where directed, chemical toilets with toilet tissue, plus wash basins with water, soap and paper towels. The CONTRACTOR shall maintain the facilities in a sanitary condition.

UUUUU. If women are employed in the work, provide separate, designated facilities for them of the same kind. Provide an adequate number of each kind of facility for each gender.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01530

FIRE PROTECTION

PART 1 - GENERAL

VVVVV. The CONTRACTOR, during construction, shall be responsible for loss or damage by fire to the work of the Contract until completion. Bitumen or tar shall be melted on the ground only. No flammable material shall be stored in the structure in excess of amounts allowed by the authorities. No gasoline shall be stored in or close to on-site buildings at any time. The CONTRACTOR shall assign a responsible employee to be in charge of fire protection measures.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01535

CONSTRUCTION EQUIPMENT

PART 1 - GENERAL

WWWWW. The CONTRACTOR shall furnish tools, apparatus and appliances, hoists and/or cranes and power for same, scaffolding, runways, ladders, temporary supports and bracing and similar work or material necessary to insure convenience and safety in the execution of the Contract except where this is otherwise specified in any Specification Section. All such items shall meet the approval of the OWNER but responsibility for design, strength and safety shall remain with the CONTRACTOR. All such items shall comply with Federal OSHA regulations and applicable codes, statutes, rules and regulations, including compliance with the requirements of the current edition of the "Manual of Accident Prevention in Construction" published by the AGC and the standards of the State Labor Department.

XXXXX. Staging, exterior and interior, required for the execution of this Contract, shall be furnished, erected, relocated if necessary and removed by the General Contractor. Staging shall be maintained in a safe condition without charge to and for the use of all trades as needed.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01540

BARRIERS AND ENCLOSURES

PART 1 - GENERAL

YYYYY. Provide barriers to prevent public entry into construction areas and to protect existing facilities from damage by construction operations.

ZZZZZ. Provide temporary security fencing in accordance with the Contract Drawings as needed for site control; equip with vehicular and pedestrian gates with locks.

AAAAAA. Provide covered walkways as required by governing authorities for public rights-of-way and for public access to existing buildings.

BBBBBB. Provide barriers around trees and plants designated to remain. Protect against vehicular traffic, materials dumping, chemically injurious materials, puddling or running water.

CCCCCC. Provide temporary, insulated, weathertight closures at openings to the exterior to provide acceptable working conditions and protection for materials, to allow for temporary heating and to prevent entry of unauthorized persons. Provide doors with self-closing hardware and locks.

DDDDDD. Barriers and enclosures shall be in conformance with code requirements. Do not block egress from occupied buildings unless necessary to further the work of the Contract. In this case, secure the Department's approval of an alternate egress plan.

EEEEEE. See also General Conditions.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01545

PROTECTION

PART 1 - GENERAL

FFFFFF. Protect buildings, equipment, furnishings, grounds and plantings from damage. Any damage shall be repaired or otherwise made good at no expense to the City.

GGGGGG. Provide protective coverings and barricades to prevent damage. The CONTRACTOR shall be held responsible for, and must make good at his own expense, any water or other type of damage due to improper coverings. Protect the public and building personnel from injury.

HHHHHH. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.

IIIIII. Provide protective coverings for walls, projections, jambs, sills and soffits of openings. Protect finished floors and stairs from traffic, movement of heavy objects and storage. Prohibit traffic and storage on waterproofed and roofed surfaces and on lawn and landscaped areas.

JJJJJJ. Provide temporary partitions and ceilings to separate work areas from Owner-occupied areas to prevent penetration of dust and moisture into Owner-occupied areas and equipment. Erect framing and sheet materials with closed joints and sealed edges at intersections with existing surfaces.

KKKKKK. See also General Conditions.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01550

SECURITY

PART 1 - GENERAL

LLLLLL. Provide security program and facilities to protect work, existing facilities and OWNER'S operations from unauthorized entry, vandalism and theft. Coordinate with OWNER'S security program.

MMMMMM. The CONTRACTOR shall be solely responsible for damage, loss or liability due to theft or vandalism.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01555

TRAFFIC WAYS

PART 1 - GENERAL

NNNNNN. The CONTRACTOR may use on-site paved roads and parking areas but shall not encumber same or their access. Public highways shall not be blocked by standing trucks, parked cars, material storage, construction operations, or in any other manner.

OOOOOO. Public roads and existing paved roads, drives and parking areas on OWNER'S property shall be kept free from scrap or debris due to construction operations, and any damage to their surface caused by the CONTRACTOR shall be repaired by him at his own expense.

PPPPPP. If the work of the Contract affects public use of any street, road, highway or thoroughfare, the General Contractor shall confer with the police authority having jurisdiction to determine if and how many police are needed for public safety in addition to any barriers and signals that may be needed. The General Contractor will be responsible for payment of any needed police services.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01560

TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 TEMPORARY ENVIRONMENTAL CONTROLS

CONTRACTOR is to provide the following controls.

QQQQQQ. Dust Control (construction and demolition): CONTRACTOR shall be responsible for controlling objectionable dust caused by his operation of vehicles and equipment, clearing or for any reason. The CONTRACTOR shall apply water and calcium chloride or use other methods subject to the ENGINEER'S approval for keeping airborne dust to a minimum.

RRRRRR. Noise Control: CONTRACTOR'S vehicles and equipment shall be such as to minimize noise to the greatest degree practicable. Noise levels shall conform to the latest OSHA standards and in no case will noise levels be permitted which interfere with the work of the OWNER or others.

SSSSSS. Erosion and Sediment Control:

1. Comply with the Stormwater Pollution Control Plan in accordance with applicable sections of the Contract Documents.
2. Plan and execute construction and earth work by methods to control surface drainage from cuts and fills, and from borrow source and waste disposal areas, to prevent erosion and sedimentation.
   f. Hold the areas of bare soil exposed at one time to a minimum.
   g. Provide temporary control measures such as berms, dikes, and drains.
3. Construct fills and waste areas by selective placement to eliminate surface silts or clays that will erode.
4. Periodically inspect earthwork to detect any evidence of the start of erosion, apply corrective measures as required to control erosion.
5. All CONTRACTOR'S equipment used during construction shall conform to all current federal, state, and local laws and regulations.

TTTTTT. Pollution Control:

1. Provide methods, means and facilities required to prevent contamination of soil, water, or atmosphere by the discharge of noxious substances from construction operations.
2. Provide equipment and personnel, perform emergency measure required to contain any spillages, and to remove contaminated soils or liquids.
3. Take special measures to prevent harmful substances from entering public waters.

a. Prevent disposal of wastes, effluents, chemicals, or other such substances adjacent to streams, or in sanitary or storm sewers.

4. Provide systems for control of atmospheric pollutants.
   a. Prevent toxic concentrations of chemicals.
   b. Prevent harmful dispersal of pollutants into the atmosphere.
5. All of the CONTRACTOR'S equipment used during construction shall conform to all current federal, state and local laws and regulations.

UUUUUU. Water Control:

1. Provide methods to control surface water and water from excavations and structures to prevent damage to the Work, the site, or adjoining properties.
   a. Control fill, grading and ditching to direct water away from excavations, pits, tunnels and other construction areas; and to direct drainage to proper runoff courses so as to prevent any erosion, damage or nuisance.
2. Provide, operate, and maintain equipment and facilities of adequate size to control surface water.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01565

STORMWATER CONTROL

PART 1 - GENERAL

VVVVVV. Assume responsibility for Stormwater pollution control by strictly complying with the "General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities" (General Permit) and the Stormwater Pollution Control Plan (SPCP) that has been prepared for the site by the ENGINEER.

WWWWWW. Sign, and cause to be signed by each appropriate subcontractor, the Certification Statement required by the General Permit and SPCP.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01570

CLEANING

PART 1 - GENERAL

XXXXXX. Maintain areas under CONTRACTOR'S control free of waste materials, debris and rubbish. Maintain in a clean and orderly condition.

YYYYYY. Execute cleaning during progress of the Work, at completion of the Work, and as required by the General Conditions.

ZZZZZZ. Control cleaning operations so that dust and other particulates will not adhere to wet or newly-coated surfaces and so that dust, wash water or other contaminants generated during such operations do not damage or mar painted or finished surfaces.

AAAAAAA. Remove waste materials, debris and rubbish from site daily and dispose of legally off-site. No scrap/debris shall remain inside the building or anywhere on site upon final acceptance of the project.

BBBBBBB. See also General Conditions.

CCCCCCC. Requirements of Regulatory Agencies:

1. In addition to the requirements herein, maintain the cleanliness of the Work and surrounding premises within the Work limits so as to comply with federal, state, and local fire and safety laws, ordinances, codes and regulations.
2. Comply with all federal, state and local anti-pollution laws, ordinances, codes and regulations when disposing of waste materials, debris and rubbish.

DDDDDDD. Cleaning Materials:

1. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
2. Use each type of cleaning material on only those surfaces recommended by the cleaning material manufacturer.
3. Use only materials which will not create hazards to health or property.

EEEEEEE. During Construction:

1. Keep the Work and surrounding premises within work limits free of accumulations of dirt, dust, waste materials, debris and rubbish.
2. Keep dust generating areas wetted down.
3. Provide suitable containers for storage of waste materials, debris and rubbish until time of disposal.
4. Dispose of waste, debris and rubbish off site at legal disposal areas.

FFFFFFF. When Project is Completed:

1. Remove and dispose of all excess or waste materials, debris, rubbish, and temporary facilities from the site, structures and all facilities.
2. Repair pavement, roads, sod, and all other areas affected by construction operations and restore them to original condition or to minimum condition specified.
3. Remove spatter, grease, stains, fingerprints, dirt, dust, labels, tags, packing materials and other foreign items or substances from interior and exterior surfaces, equipment, signs and lettering.
4. Repair, patch and touch up chipped, scratched, dented or otherwise marred surfaces to match specified finish.
5. Remove paint, clean and restore all equipment and material nameplates, labels and other identification markings.
6. Wash and shine mirrors, glazing and polished surfaces.
7. Clean all floors, slabs, pavements, and ground surfaces.
8. Maintain cleaning until acceptance and occupation by OWNER.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01575

PROJECT SIGNS

PART 1 - GENERAL

GGGGGGG. Project Signs: Provide visible, secure warning signs as needed for site control (a minimum of one sign per 500 linear feet of perimeter). The CONTRACTOR shall not post any other signs unless specifically indicated otherwise.

HHHHHHH. Relocate the "Project Sign" to an area where it will be visible to the Public, yet out of the way of construction activity, **as many times as needed** during the length of the Project.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01580

FIELD OFFICES

PART 1 - GENERAL

1.1 FIELD OFFICES

IIIIIII. The CONTRACTOR shall provide an office for his own use which may be a trailer type facility with electric lighting, air conditioning, and heat. It shall have ample natural light, a table, chairs, counter, shelf, plan racks and file cabinets. Provide a 5 lb. ABC fire extinguisher and an OSHA-approved first aid kit. If the contract amount is $2,500,000 or more, the CONTRACTOR shall provide a facsimile machine in his office and shall also provide his superintendent with a cellular telephone (smart phone).

JJJJJJJ. The CONTRACTOR shall provide a field office for the Construction Administrator of not less than 150 sq. ft. which may be a trailer type facility. The field office shall have ample natural light, a heater of sufficient capacity to maintain 70 degrees (F) in winter and an air conditioner of sufficient capacity to maintain 75 degrees (F) in summer. The CONTRACTOR shall provide a 5-lb. ABC fire extinguisher, and an OSHA-approved first aid kit. The CONTRACTOR shall furnish the following furniture, which will remain his property. Furniture may be used but shall be in good condition, as judged by the Construction Administrator.

1. (1) One double pedestal desk
2. (1) One plan table
3. (3) Three chairs
4. (1) One file cabinet (lockable four drawer letter size)
5. (1) One bookshelf w/10 L.F. of 12” wide shelving
6. (1) One large capacity waste receptacles
7. (1) One Fax Machine with telephone line
8. (1) One telephone with telephone line and voice messaging
9. (1) One Computer with internet connection using fastest connection capabilities locally available. 4th Gen Intel Core processor, with operating software, including but not limited to, Windows (or more recent version), AutoCAD (latest version), Microsoft Office (latest version), Microsoft Project (latest version), or approved equal.
10. (1) One Laser printer with supplies.
11. (1) One Copy Machine with supplies.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01600

MATERIALS AND EQUIPMENT CONTROLS

PART 1 - GENERAL

1.1 MATERIALS AND EQUIPMENT

A. Shall be delivered, stored and handled to prevent intrusion of foreign matter and damage by weather or breakage. Packaged materials shall be delivered and stored in original, unbroken packages.
   1. Promptly inspect shipments to assure that products comply with requirements, that quantities are correct and products are undamaged.
   2. Packages, materials and equipment showing evidence of damage will be rejected and replaced at no additional cost to the OWNER.

1.2 STORAGE AND PROTECTION

KKKKKKK. Store products in accordance with manufacturers' instructions with seals and labels intact and legible. Store sensitive products in weathertight enclosures; maintain within temperature and humidity range required by manufacturer.

LLLLLLL. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.

MMMMMMM. Store loose granular material on solid surfaces in a well-drained area; prevent mixing with foreign matter.

NNNNNNN. Arrange storage to provide access for inspection. Periodically inspect to insure products are undamaged and are maintained under required conditions. Keep log showing date, time and problems, if any.

OOOOOOO. Stone, masonry units and similar materials shall be stored on platforms or dry skids and shall be adequately covered and protected against damage.

PPPPPPP. The CONTRACTOR shall prepare, as directed by the OWNER, one area or space in the building for storage of City-owned equipment.

PART 2 – PRODUCTS
Not used.
PART 3 – EXECUTION
Not used.

END OF SECTION

SECTION 01631

EQUALS AND SUBSTITUTIONS

PART 1 - GENERAL

1.1 DEFINITIONS

Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.

QQQQQQQ. Equals or Substitutions General: Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the CONTRACTOR after award of the Contract.

RRRRRRR. Equal: Any deviation from the specification which is defined as follows: A replacement for the specified material, device, procedure, equipment, etc., which is recognized and accepted as substantially equal to the first listed manufacturer or first listed procedure specified, after review, by the ENGINEER and may be rejected or approved at the sole discretion of the OWNER. All equals must be substantially equivalent to the first manufacturer or first procedure listed in the Specifications with reference to all of the following areas: the substance and function considering quality, workmanship, economy of operation, durability and suitability for purposes intended; size, rating and cost. The equal does not constitute a modification in the scope of Work, the Schedule or ENGINEER'S design intent of the specified material, device, procedure, equipment, etc.

SSSSSSS. Substitution: Any deviation from the specified requirements, which is defined as follows: A replacement for the specified material, device, procedure, equipment, etc., which is not recognized or accepted as equal to the first manufacturer or procedure listed in the Specification after review by the ENGINEER and may be rejected or approved by the OWNER. The Substitution is not equal to the specified requirement in comparison to the first manufacture or first procedure listed in the Specifications in one or more of the following areas: the substance and function considering quality, workmanship, economy of operation, durability and suitability for purposes intended; size; cost and rating. The Substitution constitutes a modification in the scope of Work, the Schedule or the ENGINEER'S design intent of the specified material, device, procedure, equipment, etc.

TTTTTTT. The following are not considered to be requests for Equals or Substitutions:

1. Revisions to the Contract Documents requested by the OWNER or ENGINEER.
2. Specified options of products and construction methods included in the Contract Documents.
3. The CONTRACTOR'S determination of and compliance with governing regulations and orders issued by governing authorities having jurisdiction.

1.2 SUBMITTALS

UUUUUUU. Equals and Substitution Request Submittals: The OWNER will consider requests for equals or substitutions if received within time period designated in the General Conditions. Requests received more than the days specified after the start date of the contract will be rejected.

1. The CONTRACTOR is required to prepare and submit 3 copies of the required data for the first manufacturer listed or procedure listed in the specifications section with reference to all of the following areas: the substance and function considering quality, workmanship, economy of operation, durability and suitability for purposes intended including the size, rating and cost. All submissions must include all the required data for the first listed manufacturer or procedure as specified, as well as the required data for the proposed Equal or Substitution. This will enable the OWNER and ENGINEER to determine that the proposed Equal or Substitution is or is not substantially equal to the first listed manufacturer or procedure.

VVVVVVV. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.

WWWWWWW. Provide complete documentation showing compliance with the requirements for equals or substitutions, and the following information, as appropriate on a "Substitution Request" form as required by the OWNER:

1. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the OWNER and separate CONTRACTORS, that will be necessary to accommodate the proposed Equal or Substitution.
2. A detailed comparison chart of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.
3. Product Data, including Shop Drawings and descriptions of products and fabrication and installation procedures.
4. Samples, where applicable or requested.
5. A statement indicating the effect on the Contractor's Construction Schedule or CPM Schedule compared to the schedule without approval of the Equal or Substitution. Indicate the effect on overall Contract Time.
6. Cost information, broken down, including a proposal of the net change, if any in the Contract Sum.
7. The Contractor's certification that the proposed Equal or Substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.
8. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the Equal or Substitution to perform adequately.

XXXXXXX. ENGINEER'S Action: If necessary, the ENGINEER will request additional information or documentation for evaluation within one week of receipt of the original request for equal or substitution request. The ENGINEER will notify the Construction Administrator who will notify the OWNER of recommended acceptance or rejection of the proposed equal or substitution, within two (2) weeks of receipt of the request, or one (1) week of receipt of additional information or documentation, whichever is later. The Construction Administrator will give final acceptance or rejection by the OWNER not less than one (1) week after notification.

1. Any request deemed an “Equal” and accepted by the Construction Administrator, ENGINEER, and OWNER will result in written notification to the Contractor and will not be in the form of a change order for an “Equal”.
2. Any request deemed a “Substitution” and rejected or approved by Construction Administrator, ENGINEER, and OWNER may result in written notification to the Contractor and may be in the form of a change order if the “Substitution” is approved.

1.3 EQUAL OR SUBSTITUTIONS

YYYYYYY. Conditions: The ENGINEER will consider the CONTRACTOR’S request for Equal or Substitution of a product or method of construction when one or more of the following conditions are satisfied, as determined by the ENGINEER. If the following conditions are not satisfied, the ENGINEER will return the requests to the Construction Administrator without action except to record noncompliance with these requirements.

1. The proposed request does not require extensive revisions to the Contract Documents.
2. The proposed request is in accordance with the general intent of the Contract Documents.
3. The proposed request is timely, fully documented, and/or properly submitted.
4. The proposed request can be provided within the Contract Time. However, the ENGINEER will not consider the proposed request if it is a result of the CONTRACTOR’S failure to pursue the Work promptly or coordinate activities properly.
5. The proposed request will offer the OWNER a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the OWNER must assume. However, if the proposed request requires the OWNER to incur additional responsibilities, including but not limited to, additional compensation to the ENGINEER for redesign and evaluation services, increased cost of other construction by the OWNER or similar considerations, then the OWNER will have just cause to reject the request for Equal or Substitution.
6. The proposed request can receive the necessary approvals, in a timely manner, required by governing authorities having jurisdiction.
7. The proposed request can be provided in a manner that is compatible with the Work as certified by the CONTRACTOR.
8. The proposed request can be coordinated with the Work as certified by the CONTRACTOR.
9. The proposed request can uphold the warranties required by the Contract Documents as certified by the CONTRACTOR.

ZZZZZZZ. The CONTRACTOR’S submission and the ENGINEER’S review of Submittals, including but not limited to, Samples, Manufacturer’s Data, Shop Drawings, or other such items, which are not clearly identified as a request for an Equal or Substitution, will not be considered or accepted as a valid request for an Equal or Substitution, nor does it constitute an approval.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 SUBSTANTIAL COMPLETION

AAAAAAAA. Preliminary Procedures: Before requesting inspection for Certification of Substantial Completion, complete the following. List exceptions in the request.

1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.
   h. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
   i. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
2. Advise the OWNER of pending insurance changeover requirements, if applicable.
3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
4. Obtain and submit releases enabling the OWNER unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Submit record drawings, maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra stock, and similar items.
7. Make final changeover of permanent locks and transmit keys to the OWNER. Advise the OWNER'S personnel of changeover in security provisions.
8. Demonstration, through operation and testing, the functions of all systems and/or equipment to the satisfaction of the OWNER for compliance to the contract. Complete testing of systems, and instruction of the OWNER'S operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
9. Complete final cleanup requirements, including touchup painting,
10. Touch up and otherwise repair and restore marred, exposed finishes.

BBBBBBBB. Inspection Procedures: The Contract shall be ready and prepared when they request a Substantial Completion inspection. If the inspection reveals that the work is not complete, there are extensive punchlist items and as the items listed above are not complete, the Construction Administrator, ENGINEER, and OWNER will determine the inspection has failed.

CCCCCCCC. The CONTRACTOR is responsible for all costs to re-inspect due to a failed inspection. The OWNER will issue a deduct change order to cover all costs for re-inspection.

1. The ENGINEER will repeat inspection when requested and assured that the Work is substantially complete.
2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.2 FINAL ACCEPTANCE

DDDDDDDD. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
3. Submit a certified copy of the ENGINEER'S final inspection list of items to be completed or corrected, endorsed and dated by the ENGINEER. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the ENGINEER.
4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion or when the OWNER took possession of and assumed responsibility for corresponding elements of the Work.
5. Submit consent of surety to Final Payment.
6. Submit evidence of final, continuing insurance coverage complying with insurance requirements, if applicable.

EEEEEEEE. Reinspection Procedure: The Inspection Group will re-inspect the Work upon receipt of notice from the Construction Administrator that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the OWNER.

1. Upon completion of reinspection, the Construction Administrator will prepare a certificate of final acceptance. If the Work is incomplete, the Construction Administrator will advise the CONTRACTOR of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

1.3 RECORD DOCUMENT SUBMITTALS

FFFFFFFF. General

Do not use Record Documents for construction purposes. Protect Record Documents from deterioration and loss in a secure, fire-resistant location. Provide access to Record Documents for the ENGINEER'S reference during normal working hours. Keep documents current; do not permanently conceal any work until required information has been recorded. Failure to keep documents current is sufficient cause to withhold progress payments.

1. The CONTRACTOR shall also hire the services of a Surveyor registered in the State of Connecticut to conduct a final survey as specified in Section 01050, and to record the results, and update existing electronic media
2. The Record Drawings shall be prepared upon completion of the work and in accordance with Section 01050 and copies submitted to the OWNER as required in Section 01700. The Record Drawings shall bear the seal of the Land Surveyor and a statement of accuracy.

GGGGGGGG. Record Drawings

The CONTRACTOR shall maintain one clean, complete undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

1. Mark record sets with erasable pencil to distinguish between variations in separate categories of the Work.
2. Mark all new information that is not shown on Contract Drawings.
3. Note related change-order numbers where applicable.
4. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
5. Upon completion of the work, the CONTRACTOR shall submit Record Drawings to the Construction Administrator and shall submit the Certified Final As-built and Topographic Survey (as detailed in Section 01050) to the Construction Administrator for the OWNER'S Records. CONTRACTOR shall provide the Certified Final As-built and Topographic Survey on mylar and electronically as required in Section 01050.
6. Submit electronic format data of all revised drawings on CD-ROM or other approved electronic format and in AutoCAD (latest version) compatible format.

HHHHHHHH. Record Specifications

The CONTRACTOR shall maintain one complete copy of the Project Manual, including Addenda. Include with the Project Manual one copy of other written construction documents, such as Change Orders and modifications issued in printed form during construction.

1. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
2. Give particular attention to equals and substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.
3. Note related Record Drawing information and Product Data.
4. Upon completion of the Work, submit record Specifications to the Construction Administrator for the OWNER'S records.

IIIIIIII. Record Product Data

The CONTRACTOR shall maintain one copy of each Product Data submittal. Note related Change Orders and markup of Record Drawings and Specifications.

1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.
2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.
3. Upon completion of markup, submit complete set of Record Product Data to the Construction Administrator for the OWNER'S records.

JJJJJJJJ. Record Sample Submitted

Immediately prior to Substantial Completion, the CONTRACTOR shall meet with the Construction Administrator, ENGINEER and the OWNER'S personnel at the Project Site to determine which Samples are to be transmitted to the OWNER for record purposes. Comply with the OWNER'S instructions regarding delivery to the OWNER'S Sample storage area.

KKKKKKKK. Miscellaneous Record Submittals

Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to the Construction Administrator for the OWNER'S records.

LLLLLLLL. Maintenance Manuals

Organize operation and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-inch (51-mm), 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder according to section 01730. Included but not limited to the following types of information:

1. Emergency instructions.
2. Spare parts list.
3. Copies of warranties.
4. Wiring diagrams.
5. Recommended "turn-around" cycles.
6. Inspection procedures.
7. Shop Drawings and Product Data.
8. Fixture lamping schedule.

1.4 CLOSEOUT PROCEDURES

MMMMMMMM. Operation and Maintenance Instructions: Arrange for each Installer of equipment that requires regular maintenance to meet with the OWNER'S personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:

1. Maintenance manuals.
2. Record Documents.
3. Spare parts and materials.
4. Tools.
5. Lubricants.
6. Fuels.
7. Identification systems.
8. Control sequences.
9. Hazards.
10. Cleaning.
11. Warranties and bonds.
12. Maintenance agreements and similar continuing commitments.

NNNNNNNN. As part of instruction for operating equipment, demonstrate the following procedures:

1. Startup.
2. Shutdown.
3. Emergency operations.
4. Noise and vibration adjustments.
5. Safety procedures.
6. Economy and efficiency adjustments.
7. Effective energy utilization.

1.5 FINAL CLEANING

OOOOOOOO. General: The General Conditions requires general cleaning during construction. Regular site cleaning is included in Division 1 Section 01570, "Cleaning".

PPPPPPPP. Comply with Manufacturer's instructions. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.

QQQQQQQQ. Exterior:

1. Clean the site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth, even-textured surface.
2. Clean exposed exterior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances
3. Clean roofs, gutters and downspouts.
4. Remove waste and surplus materials, rubbish and construction equipment and facilities from the site, and deposit it legally elsewhere.
5. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Remove paint spots; wash and polish glass.

RRRRRRRR. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

SSSSSSSS. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the OWNER'S property, unless authorized by OWNER. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully, unless authorized by OWNER to leave on-site.

1. Where extra materials of value remain after completion of associated Work, they become the OWNER'S property. Dispose of these materials as directed by the Construction Administrator.
2. If the CONTRACTOR fails to clean up, the OWNER may do so, with the cost charged to the CONTRACTOR. The OWNER will issue a credit change order to cover the costs.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01730

OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

TTTTTTTT. The CONTRACTOR shall instruct the City's designated personnel in the operation of new equipment and shall provide manuals and if required, provide DVDs of this basic maintenance of the equipment for training purposes. Provide qualified personnel for as long as necessary to instruct the City's personnel.

UUUUUUUU. Submit four (4) copies of the manuals in 3-ring, loose-leaf notebooks to the ENGINEER for approval. Manuals may consist of plain paper copies of approved shop drawings and catalog cuts. Upon completion and approval, 3 copies will be forwarded to the State and one copy retained by the ENGINEER.

VVVVVVVV. Manuals shall include:

1. Operating Procedures:
   a. Typewritten procedures for each mode of operation of each piece of equipment. Procedures shall indicate the status of each component of a system in each operating mode.
   b. Procedures shall include names, symbols, valve tags, circuit numbers, schematic wiring diagrams, locations of thermostats, manual starters, control cabinets and other controls of each system.
   c. Emergency shut-down procedures for each piece of equipment or system, both automatic and manual, as appropriate.
2. Maintenance Schedule:
   a. Typewritten schedule describing manufacturers schedule of maintenance and maintenance procedures.
3. Catalog Cuts:
   1. To illustrate each piece of installed equipment, including options.
   b. Include equipment descriptions including physical, electrical and mechanical; performance characteristics; installation or erection diagrams.
   c. Include spare parts numbers and names, address and phone number of manufacturer; name, address and phone number of local representative or service department.
   d. Typewritten list of all subcontractors on the project, including name, address and phone number of local representative or service department.
4. Manuals shall be indexed with dividers indicating each system or piece of equipment.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01740

WARRANTIES AND GUARANTEES

PART 1 - GENERAL

WWWWWWWW. 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. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the CONTRACTOR.

XXXXXXXX. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.

YYYYYYYY. 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.

ZZZZZZZZ. 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 the 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.

AAAAAAAAA. OWNER'S Recourse: Expressed warranties made to the ENGINEER are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the OWNER can enforce such other duties, obligations, rights, or remedies.

1. Rejection of Warranties: The OWNER reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

BBBBBBBBB. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the OWNER reserves the right to refuse to accept the Work, until the CONTRACTOR presents evidence that entities required to countersign such commitments are willing to do so.

CCCCCCCCC. The CONTRACTOR shall guarantee all materials and workmanship for a period of eighteen months from the date of acceptance of the Work. In addition, the CONTRACTOR shall

furnish the warranties listed below. Submit four (4) copies of each to the Construction Administrator in the supplier's standard form or in the form given below if there is no standard form available.

1. Section 06643, Geomembranes: Pipe penetration seals and field seams shall be included in the warranty. The warranty shall guarantee materials for a minimum of 20-year materials, and labor for a minimum period of 5-years.

DDDDDDDDD. Submit certification that finish materials are fire rated as specified.

EEEEEEEEE. Form of Guarantees and Warranties:

City of Stamford
Bureau of Engineering
Stamford, Connecticut
(Scofieldtown Park Landfill Closure; Project Number [Insert No. Here])

I (We) hereby guarantee and warranty the work on the referenced project for a period of_____ years from_____, 20__ against failures of workmanship and materials in accordance with the requirements of Section __, Page __, Paragraph__, of the Specifications.

Signed _____
General CONTRACTOR (or authorized agent) _____

FFFFFFFFF. Bonds shall be by approved Surety Companies, made out to the OWNER on company's standard form.

GGGGGGGGG. Guarantees, warranties or bonds supplied by Subcontractors, Suppliers or Manufacturers shall reference the project name, number, and location and be certified by the General CONTRACTOR to be for the product and installation on the Project and must be countersigned by the General Contractor.

HHHHHHHHH. Submittals:

1. Submit written warranties prior to the date certified for Substantial Completion. If the Engineer's 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 ENGINEER.
2. Forms for special warranties are included in this Section. Prepare a written document utilizing the appropriate form, ready for execution by the CONTRACTOR, or by the CONTRACTOR, subcontractor, supplier, or manufacturer. Submit a draft to the OWNER, through the Construction Administrator, for approval prior to final execution.
   a. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
3. Form of Submittal: At Final Completion compile two (2) copies of each required warranty 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.

4. 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-by-l 1-inch (115-by-280-mm) paper.
   a. 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.
   b. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the CONTRACTOR.

When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 02050

DEMOLITION AND ABANDONMENT

PART 1 – GENERAL

1.1 DESCRIPTION

A. Demolition of structures includes, but is not limited to, the deconstruction and removal of buildings, trailers, tennis courts, concrete pads/slabs, foundations, retaining walls, storage tanks, fencing, guard rails, utilities, roads, paved areas, and other existing site infrastructure, both above and below grade, and including elements to be disposed or salvaged as shown on the Contract Drawings. The existing salt shed shall only be demolished if approved by the OWNER (bid alternate). Abandonment work includes in-place abandonment of existing monitoring wells, and the 36" reinforced concrete pipe and associated structures between the existing pond and wetlands.

B. Related Sections

1. The work of the following Sections is related to the work of this section. Other sections, not referenced below, may also be related to the proper performance of this work. It is the CONTRACTOR'S responsibility to perform all the work required by the Contract Documents.
2. Section 02110, Clearing, Grubbing, Stripping and Chipping
3. Section 02112, Erosion and Sediment Control
4. Section 02220, Excavation and Backfill
5. Section 02225, Subgrade Preparation

1.2 PROJECT CONDITIONS

A. The CONTRACTOR shall perform all work in compliance with all Federal, State, and Local regulations and requirements, including, but not limited to, Building Code, Health, Fire Department, and Fire Marshall provisions, and EPA and Connecticut Department of Health for asbestos and lead abatement regulations and requirements. The CONTRACTOR shall be responsible for obtaining and payment of fees for all permits and approvals required to perform the work. City permit fees will be waived (however, water and sewer usage fees will apply). Applicable regulations and requirements may include, but are not limited to:

1. Federal
   a. Environmental Protection Agency (EPA) requirements for the management of hazardous waste including 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, and 40 CFR 268. Comply with governing EPA notification regulations before beginning demolition.
   b. Department of Transportation (DOT) requirements for the transportation of waste including 49 CFR 171, 49 CFR 172, and 49 CFR 173.

c. OSHA requirements for Safety and Health Protection including 29 CFR 1910 and 29 CFR 1926.

d. NFPA 241, Standards for Fire Protection during the work, and NFPA 30, Flammable and Combustible Liquids Code.

e. ANSI A10.6, Safety Requirements for Demolition Operations.

2. State of Connecticut
   a. Connecticut Department of Environmental and Energy Protection (CTDEEP)

      1) Waste Management Bureau - requirements for Hazardous, Connecticut-regulated and Solid Waste management, transport and disposal including RCSA 22a-449(c) and RCSA 22a-209. Connecticut regulatory standards for the management of used oil are contained in RCSA 22a-449(c)-119.

      2) Water Management Bureau - requirements for control of wastewater discharges and use of Best Management Practices (BMPs) to protect surface and ground waters including RCSA 22a-6k and 22a-430. Connecticut construction stormwater regulations are contained in RCSA 22a-430(b). Obtain any necessary water discharge permits (if needed, supplemental to Stormwater General Permit). If a liquid dust suppression agent will be used, the Contractor shall either obtain approval of a Water Management Plan (for discharge to sanitary sewer) or obtain a Temporary/Emergency Authorization (for discharge to ground or surface water). For discharge to the sanitary sewer, obtain plan approval from both CTDEP and the applicable sewer authority.

      3) Air Management Bureau - requirements for control of noise, fugitive dust and visible emissions and permitting of sources exceeding state limits.

4) Water Management Bureau – requirements for soil erosion and sediment control, including C.G.S. 22a-325 through 22a-329 and summarized in Connecticut Guidelines for Soil Erosion and Sediment Control.

b. Connecticut Department of Public Health (CTDPH)

1) Requirements for abatement of asbestos, civil penalties for violation of asbestos abatement laws and licensure and training of persons engaged in asbestos consultation services.

c. State Fire Marshall's Office

1) Requirements for licensing of Contractors and compliance with the State Demolition Code (CGS 29-401 through 29-415).

3. City of Stamford

a. Building Department - requirements to obtain and comply with Demolition Permit process. The City will waive the permit application fee.

b. Engineering Department – requirements to obtain street use/street opening and sidewalk permits. No new sidewalk posts will be allowed without permission from the City Engineer.

c. Department of Health – requirements associated with cesspools, septic systems or drywells.

d. Fire Department – requirements associated with use of fire hydrant.

e. Tree Warden

f. Water Department and Water Pollution Control Authority – requirements for water and sewer service deactivation, disconnection and/or capping. Coordinate with the Water Department, in addition to the Fire Department, for hydrant usage requirements.

g. Highway Department – requirements for capping/bulkheading of storm drains.

4. Pre-Demolition Notification
   a. Requirements that CONTRACTOR notify the ENGINEER seven (7) working days prior to proposed demolition and obtain ENGINEER'S approval for the specific phase of the demolition to take place.

5. General
   a. Buildings to be demolished shall be vacated and their use discontinued before start of work.

   b. Condition of Structure: OWNER assumes no responsibility for actual condition of structures to be demolished.

   c. Provide not less than 72 hours notice to neighbors of activities that will affect their operations.

   d. Explosives: Do not bring explosives to site or use explosives at the site.

   e. Traffic: Conduct demolition operations and removal of debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

      1) Do not close or obstruct streets, walks, or other occupied or used facilities without permission from the OWNER. Provide alternate routes around closed or obstructed traffic ways as required by governing regulations.

      2) Arrange demolition so as not to interfere with neighbors and City traffic operations.

f. Protections: Ensure safe passage of persons around area of demolition. Conduct operations to prevent damage to adjacent buildings, structures, improvements and other facilities, and injury to persons.

1) Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structures to be demolished and to protect adjacent facilities to remain.

2) Erect temporary covered sidewalk shed passageways as required by authorities having jurisdiction.

3) Barricade open excavations occurring as part of this work and post with warning lights.

4) All protective barricades shall be constructed in accordance with applicable laws, including the State Demolition Code, Public Act 551 (February, 1965) and the Building Code of the City of Stamford. No work shall be done on the site unless all safety precautions required by the Contract, or by good practice, have been taken by the CONTRACTOR.

5) The CONTRACTOR shall maintain adequate metal fencing to secure this site along adjacent streets and exclude the public from the Contract Boundaries as shown on the Drawings.

6) Maintain access to other adjacent, occupied or used facilities.

g. Damages: Promptly repair damages caused to adjacent facilities by demolition operations.

h. Fire Protection: The CONTRACTOR shall contact the City's Fire Marshall concerning their requirements for providing fire protection and, if applicable, fire hydrant use.

i. Utility Services: Confirm all utilities to be removed and utilities indicated to stay in service. Protect the latter against damage during demolition operations. Field verify all utility locations.

j. Do not interrupt existing utilities serving occupied or used adjacent facilities, except when authorized in writing by the ENGINEER. Provide temporary services during interruptions to existing utilities.

k. Burning: Burning will not be permitted.

l. Removal of items from the site is prohibited unless approved otherwise.

m. Hazardous Materials: Hazardous materials may be present in the buildings and structures to be demolished.

1) Hazardous material remediation is specified elsewhere in the Contract Documents. Applicable regulations may include, but are not limited to: 40 CFR Parts 82, 171 to 179, 260 to 270, 273, 280, and 281, Regulations of Connecticut State Agencies (RCSA) Section 22a-116 to 112, -454, and -449, NFPA 20, NFPA 31, NFPA 327, API 1604, 40 CFR Part 761, TSCA Sec. 6(e), DOT 49 CFR Parts 172 to 180, and other state and federal regulations.

2) Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents, unless authorized by the ENGINEER.

3) If the CONTRACTOR encounters what is believed to be hazardous materials, not originally identified in the Contract Documents, the CONTRACTOR shall notify the ENGINEER prior to testing to verify such materials a minimum of 14 days before demolition in that area occurs.

n. Upon approval from the ENGINEER, underground and aboveground heating oil storage tanks shall be drained and removed or abandoned in place by suitable means. Oil residue shall be disposed of as waste oil in accordance with all laws and regulations.

1.3 SUBMITTALS

A. Demolition Work Plan – The CONTRACTOR shall prepare a Work Plan for performing all demolition work required by, and associated with, this project. The Demolition Work Plan shall include site and project specific details regarding health and safety measures, emergency response, work zones, utility location and decommissioning, demolition equipment and methods, staging areas, non-hazardous and hazardous materials management, and other applicable topics.

B. Abandonment Work Plan – The CONTRACTOR shall prepare a Work Plan for performing all abandonment work required by, and associated with, this project. The Abandonment Work Plan shall include site and project specific details regarding health and safety measures, emergency response, abandonment equipment and methods, staging areas, non-hazardous and hazardous materials management, and other applicable topics. For the abandonment of the 36-inch pipe and associated structures, include relevant details such as grout mix design, special conditions for weather, methods of pipe dewatering, slurry delivery rates and pressures, methods of controlling pressures, bulkhead and vent design, and grouting sequence and stages.

C. ENGINEER shall prepare a Stormwater Pollution Control Plan in accordance with the CTDEEP's General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities. This plan shall address temporary means needed to prevent discharge of sediment to water courses because of dewatering systems or erosion and off-site removal, and disposal of all water that has contacted exposed solid waste material as a result of construction activities. Submit signed Certificate of Compliance with this Plan.

D. Submit proof of valid State of Connecticut Class A Demolition License as certified by the State Fire Marshall's Office prior to contract signing.

E. The CONTRACTOR shall submit the name of the registered driller (for well abandonment) and a copy of their Certificate of Registration, as indicated in the Connecticut Department of

Consumer Protection Regulations Section 5-129, at least fourteen (14) days prior to starting well abandonment work.

F. Copies of well abandonment records.

G. Submit proof of all applicable permits and approvals necessary prior to initiating any site work. This shall include Demolition Permit and letter from applicable utilities.

H. Driller Qualification of firm with at least 5 years experience in well abandonment under similar conditions (subject to ENGINEER'S approval).

I. Proof of current OSHA HAZWOPER training for applicable personnel (prior to construction).

J. Copies of "Call-Before-You-Dig" confirmation/ticket and private utility locator reports (prior to demolition or abandonment work).

1.4 QUALITY ASSURANCE

A. Demolition and Abandonment Firm Qualifications: An experienced firm that has specialized in demolition and abandonment work similar in material and extent to that indicated for this project.

B. Standards: Comply with ANSI A10.6 and NFPA 241.

C. Pre-demolition Conference: Conduct conference at project site with OWNER, ENGINEER, and subcontractors to review methods and procedures related to demolition and abandonment work, but not limited to the following:
   1. Sequence of demolition and abandonment and removal work
   2. Coordination of decommissioning and capping of utility services.

1.5 ENVIRONMENTAL PROTECTION

A. Provide environmental protection as required to prevent fugitive dust and debris from creating a nuisance or hazard and to prevent spills and pollution of the ground or water on and off-site during the Work. Do not use water for dust control if it results in objectionable conditions such as ice or pollution.

PART 2 – PRODUCTS

Not used

PART 3 - EXECUTION

3.1 PREPARATION

A. Prior to the start of Work, the CONTRACTOR shall engage a competent person to conduct an engineering survey to address planning and implementation of all aspects of the demolition

process in accordance with the important regulations provided within of OSHA, 29 CFR 1926, Subpart T-Demolition. The engineering survey shall be utilized to prepare the Demolition Work Plan detailing safe demolition procedures and all other aspects to be utilized in performance of the Work.

B. Review Project Record Documents of existing construction (if available) from OWNER. The OWNER does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Prior to any ground disturbing activities, the CONTRACTOR shall contact "Call-Before-You-Dig" and then employ a private underground utility locating company to locate any utilities not marked by "Call-Before-You-Dig". The CONTRACTOR is solely responsible for location of underground utilities.

D. Site reconnaissance shall also include an examination of the structures with the OWNER and/or ENGINEER and review of available reports to determine the potential for the presence of hazardous materials such as asbestos, chemicals, or other materials that may require special handling and disposal.

E. The CONTRACTOR shall incorporate special handling requirements for all hazardous materials in the Demolition Work Plan (and other applicable documents).

F. All required excavation shall be performed to prevent damage to any of the lines of conduit identified to remain.

G. The CONTRACTOR shall incur all repair costs to make good all damage resulting from an incomplete underground line survey or for any misinterpretations of supplied information.

H. Coordinate with the OWNER to identify known subsurface structures and/or utilities at the site prior to demolition work.

I. Coordinate all demolition and abandonment work with the OWNER and ENGINEER prior to beginning work. Obtain full agreement between project representatives, in writing, prior to demolition of facilities, utilities, or structures.

J. Coordinate with the OWNER regarding corridors and thoroughfares to be kept clear and open.

K. Provide and maintain temporary barriers and security devices at locations designated by the OWNER, including warning signs and lights, and similar measures, for protection of the public, OWNER, CONTRACTOR'S employees and existing improvements to remain.

L. Protect existing landscaping material, trees, appurtenances, structures and any other objects which are not to be demolished or otherwise damaged.

M. Prevent movement or settlement of adjacent structures. Provide bracing or shoring as required.

N. Clarify with the OWNER the location of temporary debris spoil stockpiles. Note that clarification may be made during pre-bid and pre-constructions conferences.

O. Verify in writing that hazardous materials have been remediated before proceeding with demolition operations.

3.2 DEMOLITION REQUIREMENTS

A. Conduct demolition to minimize interference with adjacent structures and occupancies.

B. Conduct demolition in accordance with the approved Demolition Work Plan and other applicable requirements.

C. Disconnect, cap and remove utility lines serving the properties to be demolished as indicated. Demolish all aboveground pipelines, utilities and conduits, and areas of below ground pipelines and utilities as needed to demolish the indicated structures, and as approved by the OWNER. Obtain all necessary street use and street opening permits from the OWNER.

D. Cease operations immediately if adjacent structures appear to be in danger or in the event that materials of unknown or dangerous nature are discovered during the demolition process. Notify ENGINEER of the discovered condition. Do not resume operations until directed.

E. Conduct operations with minimum interference to public or private accesses. To the maximum extent possible, all required demolition and abandonment work shall be completed from within the property and not from the street.

F. Obtain written permission from adjacent property owners when demolition equipment will traverse, infringe upon or limit access to their property.

G. Sprinkle Work with water or other approved means to minimize dust. Provide hoses and water connections for this purpose, as needed. Provide water treatment as required.

H. All demolition shall protect adjacent structures and works to be retained. All survey benchmarks and staking, monitoring wells, and other permanent installations shall be protected from damage during demolition.

I. Provide for the continued excavation of the site by a competent person as the work progresses and conditions change to detect and protect against hazards to safety.

3.3 DISPOSAL

A. Unless approved otherwise, all non-hazardous demolition debris except for existing vegetation shall be incorporated into the subgrade with existing waste material as described in the applicable sections.

B. Properly dispose of all hazardous materials in accordance with current regulatory and project requirements.

3.4 MONITORING WELL ABANDONMENT

A. Description:

1. Well abandonment shall be performed by a registered well driller at locations shown on the Contract Drawings or as directed by the ENGINEER. The well driller must be registered in the State of Connecticut.
2. Well abandonment shall conform to the requirements of the Connecticut Well Drilling Code (CGS Chapter 432 Well Drilling Section 25-126 through 137; and DCP Regulations for the Well Drilling Industry 25-128-1 through 64).

B. Materials:

1. The grout used to seal the ground water monitoring wells shall be a bentonite cement grout complying with RCSA 25-128-36(E). The mix shall be comprised of one ninety-four (94) pound bag of Portland cement, an equal volume of dry sand, and five to six gallons of water with ten percent (10%) bentonite added to reduce shrinkage. The CONTRACTOR shall not use admixtures to decrease the set time of the grout.

C. Construction Methods:

1. Prior to the planned excavation work, the CONTRACTOR shall confirm the location and depth for each of the subject wells. Wells with a total depth of up to 15 feet below ground surface (bgs) may be removed as a part of the planned excavation work and will not require abandonment by a registered driller. All wells with a depth greater than 15 feet bgs must be properly abandoned by a registered driller prior to commencement of earthwork in the vicinity.
2. Wells shall be abandoned prior to the commencement of any earthwork in the vicinity. The CONTRACTOR shall coordinate the work of monitoring well abandonment with the ENGINEER. No such work shall be performed without the ENGINEER present to verify abandonment procedures.
3. Wells shall be abandoned in accordance with the Connecticut Department of Consumer Protection Regulations, particularly Sections 25-128-56 and 25-128-57. In the event of any conflict between the regulations and this specification, the more stringent shall apply.

D. Well Abandonment Procedure:

1. The well shall be plugged to prevent the entrance of surface water, circulation of water between or among producing zones, or any other process resulting in the contamination or pollution of ground water resources.
2. The well shall be chlorinated prior to abandonment using a chlorine solution with a minimum concentration of 150 parts per million (ppm) of chlorine.
3. The well shall be checked from land surface to the entire depth of the well before it is sealed to ensure against the presence of any obstruction that will interfere with sealing operations.
4. The well bore shall be completely filled and sealed with bentonite cement grout.
5. The grout material shall be placed in such a way to prevent voids in the grout or dilution of the grout.
6. The well shall be abandoned in such a manner that it does not become a channel for the vertical movement of water or other substance to the potable ground water resources.

7. Upon completion of abandonment of the well, the top of the casing and grout material shall not be terminated more than four feet below the ground surface of the final grade.

E. Within 30 days of completion of each well abandonment, the licensed well drilling CONTRACTOR shall complete the DCP Well Abandonment, Verification of Work Completed Form, in accordance with CGS Section 25-131, and submit such form to the DCP, DEEP, local Health Department and the ENGINEER.

3.5 ABANDONMENT OF 36" REINFORCED CONCRETE PIPE AND ASSOCIATED STRUCTURES

A. The existing 36" reinforced concrete pipe (and associated structures) between the existing pond and the wetlands shall be abandoned in place in accordance with the approved Abandonment Work Plan. Unless approved otherwise, abandonment shall be achieved by completely filling with an approved non-shrink grout mix in a manner that minimizes void spaces. Dewatering of the pipe shall be provided, as necessary. The grout shall consist of a mixture of Portland cement and water, along with required aggregates and admixtures as needed to create a pumpable slurry that will not readily mix with any residual fluids in the pipe. Aggregates shall be uncoated, hard and durable. The grout shall have a 28-day unconfined compressive strength of approximately 100 psi and shall be installed operators experienced with the type of work required. The pipe and structures shall not be abandoned until the existing pond is no longer needed to serve as a temporary sediment basin.

END OF SECTION

SECTION 02110

CLEARING, GRUBBING, STRIPPING, AND CHIPPING

PART 1 - GENERAL

1.1 DESCRIPTION

B. Remove felled trees (including branches) from the area to be capped. All removed items shall be legally reused/disposed offsite at a preapproved location.

C. Remove stumps and roots from the area to be capped. These materials shall be modified by chipping or grinding, as needed. All removed stumps and roots shall be legally reused/disposed offsite at a preapproved location.

D. Removal and legal offsite reuse or disposal of leaves, leaf mulch, etc., which may remain in the existing leaf processing area. All such material shall be legally reused/disposed offsite at a preapproved location.

E. Clearing, grubbing, stripping, and chipping as required of existing brush, grass, and other near-surface vegetation organic material from the area to be capped. All removed vegetation shall be legally reused/disposed offsite of a preapproved location.

E. Related Sections:
1. Section 02112, Erosion and Sediment Control
2. Section 02220, Excavation and Backfill
3. Section 02225, Subgrade Preparation

1.2 RESERVED

1.3 SUBMITTALS

A. Submit written notice of intent to perform clearing, grubbing, or stripping to ENGINEER at least 15 days in advance of performing these activities.

B. Submit proposed recycling/disposal facilities for indicated materials (subject to approval by ENGINEER) at least 15 days prior to start of clearing and grubbing work.

C. Proof of current OSHA HAZWOPER training for applicable personnel (prior to start of associated work).

D. Copies of “Call-Before-You-Dig” confirmation/ticket and private utility location report (prior to start of associated work).

E. ENGINEER shall prepare a Stormwater Pollution Control Plan in accordance with the CTDEEP's General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities. This plan shall address temporary means needed to prevent discharge of sediment to water courses because of dewatering systems or erosion and off-site removal, and disposal of all water that has contacted exposed solid waste material as a result of construction activities. Submit signed Certificate of Compliance with this Plan.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 PREPARATION

A. A pre-construction survey shall be performed by the CONTRACTOR to document site conditions prior to starting work. Note that the topography shown on the Construction Drawings may differ from the topography at the time of construction.

B. Prior to the start of associated work, the CONTRACTOR shall contact “Call-Before-You-DIG” and then employ a private underground utility locating company to locate any utilities not marked by “Call-Before-You-Dig”. The CONTRACTOR is solely responsible for location of underground utilities.

C. Verify that any existing plant life designated to remain is tagged and identified.

D. Verify plants to be removed and salvaged are tagged and identified.

E. Set required lines, levels, and datum by construction by approved means.

F. Locate utilities, as required.

G. Provide for dust control

H. Protect bench marks, existing structures and features to be preserved from construction equipment and vehicular traffic. Any damage caused by the CONTRACTOR shall be repaired by the CONTRACTOR at no expense to the OWNER.

I. Provide for dewatering of the construction area as necessary, that includes but is not limited to, diversion, collection, and removal of surface water, seeps, and leachate.

J. Remove and eradicate all pests from the work area during the clearing and grubbing project and during the course of the project. This shall include the removal of wasp and bees nests.

K. Protect from damage all existing utility lines that are indicated to remain, as directed in Sections 02050 and 02220. The CONTRACTOR shall be responsible for the repair of any damage to

existing utility lines that are indicated or made known to the CONTRACTOR prior to start of clearing and grubbing operations. When utility lines which are to be removed are encountered within the area of operations, the CONTRACTOR shall notify OWNER in ample time to minimize interruption of the service.

3.2 RESERVED

3.3 CLEARING, GRUBBING, STRIPPING AND CHIPPING

A. The area to be capped shall be cleared, grubbed, and stripped prior to filling, backfilling, and/or grading to design elevations.

B. Conduct operations and maintain the project site so as to minimize dust creation and dispersion.

C. Clearing shall consist of cutting and removing all vegetation including trees, shrubs, grass, and other vegetative growth. This shall include the felling, trimming, and cutting of trees and branches into sections as needed. If such trees have not already been felled (by others) at the start of the project.

D. Grubbing shall consist of the removal and disposal of wood or root matter below the ground surface remaining after clearing and shall include stumps, trunks, roots, or root systems to a minimum depth of 3 feet below the ground surface.

E. Stripping shall include the removal, stockpile, handling, reuse by processing of stripping debris with soil, and disposal of unused stripping debris. Stripping shall include all organic sod, topsoil, plant growth and associated roots. Stripping shall extend to the bottom of the root zone to a maximum of 12 inches. Topsoil may be reused, if approved.

F. Surface rocks and boulders encountered during clearing and stripping activities shall be grubbed, and may be reused in the construction if approved by the ENGINEER.

G. Except as approved otherwise, all vegetative materials, described in this section, shall be legally reused/disposed offsite at preapproved locations. If approved by the ENGINEER, wood chips may be used for dust control on unpaved roads and other suitable areas.

END OF SECTION

SECTION 02112

EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.1 DESCRIPTION

A. The work described herein and as shown in the details on the Contract Drawings shall consist of furnishing all labor, material and equipment and performing all operations required for furnishing and installing the erosion and sediment controls during construction activities. Staked haybales, silt fence and stone anti-tracking pad, and other devices/components, shall be required where indicated on the Contract Drawings and elsewhere, as necessary to control sedimentation from disturbed area and soil stockpiles. Also maintain the erosion and sediment controls through the construction period until the site has been stabilized, as determined by the ENGINEER. The CONTRACTOR shall be responsible for maintaining compliance with all applicable erosion and sediment control regulations.

B. The work shall conform to the Soil Erosion and Sediment Control Contract Drawings, as well as the Soil Erosion and Sediment Control Plan/Stormwater Pollution Control Plan and the Quality Assurance plan for the project. Site soil erosion and sediment controls must be in place before proceeding with any site disturbance activity.

C. The CONTRACTOR is solely responsible for the management of surface water runoff. The ENGINEER shall verify that all required sediment and erosion controls have been installed to specifications prior to the CONTRACTOR starting any construction activities at the site. The ENGINEER shall also periodically inspect sediment and erosion controls, including after rainfall events, and inform the CONTRACTOR of repairs or removal of accumulated sediments that are required to maintain the effectiveness of the sediment and erosion controls. The CONTRACTOR shall promptly perform these repairs and removal actions as directed by the ENGINEER. The CONTRACTOR is responsible for the costs associated with these repairs and removal actions.

1.2 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Latest editions apply.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.

Concrete Aggregates

ASTM D 3787 Bursting Strength of Knitted Goods – Constant-Rate-or-Transverse (CRT) Ball Burst Test

ASTM D 4355 Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)

Trapezoid Tearing Strength of Geotextiles

Grab Breaking Load and Elongation of Geotextiles

ASTM D 5141 Determining Filtering Efficiency and Flow rate of a Geotextile for Silt Fence Application Using Site-Specific Soil

o. 83-388 An Act Concerning Soil Erosion and Sediment Control

CT Council on Soil and Water Conservation, Connecticut Guidelines for Soil Erosion and Sediment Control

1.3 SUBMITTALS

A. The CONTRACTOR shall furnish copies of manufacturer's material data literature for silt fence.

B. Furnish submittals identified on the Soil Erosion and Sediment Control Drawings (15 days prior to the start of the work). This shall include, but is not limited to, a Construction Sequencing and Water Management Plan.

C. Submit signed Certificate of Compliance with the Stormwater Pollution Control Plan.

PART 2 PRODUCTS

2.1 SILT FENCE FABRIC

A. Fabric used in silt fence construction shall be non-rotting, ultraviolet light resistant woven polyester geotextile with sufficient strength for the purpose intended. The grab tensile strength shall exceed 150 pounds and puncture strength shall exceed 50 pounds.

2.2 HAYBALES/STRAWBALES

A. Bales used in sedimentation control system shall be made of straw with forty pounds minimum weight and one hundred and twenty pounds maximum.

2.3 WOOD STAKES

A. Wood stakes used in sedimentation control system shall be a minimum 2 inch by 2 inch nominal size by a minimum 3 feet long.

2.4 ANTI-TRACKING PAD

A. Stone used for the anti-tracking pad shall be 1-inch to 2-inch crushed stone conforming to the requirement of Size #3 in CDOT Form 816 Section M.01.01.

2.5 SILT STACKS/FILTER FABRIC CATCH BASIN TRAPS

A. Filter fabric catch basin traps shall utilize filter fabric of the type described in 02112-2.1 and shall be constructed as shown on the Contract Drawings. Proprietary silt sacks may also be used with approval from the ENGINEER.

2.6 FIBER FILTRATION TUBES

A. The Fiber Filtration Tubes (FFT) shall consist of an engineered composite of wood fibers, man-made fibers and performance-enhancing polymers encased within cylindrical tubes composed of a heavy-duty, knitted, high density polyethylene mesh. The photodegradable mesh shall be oriented in diamond or hexagonal patterns and shall move freely at all knitted yarn intersections. The FFT shall allow water to flow freely through its matrix, provide three-dimensional filtration of soil particles and facilitate the release of flocculants to coagulate and aggregate suspended soil particles. Stakes and staples shall be as recommended by the manufacturer.

B. Product and Manufacturer
   1. Terra-Tubes by Profile Products, LLC
   2. or Equal

2.7. JUTE NETTING

A. Jute netting shall be a jute netting woven from undyed and unbleached plain, single jute yarn, loosely twisted with approximately uniform diameter yarn in both length and width directions. The finished cloth physical requirements are as follows:
   1. Width – Nominal 48 inches
   2. Length – Convenient lengths; 50 yard minimum
   3. Weight – 1.05 pounds – 1.70 pounds per linear yard of 48 inch wide material
   4. Mass – 0.5 to 0.769 kg/m of 1200 mm wide material
   5. Openings – Approximately ½” to 1” in width and length
      a) The use of either staples or stakes shall be as recommended by the manufacturer of the erosion control netting.

b) Staples used to fasten the erosion control netting to the soil surface shall be steel, U-shaped and shall be approximately 6 inches long and 1 inch wide. Machine made staples shall be of No. 11 gauge or heavier steel wire. Hand made staples shall be made from 13 inch lengths of no. 9 gauge or heavier steel wire.

c) Stakes used to fasten the erosion control netting to the soil surface shall be of a type, shape and length as recommended by the manufacturer unless designed otherwise by the plans.

PART 3 EXECUTION

3.1 CONSTRUCTION METHODS

Construction of erosion and sediment control practices shall be sequenced to coordinate with the construction schedule. Perimeter erosion and sediment controls shall be in place and be completely functional prior to start of any land disturbing activities. All erosion and sediment controls shall be constructed and installed in accordance with the Contract Drawings and Soil Erosion and Sediment Control Plan/Stormwater Pollution Control Plan for the project.

A. Silt Fence

1. Furnish and install silt fence as needed to control sedimentation due to runoff from disturbed areas and soil stockpiles. The silt fence shall remain in place during the duration of the project and shall be removed with the approval of the ENGINEER.

B. Staked Hay Bales

1. Furnish and install staked haybales as shown on the Contract Drawings and elsewhere as required to control sedimentation from surface runoff. Haybales shall be installed as detailed on the Contract Drawings with two wooden stakes and the lower 4 inches shall be buried below the soil surface.

C. Anti-Tracking Pad

1. Excavate and install the stone pad to the dimensions and location shown on the Contract Drawings or as directed by the ENGINEER at the edge of the paved road where construction equipment and hauling vehicles will enter and exit the disturbed work area. The stone material shall be removed and properly disposed of at the end of construction. The excavated area shall be refilled with topsoil and turf established.

D. Jute Netting

1. Jute netting strips shall be rolled out flat, parallel to the direction of flow, in flumes and ditches, perpendicular to the direction of flow on backslopes. When two or more strips are required to cover an area, they shall overlap 3 inches (minimum); and staples placed with half of each staple located in each of the adjoining blankets. Ends of strips shall overlap a minimum of 6 inches with the upgrade section on top. The upslope end (anchor slot) of each strip shall be buried in 6 inch vertical slots, and soil tamped firmly against it.

E. Catch Basin Protection

1. For catch basins in paved roadways and drainage swales, provide a filter fabric sediment trap as shown on the Contract Drawings.

F. Furnish and install Fiber Filtration Tubes (FFT) where indicated on the Contract Drawings.
   1. Install FFTs as shown on the Contract Drawings. The FFTs shall be installed after final grading but before hydroseeding and remain until turf is firmly established.

G. Maintenance
   1. The erosion and sediment control measures shall remain in place for the duration of the construction period and until turf has been established pursuant to Section 02900. The CONTRACTOR shall inspect all erosion and sediment control measures after each rainfall event and replace or repair as necessary for measures to remain functional and as directed by the ENGINEER.

3.2 BEST MANAGEMENT PRACTICES

A. Erosion and Sediment Control Devices
   1. Soil erosion and sediment controls are measures that are used to reduce the amount of soil particles that are carried off of a land area and deposited in a receiving water. This section provides a general description of the most appropriate measures planned for this project. Additional requirements as shown on the Contract Drawings. All soil erosion and sediment control measures shall be implemented in accordance with the applicable guidelines prior to commencement of demolition and construction activities. Measures shall be maintained during and after the demolition and construction activity until final stabilization is accomplished, after which time all temporary soil erosion and sediment control measures will be removed.
      a. Temporary Stabilization
         Temporary stabilization consists of terracing, mulching, or reseeding vegetation in all disturbed, unvegetated areas that are exposed during prolonged periods of inactivity. Temporary stabilization measures shall be implemented if construction halts for more than 14 days, where construction will not resume within 21 days, and where the area is not subject to traffic.
      b. Permanent Stabilization
         Permanent stabilization for the site consists of turf establishment and landscaping as described in Section 02900.
      c. Temporary Erosion Control Practices
         Prior to initiating construction, all temporary erosion and sediment control practices shall be in place. This section discusses all temporary erosion and sediment control practices that are necessary for the construction practices.
         1) Construction Access
            Any material which is transported outside the contract boundaries and is deposited on public roadways shall be removed immediately. Material may be removed by shoveling, wet mopping, wet sweeping, or wet power brooming and shall be transported to the appropriate stockpile within the contract boundaries. Road washing shall be allowed only after the sediment is removed in the above manner and approved by the ENGINEER. Dry sweeping or dry power brooming shall not be allowed.
         2) Silt Fence and Straw Bales

Silt Fence and straw bales will be used to intercept and retain small amounts of sediment carried by sheet flow from the disturbed areas during construction activities in order to prevent sediment runoff from the project site. Silt fence and straw bales shall be placed within or around the work zones as shown on the Contract Drawings. Silt fence and straw bales shall be placed perpendicular to the flow of runoff and parallel to the contours. The devices shall be placed down slope of disturbed areas where erosion would occur in the form of sheet or rill erosion. Construct silt fence and straw bale applications as shown on the Contract Drawings.

END OF SECTION

SECTION 02220

EXCAVATION AND BACKFILL

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, tools, equipment tests and incidentals required to perform all surveys, excavations, backfilling, compaction, and disposing of materials as shown, specified, and required for the purpose of constructing the landfill cap, structures, pipelines, drainage structures, basins, embankments, roads, grading, and other facilities required to complete the Work in every respect.
2. The CONTRACTOR is solely responsible for the management of surface water runoff. The ENGINEER shall verify that all required sediment and erosion controls have been installed to specifications prior to the CONTRACTOR starting any construction activities at the site. The ENGINEER shall also periodically inspect sediment and erosion controls, including after rainfall events, and inform the CONTRACTOR of repairs or removal of accumulated sediments that are required to maintain the effectiveness of the sediment and erosion controls. The CONTRACTOR shall promptly perform these repairs and removal actions as directed by the ENGINEER. The CONTRACTOR is responsible for the costs associated with these repairs and removal actions.
3. After the CONTRACTOR has performed the initial survey and provided the survey information to the ENGINEER and OWNER, the ENGINEER will confirm required final grades. All of the drawings and other associated documents associated with completion of the work will be provided to the CONTRACTOR at a meeting to be held with the OWNER, the ENGINEER, and the CONTRACTOR.
4. All of the necessary excavation, backfilling and compaction of materials to achieve the landfill cap subgrade contours as shown on the Contract Drawings.
5. All temporary means needed to maintain areas in a dewatered condition (as required).
6. All necessary testing of materials as required in the Contract Documents.
7. All necessary preparation of subgrade for the landfill cap, pavements, roadways, soil and fill material, geosynthetics and geomembranes is included.
8. All necessary preparation required to repair displaced and eroded soil materials on subgrade, general and structural fill layers, and vegetative/cover soil layer prior to final acceptance is included.
9. All temporary means needed to prevent discharge of sediment to water courses due to dewatering systems or erosion during construction are included. Such means shall be included in a Stormwater Pollution Control Plan to be prepared by the ENGINEER prior to mobilization.
10. No classification of excavated materials will be made. Excavation includes all materials regardless of type, character, composition, moisture, or condition.
11. All earthwork required to relocate (cut/fill), grade, and compact existing materials (waste and soil) to specified subgrade requirements.
12. All earthwork required to excavate, load, transport, unload, stockpile, place, grade and compact soil and gravel/stone cap components, cleared/grubbed/stripped/chipped materials,

non-hazardous demolition debris, and general and structural fill materials, as required. Note that cleared/grubbed/stripped/chipped materials shall be legally reused/disposed offsite at a preapproved location.

13. All earthwork required to install piping, foundations, structures, swales, erosion controls, stormwater measures, basins, access roads, anchor trenches, retaining walls, and other features indicated in the Contract Drawings or described in the Contract Documents.
14. All earthwork required to relocate and place boulders, regardless of size, as required. This shall include breaking boulders, if required.
15. All earthwork required to remove weathered or competent rock, where required, to establish required grades and install structures as specified.

B. Related Sections:

1. Section 02110, Clearing, Grubbing, Stripping, and Chipping
2. Section 02225, Subgrade Preparation
3. Section 02226, Subbase Material
4. Section 02227, Cover Soil Material
5. Section 02228, Topsoil
6. Section 02230, Crushed Stone and Gravel
7. Section 02900, Turf Establishment and Landscaping

C. General:

1. Subgrade contours shown on the Contract Drawings are subject to confirmation (see Part 1.1.A) and may need to be adjusted due to the amount of material available. The ENGINEER shall direct the CONTRACTOR as to any changes in the subgrade contours.
2. Except where specified otherwise, the CONTRACTOR is required to use approved clean material from off-site sources as shown on the Contract Drawings to achieve final landfill configuration.
3. Fill materials and their respective applications include, but are not limited to the following (see related sections):

Fill Material	Application
1) Subbase	Subbase Layer
2) Cover Soil Material	Layer overlying Geomembrane & Geocomposite
3) Topsoil Material	Vegetative Layer (to be established)
4) Relocated Existing Materials (waste and soil)	Cap Subgrade

4. The CONTRACTOR shall be responsible for regrading the surface of the Work Area to achieve the specified grades. It may be necessary for the CONTRACTOR to move large amounts of materials to achieve the specified grades. Payment will be made on a unit price basis. Except where specifically indicated otherwise, all grades prior to placement of subbase shall be no greater than 33%, nor less than 4%.
5. CONTRACTOR shall provide a final as-built survey of lines and grades showing topography and spot elevations prepared and sealed by a Connecticut licensed surveyor for top of subgrade (waste surface), top of geomembrane, and finished grades. Copies of all field notes shall accompany the as-built surveys and shall be submitted prior to the request for payment.
6. CONTRACTOR'S test field data must indicate compliance with the Contract Documents in order to be accepted. The data shall be presented to and accepted by the ENGINEER prior to placement of

the next lift. CONTRACTOR shall assist the ENGINEER in doing periodic conformance testing while the work is in progress. The field data shall be certified and sealed by a Connecticut licensed Professional ENGINEER.

D. CONTRACTOR shall provide ENGINEER with access to the borrow pit or material source upon request for the purposes of observing material source operations and obtaining samples.

E. CONTRACTOR shall maintain open access to roads at all times during landfill cap construction. CONTRACTOR shall not block the existing roads at any time. If access needs to be temporarily blocked during construction, the CONTRACTOR shall provide written notice to the OWNER at least one week prior to needing to block this access.

1.2 QUALITY ASSURANCE

A. Reserved

B. Permits and Regulations:
1. CONTRACTOR shall obtain all necessary permits for work.
2. CONTRACTOR shall perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction and any other permits required for this project.
3. CONTRACTOR shall comply with the CTDEEP's General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities.

C. Reserved

1.3 SUBMITTALS

A. Test Reports:
1. Submit six (6) copies of the following reports directly to ENGINEER from the testing service, with copy to the CONTRACTOR:
   a. All tests for cover material, subbase, gravel, backfill, and topsoil (see applicable sections).
   b. Compliance testing during construction.
   c. Field density tests.
   d. Optimum moisture - maximum density curve for each soil.
2. Testing shall conform to the requirements as indicated in the specific material specification sections.

B. Submit six (6) samples of all gravel, backfill, subbase, cover soil, and topsoil materials required (see applicable sections).

C. ENGINEER shall prepare a Stormwater Pollution Control Plan in accordance with the CTDEEP's General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities. This plan shall address temporary means needed to prevent discharge of sediment to water courses because of dewatering systems or erosion and off-site removal, and disposal of all water that has contacted exposed solid waste material as a result of construction activities. Submit signed Certificate of Compliance with this Plan.

D. Excavation support measure design documents, signed and stamped by a qualified Connecticut licensed professional engineer (as applicable, at least 15 days to start of applicable work).

E. Copies of Call-Before-You-Dig confirmation/ticket and private utility locator reports (prior to excavation work).

F. Proof of current OSHA HAZWOPER training for applicable personnel (prior to applicable earthwork).

G. Land Surveyor Qualifications. Unless specified otherwise, all surveys required for landfill cap construction shall be completed by a single firm. The land surveyor shall be a Connecticut licensed surveyor with a minimum of two years experience in construction land surveying of the kind required, and preparation of as-built survey in accordance with the specified horizontal and vertical control requirements. The surveying firm shall be subject to ENGINEER'S approval.

1.4 JOB CONDITIONS

A. Existing Structures: Shown on the Drawings are certain surface and underground structures adjacent to the Work. This information has been obtained from existing records. It is not guaranteed to be correct or complete and is shown for the convenience of the CONTRACTOR. CONTRACTOR shall explore ahead of the required excavation to determine the exact location of all structures. Structures/utilities identified to remain shall be supported and protected from injury by the CONTRACTOR. If they are damaged, broken or injured, they shall be restored immediately by the CONTRACTOR at his expense.

B. Existing Utilities: Locate existing underground utilities in the areas of work. Prior to the start of excavation work, the CONTRACTOR shall contact "Call-Before-You-Dig" and then employ a private underground utility locating company to locate any utilities not marked by "Call-Before-You-Dig". The CONTRACTOR is solely responsible for location of underground utilities. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

1. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the ENGINEER immediately for directions as to procedure. Cooperate with OWNER and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
2. Do not interrupt existing utilities serving facilities occupied and used by OWNER or others, except when permitted in writing by ENGINEER and then only after acceptable temporary utility services have been provided.

C. Use of Explosives:

1. The use of explosives will not be permitted.

D. Protection of Persons and Property: Barricade open excavations occurring as part of this Work and post with warning lights. Operate warning lights during hours from dusk to dawn each day and as otherwise required.

1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

E. Dust Control: CONTRACTOR shall conduct all of his operations and maintain the area of his activities, including sweeping and sprinkling of roadways, so as to minimize creation and dispersion of dust. Calcium chloride shall be used to control serious or prolonged dust problems, subject to approval of ENGINEER.

F. Stockpiles shall not be located in wetlands, watercourses, or other areas prohibited by the OWNER or ENGINEER. Surface drainage shall not be hindered, and nuisance conditions shall not be created. Place soil in stockpiles at a maximum slope of 3H:1V.

G. If construction, excavation, or backfilling equipment (crane derricks, excavator arms, lifts, dump truck beds, etc.) at the site can potentially come within a 15' radius of overhead electrical lines, a dedicated spotter must be used for each such piece of equipment. The spotter must be in continuous radio and line of sight communication with the equipment operator and be capable of immediately stopping the equipment operation if any portion of the equipment is in danger of penetrating the 15' radius overhead electrical line safety zone. The spotter shall be an experienced and qualified equipment operator. The operator shall not move equipment into the vicinity of overhead electrical lines without spotter's acknowledgment and approval. Provide other suitable precautions (e.g., flagging, signage or de-energized lines) as required.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Not Applicable.

2.2 SOIL MATERIALS

A. Cover Soil Material (Vegetative Support Soil):
1. Cover soil material (vegetative support soil) shall be used where shown or specified, or as directed by the ENGINEER.
2. Cover soil material in accordance with Section 02227.

B. Topsoil:
1. Topsoil shall be placed where shown or specified, or as directed by the ENGINEER.
2. See Section 02900 "Turf Establishment and Landscaping" for full specifications.

C. Subbase Material:
1. Subbase shall be provided to cover the waste areas subgrade (regraded waste and soil). Subbase shall be placed where shown or specified on the Drawings, or as directed by ENGINEER.
2. See Section 02226 "Subbase Material", for detailed specifications related to Subbase.

PART 3 - EXECUTION

3.1 SURVEY

A. CONTRACTOR shall have indicated surveys performed by a Connecticut licensed Land Surveyor. At a minimum, the survey shall consist of cross-sections spaced every 50 feet. Spot elevations shall be taken every 25 feet and at grade changes for every section. The survey limits shall coincide with the cap limits plus 50 feet. The survey information shall be submitted to the OWNER and the ENGINEER.

B. The ENGINEER shall confirm required grades based upon the survey information provided by the CONTRACTOR and shall modify all Contract Documents as necessary for the Work.

3.2 INSPECTION

A. ENGINEER will examine the areas and conditions under which excavating, filling, and grading are to be performed and notify the CONTRACTOR of conditions he may find that are detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in an acceptable manner.

B. CONTRACTOR shall provide the ENGINEER with clean, unused, scalable 5 gallon pails with handles and lids to obtain samples. CONTRACTOR shall assist ENGINEER while taking samples.

3.3 SITE PREPARATION

A. CONTRACTOR shall grade waste surface to achieve required grades prior to construction of the landfill cap. The CONTRACTOR shall excavate and relocate waste and existing soil to achieve the subgrade contours on the Contract Drawings. See section 02225, “Subgrade Preparation”, for additional requirements.

3.4 EXCAVATION

A. CONTRACTOR shall perform all excavation required to complete the Work as directed by the ENGINEER. Excavations of waste material shall not require drilling and blasting to remove.

B. Material Storage: Stockpile satisfactory excavated materials in approved areas, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.
   1. Locate and retain soil materials at locations indicated on Contract Drawings.
   2. CONTRACTOR shall ensure temporary erosion & sediment control measures are taken in accordance with the Stormwater Pollution Control Plan.

C. Provide shoring, bracing, and sheeting and other approved forms of sidewall support where required in accordance with OSHA regulations. Such measures shall be designed, signed and stamped by a qualified professional engineer licensed in Connecticut. The CONTRACTOR shall be responsible for the condition of all excavations made by him. All slides and caves shall be removed without extra compensation, at whatever time and under whatever circumstanced

they occur. Side slopes shall be maintained in stable condition under all normal anticipated weather conditions for the period that the excavation will be open/exposed.

D. Notify ENGINEER in advance if dewatering will be required. Coordinate dewatering of surface water and groundwater, if required.

3.5 UNAUTHORIZED EXCAVATION

A. All excavation outside the lines and grades shown, and which is not approved by the ENGINEER, together with the removal and disposal of the associated material shall be at the CONTRACTOR'S expense. The unauthorized excavation shall be filled and compacted with select backfill by the CONTRACTOR at his expense.

B. Any damage, disturbance, or settlement that occurs as a result of the CONTRACTOR'S stockpiling of material or equipment on site shall be the responsibility of the CONTRACTOR to repair and/or supply additional materials to compensate for settlement caused by the CONTRACTOR'S actions.

C. Final compacted grades shall be constructed within a tolerance of ± 1.0 foot for horizontal state plane coordinates, and within ± -0.1 foot vertical for reference to mean sea level (MSL).

3.6 GRADING

A. General: Uniformly grade areas within limits of grading under this Section, including adjacent transition areas. Smooth surfaces within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

B. Compaction:
1. After grading, compact surfaces to the depth and percentage of maximum density for each area classification.

3.7 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction (as applicable for specified materials):
1. CONTRACTOR shall establish and maintain a 50 foot grid for control of field density testing.
2. Compaction testing shall be performed by contractor on a 50 foot grid in the presence of the ENGINEER.
3. Compaction testing shall be performed according to ASTM D 2922, Density of Soil in Place by Nuclear Methods.
4. Compaction testing shall be presented and accepted by the ENGINEER prior to placement of the next lift. Fill compaction test results on the 50 foot grid interval to be signed and stamped by a professional engineer licensed in the State of Connecticut prior to submission to the ENGINEER.
5. Field compaction testing shall be included in each of the bid items. Field compaction testing for additional compacted backfill and structural fill shall be included in the respective bid items.

PART 4 – SUBGRADE PREPARATION (WASTE RELOCATION AND REGRADING) MEASUREMENT AND PAYMENT

A. Method of Measurement

1. As described herein, the CONTRACTOR shall retain the services of a licensed Connecticut Land Surveyor to survey the pre-construction grades and the grades of the top of the finished cap subgrade after compaction. At a minimum, the survey shall consist of cross-sections spaced every 50 feet. Spot elevations shall be taken every 25 feet and at grade changes for every section. The survey limits shall coincide with the cap limits plus 50 feet.
2. Measurement for payment shall only be within the limits of grading shown for the subgrade for the cap area shown on the Contract Drawings. The volume of excavation and filling shall be calculated using the average end area method based upon the pre-construction and finished cap subgrade sections.

B. Basis for Payment

1. The CONTRACTOR shall be paid at the contract unit price for pre-construction and final as-built surveys. The price shall include all labor, equipment, materials and tools incidental to the relocation and regrading of existing materials (waste and soil) to achieve the landfill cap subgrade shown on the final adjusted Contract Drawings.
2. The CONTRACTOR will be paid at the contract unit price for “waste and soil relocation and regrading” on a cubic yard basis for the combined volume of excavation and fill as defined in the method of measurement above. The price shall include all labor, equipment, materials and tools incidental to the relocation and regrading of waste and soil to achieve the landfill cap subgrade shown on the Contract Drawings (or as amended).
3. Other earthwork including breaking rock, or relocating boulders, will not be measured for payment. No additional payment shall be granted for failure to properly sequence excavation and backfill operations. No additional payment shall be granted for dewatering of surface or groundwater.

END OF SECTION

SECTION 02225
SUBGRADE PREPARATION

PART 1 – GENERAL

1.1 DESCRIPTION

A. The work shall consist of cutting/filling, placement, and consolidation/compaction of existing municipal solid waste and soil cover materials to achieve the grades indicated on the Contract Drawings.

B. The work shall also include the excavating, loading, hauling, placing, and compaction of soil for daily cover as required.

C. Related Sections
1. Section 02110, Clearing, Grubbing, Stripping and Chipping
2. Section 02112, Erosion and Sediment Control
3. Section 02220, Excavation and Backfill

1.3 SUBMITTALS

A. Subgrade Preparation Work Plan – The CONTRACTOR shall prepare a Work Plan for performing work required by, and associated with this Section. The Work Plan shall include site and project specific details regarding health and safety measures, emergency response, waste relocating and consolidation equipment and methods, sequence and schedule, and other applicable topics. Submit at least 15 days prior to starting applicable work.

B. ENGINEER shall prepare a Stormwater Pollution Control Plan in accordance with the CTDEEP's General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities. This plan shall address temporary means needed to prevent discharge of sediment to water courses because of dewatering systems or erosion and off-site removal, and disposal of all water that has contacted exposed solid waste material as a result of construction activities. Submit signed Certificate of Compliance with this Plan.

C. Copies of Call-Before-You-Dig confirmation/ticket and private utility locator reports (prior to subgrade preparation work).

D. Proof of current OSHA HAZWOPER training for applicable personnel (prior to subgrade preparation work).

PART 2 – PRODUCTS

2.1 MUNICIPAL SOLID WASTE

A. Excavated non-hazardous waste for hauling and disposal to the locations within the existing footprint of the landfill.

2.2 DAILY COVER

A. Soil meeting the requirements of Sections 02226 or 02227 of these specifications shall be acceptable as daily cover.

B. Alternative daily cover, used in lieu of soil, may consist of tarps, foam or other material as approved by the ENGINEER.

PART 3 - EXECUTION

3.1 PREPARATION

A. The CONTRACTOR shall review existing site information contained in the Landfill Closure Plan and other documents provided by the OWNER to become familiar to his satisfaction with the known subsurface conditions.

B. Establish required lines, levels, contours, and datum by approved methods

C. Prior to the start of subgrade work, the CONTRACTOR shall contact "Call-Before-You-Dig", and then employ a private underground utility locating company to locate any utilities not marked by "Call-Before-You-Dig". The CONTRACTOR is solely responsible for location of underground utilities.

D. Provide water for dust control and potential fire suppression.

E. Provide litter fences for the control of windblown litter. CONTRACTOR shall be responsible for the collection and disposal of all windblown litter created from the excavation and placement of refuse.

F. Protect bench marks, existing structures, and fences from excavation equipment and vehicular traffic.

G. Provide for dewatering as necessary for excavation and placement of waste and daily cover.

H. Perform clearing and grubbing type operations as described in the applicable section.

I. Note that topography shown on drawings may differ from topography at time of construction. A pre-construction survey shall be performed by the CONTRACTOR to document site conditions prior to starting work.

3.2 WASTE EXCAVATION

A. Strip existing clean soil cover and stockpile soil in areas designated on the Construction Drawings or as directed by the ENGINEER for re-use.

B. Excavate and haul waste to areas designated on the Construction Drawings or as directed by the ENGINEER. Excavate waste to the required lines, grades, and elevations as shown on the Contract Drawings.

C. Provide landfill gas monitoring during excavation activities in accordance with the approved Work Plan and Site, Safety and Health Plan.

D. Notify OWNER of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.

E. Provide dust and windblown litter control and protect workers as appropriate for handling municipal solid waste during excavation and filling operations.

F. The CONTRACTOR shall excavate the waste (refuse) such that large sections of refuse are not exposed.

G. Over excavation may be required to remove large objects present at the surface of the regraded waste. Such excavation shall not be measured for payment.

3.3 WASTE RELOCATION, PLACEMENT, AND CONSOLIDATION/COMPACTION

A. Place waste and non-hazardous demolition debris at the locations designated and to the grades shown on the Construction Drawings. Bulky material shall be completely buried such that no portions are within 1 foot of the geomembrane. It is recommended that boulders and other large materials be buried in the deepest fill areas early in the subgrade preparation sequence. No additional payment shall be granted for failure to properly sequence excavation and subgrade preparation.

B. Place waste in a manner which inherently eliminates large void spaces.

C. Waste fills shall be keyed-in (bonded) to the existing waste fill to prevent the development of a slip-plane by excavating horizontally into the existing waste in a minimum one foot vertical step, or as approved by the ENGINEER.

D. Spread in a maximum 1-foot lifts, and compact each lift of relocated waste by making a minimum of four passes with a Caterpillar 826H landfill compactor, or as approved by the ENGINEER. Other types of equipment which may be acceptable for spreading the waste shall not be considered acceptable for compaction/consolidation.

E. As required, load, haul, and place 6-inches of daily cover soil or approved alternative daily cover over exposed waste at end of working day.

F. Provide water for windblown litter and dust control, as necessary, during the course of the work.

3.4 HAZARDOUS CONDITIONS

A. The CONTRACTOR is advised that potentially hazardous and flammable landfill gases (such as methane and hydrogen sulfide) may be generated within the construction site and that gas may emit from the refuse during excavation. In addition, fires may potentially break out due to refuse being exposed to oxygen. As part of an approved Work Plan and HASP, the CONTRACTOR shall have suitable means available for fire suppression.

B. The CONTRACTOR shall be responsible for providing and operating properly calibrated equipment to monitor for the presence of methane, hydrogen sulfide, and adequate levels of

oxygen. If necessary, in accordance with an approved Work Plan and HASP, the CONTRACTOR shall provide suitable means to maintain the air quality within the work area in a condition such that the concentrations of methane gas, hydrogen sulfide gas, and oxygen are within acceptable limits.

C. The CONTRACTOR shall comply with all Federal, State and Local safety rules and regulations. The CONTRACTOR shall prohibit his employees from smoking except in approved areas.

D. The OWNER and ENGINEER may inspect the work area for compliance with safety rules and regulations and is empowered to stop any phase of the work which he deems unsafe. Unless otherwise provided in the Contract Documents, the CONTRACTOR shall not be entitled to any compensation for any work stoppage due to poor safety conditions which could have been prevented by the CONTRACTOR.

E. The gas from refuse may contain detectable levels of potentially hazardous constituents. The CONTRACTOR shall be responsible for instructing his personnel to utilize any other safety precautions he deems necessary or appropriate of his worker's safety.

F. Halt activities and notify the ENGINEER if unexpected hazardous materials (drums, tanks, medical waste, UXO, etc.) are discovered during subgrade preparation activities.

END OF SECTION

SECTION 02226

SUBBASE MATERIAL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. The work to be performed under this Section shall include materials, all labor, tools, equipment, and testing for furnishing, placing, grading, and compacting subbase material over the prepared and accepted subgrade (waste and soil) as shown on the Contract Drawings or as otherwise directed by the ENGINEER.
2. The CONTRACTOR is solely responsible for the management of surface water runoff. The ENGINEER shall verify that all required sediment and erosion controls have been installed to specifications prior to the CONTRACTOR starting any construction activities at the site. The ENGINEER shall also periodically inspect sediment and erosion controls, including after rainfall events, and inform the CONTRACTOR of repairs or removal of accumulated sediments that are required to maintain the effectiveness of the sediment and erosion controls. The CONTRACTOR shall promptly perform these repairs and removal actions as directed by the ENGINEER. The CONTRACTOR is responsible for the costs associated with these repairs and removal actions.
3. All necessary testing of materials as required in the Contract Documents.
4. CONTRACTOR field test data shall indicate compliance with the Contract Documents in order to be accepted. The field data shall be certified by the ENGINEER.
5. CONTRACTOR shall provide the ENGINEER with access to the borrow pits or material sources upon request for the purposes of observing material source operations and obtaining samples. The CONTRACTOR shall be responsible for supplying all required samples for testing.
6. All soil layer thicknesses referenced in this Section represent the installed compacted thickness.

B. Related Sections:

1. Section 02220, Excavation and Backfill
2. Section 02225, Subgrade Preparation
3. Section 02227, Cover Soil Material
4. Section 02228, Topsoil Material
5. Section 06643, Geomembranes
6. Section 06644, Geosynthetics

1.2 QUALITY ASSURANCE

A. Tests:

1. The services of a qualified testing laboratory shall be engaged by the CONTRACTOR to make tests and determine acceptability of the fill or material as listed below. The laboratory shall be acceptable to the ENGINEER.
2. Required Tests:

a. Gradation, ASTM D 422; Plasticity Index, ASTM D 4318; Soil Classification, ASTM D 2487; Priority Pollutant Semivolatile Compounds, EPA Method 8270; Priority Pollutant Volatile Organic Compounds, EPA Method 8260; Extractable Total Petroleum Hydrocarbons, Connecticut Method; Priority Pollutant Metals, EPA Method 6010 (HG Method); Pesticides, EPA Method 8081; PCBs, EPA Method 8082; Herbicides, EPA Method 8151. All test results shall be in conformance with the criteria for Industrial Direct Exposure Criteria (IDEC) and Class GB Groundwater Pollutant Mobility Criteria (GBPMC) of the CTDEEP's Remediation Standard Regulations (RSRs), 22a-133k-l to k-3 of the Regulations of Connecticut State Agencies.

b. Compacted Subbase material: Compaction, ASTM D 1557, ASTM D 1556, ASTM D 2922 and ASTM D3017.

B. Permits and Regulations:

1. Material transfer and storage shall comply with all local and state permits required for management and storage of soil having restricted re-use in the State of Connecticut. In particular compliance with the State of Connecticut General Permit for Contaminated Soil and/or Sediment Management (Staging & Transfer) requirements under sections 22a-133z and 22a-208a of the Regulations of Connecticut State Agencies is required.

C. Reference Standards: Comply with applicable provisions and recommendations of the following except as otherwise shown or specified.

1. ASTM D 422, Particle-Size Analysis of Soils.
2. ASTM D 4318, Liquid Limit, Plastic Limit and Plasticity Index of Soils.
3. ASTM D 1557, Laboratory Compaction Characteristics of Soil using a Modified Effort.
4. ASTM D 2922, Density of Soil and Soil-Aggregate in Place by Nuclear Methods.
5. ASTM D 3017, Water Content of Soil and Rock in Place by Nuclear Methods.
6. ASTM D 2487, Classification of Soils for Engineering.
7. Priority Pollutant Semivolatile Compounds by EPA Method 8270.
8. Priority Pollutant Volatile Organic Compounds by EPA Method 8260.
9. Extractable Total Petroleum Hydrocarbons by the Connecticut Method.
10. Priority Pollutant Metals by EPA Method 6010 (HG Method).
11. Pesticides, EPA Method 8081.
12. Herbicides, EPA Method 8151.
13. PCBs/EPA Method 8082.

Note: Items 7 through 13 as noted above will be referred to as "environmental testing" throughout these Specifications.

1.3 SUBMITTALS

A. Test Reports:

1. Submit six (6) copies of the following reports directly to ENGINEER from the testing service, with copy to the CONTRACTOR:
   a. A materials certificate stating that the subbase material meets the requirements of this section (one per source, prior to delivery of subbase to the site).
   b. All tests for subbase material.
   c. Compliance testing during construction.
   d. Field density tests.

e. Optimum moisture - maximum density curve for each soil.

2. Testing shall conform to the following as a minimum.
   a. Tests on material
      1) Subbase material: Environmental, particle size, modified proctor, and interface and internal friction angle tests for Subbase material from off-site shall be performed at a frequency of 1 per 3,000 cubic yards if from a natural borrow source or 1 per source, whichever is more stringent. Material that is not from a natural borrow source shall be tested at a frequency of 1 per 1,000 cubic yards.
   b. Field density tests:
      1) Subbase material: CONTRACTOR shall conduct one (1) test every 10,000 square feet per 6 inch lift. A Troxler Nuclear Moisture-Density gauge shall be used for all field density tests. Test locations shall be tied into a site grid system 50 foot square. Test reports shall note the grid location point and lift for each test. CONTRACTOR shall establish and maintain grid points for each lift of material placed.
   c. Moisture-density curve for each Subbase material used in construction.

B. Submit six (6) samples of all Subbase materials required.

C. ENGINEER shall prepare prior to mobilization, a Stormwater Pollution Control Plan prepared in accordance with the CTDEEP's General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities. This plan shall address temporary means needed to prevent discharge of sediment to water courses because of dewatering systems or erosion, and off-site removal and disposal of all water that has contacted exposed solid waste material as a result of construction activities. Submit signed Certificate of Compliance with this Plan.

D. Proof of current OSHA HAZWOPER training for applicable personnel.

PART 2 - PRODUCTS

2.1 ACCEPTABLE SOURCES

A. Subbase material shall be both obtained and screened/processed on-site to the maximum extent practical and economical, and then from approved off-site sources. Whether from on-site or off-site, subbase material shall meet all specified requirements.

2.2 SUBBASE

A. SUBBASE
   1. Subbase shall be provided to cover the waste areas and for supporting the overlying geotextile/geomembrane. Subbase shall be placed where shown or specified on the Drawings, or as otherwise directed by ENGINEER.
   2. Subbase shall be low plasticity inorganic soil borrow with adequate shear strength properties. The material shall be an earthen soil which is free of vegetation, ice or frozen material, wood, glass, metal, or other deleterious material. The maximum particle size shall be 1/4-inch and free of sharp edges.
   3. The Subbase shall meet or exceed the following requirements:

a. Internal Shear Strength:
All Subbase material must adhere to the range of cohesion/internal friction angle properties (i.e. 0 psf, 37°) specified below:

Cohesion, psf	Peak Internal Friction Angle Φ
0	37
10	36
20	34
35	32
45	30

The tests shall be performed for a minimum of three normal stresses that simulate field loading conditions. The following normal loads shall be used:
1) Condition No. 1 - 100psf, 300psf, 500psf.

b. U.S. Standard Sieve analysis parameters:
1) 100% passing 1/4-inch square sieve.
2) Less than or equal to 30% passing #200 sieve.

c. Plasticity index (PI) < 5.

d. The CONTRACTOR shall submit to the ENGINEER engineering calculations prepared by a licensed Connecticut Professional Engineer, shop drawings, proposed quality assurance and quality control measures, product information, laboratory test results and all other necessary and applicable data to the ENGINEER.

e. The Subbase shall be tested in accordance with ASTM D 5321, based on soil type and geosynthetics used and shall exhibit an interface friction angle >30°. Refer to Section 06643 and 06644 for testing requirements.

4. Provide approved soil materials for Subbase, free of contaminated soil, clay, rock or gravel larger than 0.25 inches in any dimension, debris, waste, frozen materials, vegetable and other deleterious matter. Soil material acceptable for use as Subbase shall be classified as SW, SP or SM according to the Unified Soil Classification System.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The ENGINEER or his representative will examine the areas and conditions under which excavating, filling, and grading are to be performed and notify the CONTRACTOR of conditions CONTRACTOR may encounter that are detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in an acceptable manner.

B. CONTRACTOR shall provide the ENGINEER or his representative with clean, unused, scalable 5-gallon pails with handles and lids to obtain samples. CONTRACTOR shall provide personnel to the ENGINEER or his representative to collect samples.

C. Prior to procurement of material and starting construction, the ENGINEER shall have submitted and received approvals for the materials based on the testing required in this Section.

D. Subbase material shall be pushed up side slopes, never down slope or sideways. It is imperative that the CONTRACTOR makes every reasonable effort to minimize the potential for Subbase to adversely affect the overlying proposed geotextile and geomembrane via penetration. Therefore, a crew of 3 workers shall work near the earthmoving equipment and remove all rocks, stones, roots or other debris in excess of 1/2-inch in any dimension that could cause damage to the proposed overlying geomembrane. Equipment operators shall not be permitted to make sharp turns or quick stops.

E. Subbase shall be placed on all areas as shown on the Drawings or as directed by the ENGINEER and as described in these Specifications. The thickness of each lift prior to compaction of the Subbase shall be no greater than eight (8) inches. Total compacted thickness of the Subbase shall be as shown on the Drawings. Compaction of the Subbase shall be accomplished by suitable compaction equipment, subject to approval by the ENGINEER.

F. The Subbase shall be placed and compacted as necessary to achieve the required shear strength (internal friction angle). The Subbase shall be compacted to 95 percent of Modified Proctor. The moisture content of the material shall be maintained within 3 percent of optimum moisture. CONTRACTOR shall not work wet cover material that cannot support equipment. Subbase material that becomes wet and soft from rainfall shall be allowed to dry and firm before placing geomembrane.

G. The existing on-site material or material delivered to the site shall be visually inspected by the ENGINEER during construction to check that it is consistently the same as the materials previously existent or delivered to the site. If changes in the material occur, the ENGINEER shall verify the material is from an approved source and the ENGINEER may require additional testing in accordance with Paragraph 1.3, Part A (2) of this Section. If the material is not from an approved source or if the material is determined to not be acceptable by the ENGINEER, the CONTRACTOR shall be notified that the material is not approved. The ENGINEER shall reject any work performed by the CONTRACTOR using the new material until the appropriate testing is conducted and the material is approved by the ENGINEER.

H. The thickness of the in-place Subbase will be checked after the completion of the work on a grid pattern not to exceed 50-foot by 50-foot by digging, by hand, in the presence of and as directed by the ENGINEER. The size of the test hole shall not be less than one-foot in diameter. Measurements shall be made perpendicular to the slope. The CONTRACTOR shall be responsible for digging holes in the Subbase to allow for the measurements to be taken by the ENGINEER. After measurements have been made, the CONTRACTOR shall backfill the holes with Subbase, and hand tamp.

I. The CONTRACTOR shall be responsible to repair damage to the Subbase between testing and acceptance. Rills and gullies shall be repaired before placing the geomembrane.

J. All soil samples are to be obtained under the direction of the ENGINEER.

K. Final acceptance of Subbase is dependent upon:
   1. Satisfying the minimum requirement of compacted thickness (6 inches) of the Subbase layer measured perpendicular to the slope.
   2. Subbase meeting all the physical/analytical properties listed in Section 02226.
   3. Final inspection conducted by the ENGINEER ensuring that the final state of the Subbase and Subbase surface will not puncture, wrinkle, or damage the proposed overlying geomembrane in any manner. If the compacted Subbase does not meet the ENGINEER'S requirements to ensure the integrity of the proposed overlying geomembrane, then the CONTRACTOR will perform all work necessary to mitigate to acceptable Subbase conditions, at no additional cost to the OWNER.

L. Any damage, disturbance, or settlement that occurs as a result of the CONTRACTOR's stockpiling of material or equipment on site shall be the responsibility of the CONTRACTOR to repair and/or supply additional materials to compensate for settlement caused by the CONTRACTOR'S actions.

3.2 SOURCE QUALIFICATION TESTING

A. Prior to acceptance of the borrow or stockpile site, the CONTRACTOR shall provide the following soil analyses to the ENGINEER:
   1. Results of interface friction test performed for the interface between the proposed Subbase and proposed geotextile material in accordance with ASTM Standard Test Method D 5321 (latest revision) performed under saturated conditions, with a 24-hour saturation period prior to the test, Determining the Coefficient of Soil/Geosynthetic Friction by the Direct Shear Method. The test shall be performed for a minimum of three normal stresses applied to bracket the normal stress of 300 psf at the interface being tested. The CONTRACTOR shall take particular note that this test shall be repeated for every proposed geotextile and Subbase combination used in the construction.
   2. Results of compaction tests conducted in accordance with ASTM D 1557 (latest revision), Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
   3. Results of Atterberg limits, plastic and liquid limit, and plasticity index conducted in accordance with ASTM D 4318 (latest revision), Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
   4. Results of the particle-size analysis conducted in accordance with ASTM D 421/422 (latest revision). Standard Practice for Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants/Test Method for Particle Size Analysis of Soils.
   5. Results of chemical/environmental analyses conducted in accordance with the requirements of Section 02226.

3.3 SUBBASE

A. Subbase Material:
   1. Quality Control Testing:
      a. The ENGINEER shall perform quality control testing during construction. This testing is in addition to all other tests required to be conducted by the CONTRACTOR.
      b. The ENGINEER shall collect representative samples from each material source of Subbase for testing at a frequency determined by the ENGINEER.

c. The Subbase shall exhibit an interface friction angle in accordance with the values as specified in paragraph 2.2 A.3.e of this specification. Materials tested by the ENGINEER exhibiting results not meeting the interface friction angle requirements will be rejected, or the CONTRACTOR may be required to furnish additional test data, at his expense, to demonstrate acceptability of the material.

3.4 MEASUREMENT AND PAYMENT

A. Payment will be made on a unit price basis for furnishing, transporting, and stockpiling materials onsite and for placing, compacting, and for performing and passing the required testing. No payment will be made for placing and compacting soil that does not meet the specified requirements and the CONTRACTOR shall be required to repair, replace, and re-compact soil until all specifications are met at their own cost.

B. Measurement for payment for furnishing, transporting and stockpiling materials onsite and for placing, compacting and performing and passing the required testing will be made based upon the final, in-place volumes for work that is accepted by the ENGINEER.

C. The OWNER reserves the right to furnish, transport, and stockpile materials onsite for use by the CONTRACTOR. The CONTRACTOR may use the materials provided by the OWNER as instructed by the ENGINEER and shall **not** assume that the materials are suitable for the directed use. The OWNER shall provide the CONTRACTOR with the environmental testing data for all materials provided by the OWNER.

END OF SECTION 02226

SECTION 02227

VEGETATIVE SUPPORT SOIL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

7. The work to be performed under this Section shall include all materials, labor, tools, equipment, and testing for furnishing, placing, grading, and compacting Vegetative Support Soil material (may also be designated as "Cover Soil" in some cases) as shown on the Drawings or as otherwise directed by the ENGINEER.
8. The CONTRACTOR is solely responsible for the management of surface water runoff. The ENGINEER shall verify that all required sediment and erosion controls have been installed to specifications prior to the CONTRACTOR starting any construction activities at the site. The ENGINEER shall also periodically inspect sediment and erosion controls, including after rainfall events, and inform the CONTRACTOR of repairs or removal of accumulated sediments that are required to maintain the effectiveness of the sediment and erosion controls. The CONTRACTOR shall promptly perform these repairs and removal actions as directed by the ENGINEER. The CONTRACTOR is responsible for the costs associated with these repairs and removal actions.
9. All necessary testing of materials as required in the Contract Documents.
10. CONTRACTOR field test data shall indicate compliance with the Contract Documents in order to be accepted. The field data shall be certified by the ENGINEER.
11. CONTRACTOR shall provide the ENGINEER with access to the borrow pits or material sources upon request for the purposes of observing material source operations and obtaining samples. The CONTRACTOR shall be responsible for supplying all required samples for testing.
12. All soil layer thicknesses referenced in this Section represent the installed compacted thickness.

B. Related Sections:

1. Section 02220, Excavation and Backfill
2. Section 02225, Subgrade Preparation
3. Section 02226, Subbase Material
4. Section 02228, Topsoil Material
5. Section 06643, Geomembranes
6. Section 06644, Geosynthetics

1.2 QUALITY ASSURANCE

A. Tests:

3. The services of a qualified testing laboratory shall be engaged by the CONTRACTOR to make tests and determine acceptability of all fill or material as listed below. The laboratory shall be acceptable to the ENGINEER.

4. Required Tests:
   a. Gradation, ASTM D 422; Plasticity Index, ASTM D 4318; Soil Classification, ASTM D 2487; Priority Pollutant Semivolatile Compounds, EPA Method 8270; Priority Pollutant Volatile Organic Compounds, EPA Method 8260; Extractable Total Petroleum Hydrocarbons, Connecticut Method; Priority Pollutant Metals, EPA Method 6010 (HG Method); Pesticides, EPA Method 8081; PCBs, EPA Method 8082; Herbicides, EPA Method 8151. All test results shall be in conformance with the criteria for either Residential Direct Exposure Criteria (RDEC) or the Industrial Direct Exposure Criteria (IDEC) and Class GA Groundwater Pollutant Mobility Criteria (GAPMC) of the CTDEEP's Remediation Standard Regulations (RSRs), 22a-133k-l to k-3 of the Regulations of Connecticut State Agencies. Soil designated as Vegetative Support Soil material within the proposed park area on the site shall comply with the RDEC and all other Vegetative Support Soil material shall comply with the IDEC
   b. Compaction, ASTM D 1557, ASTM D 1556, ASTM D 2922 and ASTM D 3017.

B. Permits and Regulations:
   2. CONTRACTOR shall obtain all necessary permits for work.
   3. CONTRACTOR shall perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.
   3 Material transfer and storage shall comply with all local and state permits required for management and storage of soil having restricted re-use in the State of Connecticut, except as noted below. In particular compliance with the State of Connecticut General Permit for Contaminated Soil and/or Sediment Management (Staging & Transfer) requirements under sections 22a-133z and 22a-208a of the Regulations of Connecticut State Agencies is required. Soils meeting the RDEC and GAPMC are not considered Contaminated Soil and as such will not be covered by the above General Permit.

C. Reference Standards: Comply with applicable provisions and recommendations of the following except as otherwise shown or specified.
   14. ASTM D 422, Particle-Size Analysis of Soils.
   15. ASTM D 4318, Liquid Limit, Plastic Limit and Plasticity Index for Soils.
   16. ASTM D 1556, Density of Soil in Place by the Sand-Cone Method.
   17. ASTM D 1557, Laboratory Compaction Characteristics of Soil using a Modified Effort.
   18. ASTM D 2922, Density of Soil and Soil-Aggregate in Place by Nuclear Methods.
   19. ASTM D 3017, Water Content of Soil and Rock in Place by Nuclear Methods.
   20. Priority Pollutant Semivolatile Compounds by EPA Method 8270.
   21. Priority Pollutant Volatile Organic Compounds by EPA Method 8260.
   22. Extractable Total Petroleum Hydrocarbons by the Connecticut Method.
   23. Priority Pollutant Metals by EPA Method 6010 (HG Method).
   24. Pesticides, EPA Method 8081.
   25. Herbicides, EPA Method 8151.
   26. PCBs/EPA Method 8082.

   Note: Items 7 through 13 as noted above will be referred to as "environmental testing" throughout this Specifications.

1.3 SUBMITTALS

A. Test Reports:
   1. Submit six (6) copies of the following reports directly to ENGINEER from the testing service, with copy to the CONTRACTOR:
      a. All tests for Vegetative Support Soil material.
      b. Compliance testing during construction.
      c. Field density tests.
      d. Optimum moisture - maximum density curve for each soil.
   2. Testing shall conform to the following as a minimum.
      a. Tests on material
         1) Vegetative Support Soil material: Environmental, hydraulic conductivity, particle size, modified proctor, and interface and internal friction angle tests for Vegetative Support Soil material from off-site shall be performed at a frequency of 1 per 3,000 cubic yards if from a natural borrow source or 1 per source, whichever is more stringent. Material that is not from a natural borrow source shall be tested at a frequency of 1 per 1,000 cubic yards.
      b. Field density tests:
         1) Vegetative Support Soil material: CONTRACTOR shall conduct one (1) test every 10,000 square feet per 12 inch lift. A Troxler Nuclear Moisture-Density gauge shall be used for all field density tests. Test locations shall be tied into a site grid system 50 foot square. Test reports shall note the grid location point and lift for each test. CONTRACTOR shall establish and maintain grid points for each lift of material placed.
      c. Moisture-density curve for each Vegetative Support soil and drainage sand material used in construction.

B. Submit six (6) samples of all Vegetative Support Soil materials required.

C. ENGINEER shall prepare prior to mobilization, a Stormwater Pollution Control Plan prepared in accordance with the CTDEEP's General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities. This plan shall address temporary means needed to prevent discharge of sediment to water courses because of dewatering systems or erosion, and off-site removal and disposal of all water that has contacted exposed solid waste material as a result of construction activities. Submit signed Certificate of Compliance with this Plan.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Not Applicable.

2.2 VEGETATIVE SUPPORT SOIL MATERIAL

A. Vegetative Support Soil Material
   1. Vegetative Support Soil material shall be placed where shown or specified on the Drawings, or as otherwise directed by ENGINEER.

2. Vegetative Support Soil material shall be low plasticity inorganic soil borrow with adequate shear strength properties. The material shall be an earthen soil which is free of vegetation, ice or frozen material, wood, glass, metal, or other deleterious material. The maximum particle size shall be 1/2 inch for all soil placed within 6 inches of the geomembrane and shall be free of sharp edges. The maximum particle size shall be 3 inches and free of sharp edges for all other Vegetative Support soil.
3. The Vegetative Support Soil material shall meet the following requirements:
   a. Permeability: The coefficient of hydraulic conductivity, k, of suitable material shall be less permeable than 1.0×10^{-5} cm/s at 90% of optimum Proctor Density in accordance with ASTM D 1557.
   b. Internal Shear Strength: All Vegetative Support Soil material shall adhere to the range of cohesion/internal friction angle properties specified below:

Cohesion (psf)	Internal Friction Angle (Φ)
0	37
10	36
20	34
35	32
45	30

   The tests shall be performed for a minimum of three normal stresses that simulate field loading conditions. The following normal loads shall be used, 100 psf, 300 psf, 500 psf.
   c. U.S Standard Sieve analysis parameters:
   i. 100% passing ½ inch or 3-inch square sieve (see A2 above)
   ii. Less than or equal to 25% passing No. 200 sieve for suitable overlying material
   d. Plasticity index (PI) <10
4. Provide approved soil materials for Vegetative Support Soil material, free of contaminated soil, debris, waste, frozen materials, vegetable and other deleterious matter. Soil material acceptable for use shall be classified as GM, GC, SM or SC according to the Unified Soil Classification System.
5. The CONTRACTOR shall submit to the ENGINEER engineering calculations prepared by a licensed Connecticut Professional Engineer, shop drawings, proposed quality assurance and quality control measures, product information, laboratory test results and all other necessary and applicable data to the ENGINEER.
6. The Vegetative Support Soil material shall be tested in accordance with ASTM D 5321, based on soil type and geosynthetics used, and shall exhibit an interface friction angle of ≥ 30º.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The ENGINEER or his representative will examine the areas and conditions under which excavating, filling, and grading are to be performed and notify the CONTRACTOR of conditions

CONTRACTOR may encounter that are detrimental to the proper and timely completion of the Work. The CONTRACTOR shall not proceed with the Work until unsatisfactory conditions have been corrected in an acceptable manner.

B. CONTRACTOR shall provide the ENGINEER or his representative with clean, unused, scalable 5-gallon pails with handles and lids to obtain samples. CONTRACTOR shall provide personnel to the ENGINEER or his representative to collect samples.

C. Prior to procurement of material and starting construction, the CONTRACTOR shall have submitted and received approvals for the materials based on the testing required in this Section.

D. Vegetative Support Soil material shall be pushed only upslope using low pressure equipment and a minimum of 12 inches of material shall be kept beneath the tracks at all times. It is imperative that the CONTRACTOR makes every reasonable effort to minimize the potential for Vegetative Support Soil material to adversely affect the underlying geomembrane and geocomposite via penetration, delamination, or slippage. Therefore, low pressure equipment shall be used to place Vegetative Support materials. Equipment operators shall not be permitted to make sharp turns or quick stops.

E. Vegetative Support Soil material shall be placed on all areas as shown on the Drawings or as directed by the ENGINEER and as described in these Specifications. The thickness of each lift prior to compaction of the Vegetative Support material shall be no greater than twelve (12) inches. Total compacted thickness of the Vegetative Support material shall be as shown on the Drawings. Compaction of the Vegetative Support Soil material shall be accomplished by suitable compaction equipment, subject to approval by the ENGINEER.

F. The Vegetative Support Soil material shall be placed and compacted as necessary to achieve the required permeabilities and shear strength. The Vegetative Support Soil material shall be compacted to 90 percent of Modified Proctor (except where specified otherwise for installation of structures, etc.). The moisture content of the material shall be maintained within 3 percent of optimum moisture. CONTRACTOR shall not work wet Vegetative Support material that cannot support equipment.

G. If changes in the material occur, the ENGINEER shall verify the material is from an approved source and the ENGINEER may require additional testing in accordance with Paragraph 1.3, Part A (2) of this Section. If the material is not from an approved source or if the material is determined to not be acceptable by the ENGINEER, the CONTRACTOR shall be notified that the material is not approved. The ENGINEER shall reject any work performed by the CONTRACTOR using the new material until the appropriate testing is conducted and the material is approved by the ENGINEER.

H. The thickness of the in-place materials will be checked after the completion of the work on a grid pattern not to exceed 50-foot by 50-foot by digging, by hand, with a plastic shovel in the presence of and as directed by the ENGINEER. The size of the test hole shall not be less than one-foot in diameter. Measurements shall be made perpendicular to the slope. The CONTRACTOR shall be responsible for digging holes in the Vegetative Support material to allow for the measurements to be taken by the ENGINEER. After measurements have been made, the CONTRACTOR shall

backfill the holes with Vegetative Support material, and hand tamp. During digging and backfill of test holes, the CONTRACTOR shall use plastic shovels and exercise care not to damage any materials. Any such damage shall be repaired at the expense of the CONTRACTOR.

I. The CONTRACTOR shall be responsible to repair damage to the Vegetative Support material between testing and acceptance.

J. All soil samples are to be obtained under the direction of the ENGINEER.

K. Final acceptance of Vegetative Support Soil material is dependent on:
   a. Satisfying the minimum requirement of thickness from the selected alternative as shown on the Contract Drawings measured perpendicular to the slope.
   b. Vegetative Support Soil material meeting all the physical/analytical properties listed in Section 02227.

L. Any damage, disturbance, or settlement that occurs as a result of the CONTRACTOR'S stockpiling of material or equipment on site shall be the responsibility of the CONTRACTOR to repair and/or supply additional materials to compensate for settlement caused by the CONTRACTOR'S actions.

3.2 SOURCE QUALIFICATION TESTING

A. Prior to acceptance of the borrow or stockpile site, the CONTRACTOR shall provide the following soil analyses to the ENGINEER:
   1. Results of interface friction test performed for the interface between the proposed Vegetative Support Soil material with proposed geosynthetics in accordance with ASTM Standard Test Method D 5321 (latest revision) performed under saturated conditions, with a 24-hour saturation period prior to the test, Determining the Coefficient of Soil/Geosynthetic Friction by the Direct Shear Method. The test shall be performed for a minimum of three normal stresses applied to bracket the normal stress of 300 psf at the interface being tested. The CONTRACTOR shall take particular note that this test shall be repeated for every proposed geosynthetic and Vegetative Support Soil material combination used in the construction.
   2. Results of compaction tests conducted in accordance with ASTM D 1557 (latest revision), Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.
   3. Results of Atterberg limits, plastic and liquid limit, and plasticity index conducted in accordance with ASTM D 4318 (latest revision), Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
   4. Results of the particle-size analysis conducted in accordance with ASTM D 421/422 (latest revision). Standard Practice for Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants/Test Method for Particle Size Analysis of Soils.
   5. Results of hydraulic conductivity testing conducted in accordance with ASTM D 5084 (latest revision), Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.
   6. Results of chemical/environmental analyses conducted in accordance with the requirements of Section 02227.

3.3 VEGETATIVE SUPPORT SOIL MATERIAL

A. Vegetative Support Soil Material
   1. Quality Control Testing:
      a. The ENGINEER shall perform quality control testing during construction. This testing is in addition to all other tests required to be conducted by the CONTRACTOR.
      b. The ENGINEER shall collect representative samples from each material source of Vegetative Support Soil material for testing at a frequency determined by the ENGINEER.
      c. The Vegetative Support Soil material shall exhibit an interface friction angle in accordance with the values as specified in Section 2.2(A) of this specification. Materials tested by the ENGINEER exhibiting results not meeting the interface friction angle requirements will be rejected, or the CONTRACTOR may be required to furnish additional test data, at his expense, to demonstrate acceptability of the material.

3.4 MEASUREMENT AND PAYMENT

A. Payment will be made on a unit price basis for furnishing, transporting, and stockpiling materials onsite and for placing, compacting, and for performing and passing the required testing. No payment will be made for placing and compacting soil that does not meet the specified requirements and the CONTRACTOR shall be required to repair, replace, and re-compact soil until all specifications are met at their own cost.

B. Measurement for payment for furnishing, transporting and stockpiling materials onsite and for placing, compacting and performing and passing the required testing will be made based upon the final, in-place volumes for work that is accepted by the ENGINEER.

C. The OWNER reserves the right to furnish, transport, and stockpile materials onsite for use by the CONTRACTOR. The CONTRACTOR may use the materials provided by the OWNER as instructed by the ENGINEER and shall **not** assume that the materials are suitable for the directed use. The OWNER shall provide the CONTRACTOR with the environmental testing data for all materials provided by the OWNER.

END OF SECTION

SECTION 02230

CRUSHED STONE AND GRAVEL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall furnish and place gravel of the types specified at locations shown on the Contact Drawings. Crushed stone and gravel applications shall include, but shall not be limited to, anti-tracking pads, gabion components, stormwater quality basin components, bioretention basin components and certain erosion and sediment control system components. Additional and/or specific requirements for gravel or crushed stone for roads and paved areas, retaining walls, and piping to be grouted are specified separately under applicable sections. However, all crushed stone and gravel used on this project shall be considered "clean fill" as described herein.

B. Related Sections:
   1. Section 02220, Excavation and Backfill
   2. Section 02271, Riprap.

1.2 SUBMITTALS

A. CONTRACTOR shall advise the ENGINEER of the proposed source location(s) and provide representative sample(s) from each source and type. Source(s) shall be subject to OWNER approval.

B. Provide certificates from supplier that materials are clean fill (not a waste material) and meet the requirements of this section (prior to delivery).

C. Results of laboratory sieve analyses for required gradiations.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Refer to Contract Drawings for types, sizes, and gradations, which are generally based on CTDOT or AASHTO definitions.
   1. CONTRACTOR shall submit a sample meeting the above requirements to an approved commercial testing laboratory for sieve analysis. The laboratory analysis results shall be approved by the ENGINEER before any material is ordered.
   2. After the materials are delivered to the job site, the ENGINEER will take two samples from each shipment of material. The CONTRACTOR shall have a sieve analysis performed on these samples by a commercial testing laboratory. If the results of the samples taken in the field do not conform to those previously approved, the material will be rejected and shall be modified or removed from the job site.
   3. CONTRACTOR shall furnish and place crushed stone and gravel as shown and specified or as directed by the ENGINEER.

PART 3 - EXECUTION

3.1 PLACING

A. Crushed stone and gravel shall be spread in layers of uniform thickness not exceeding 12 inches and shall be thoroughly compacted with suitable power driven tampers or other power driven equipment. The placing of gravel shall conform to applicable requirements of Section 02220 except as noted above.

3.2 MEASUREMENT AND PAYMENT

A. Payment will be made on a unit price basis for furnishing, transporting, and stockpiling materials onsite and for placing, compacting, and for performing and passing the required testing. No payment will be made for placing and compacting material that does not meet the specified requirements, and the CONTRACTOR shall be required to repair, replace, and re-compact soil until all specifications are met at their own cost.

B. Measurement for payment for furnishing, transporting and stockpiling materials onsite and for placing, compacting and performing and passing the required testing will be made based upon the final, in-place volumes for work that is accepted by the ENGINEER.

C. The OWNER reserves the right to furnish, transport, and stockpile materials onsite for use by the CONTRACTOR. The CONTRACTOR may use the materials provided by the OWNER as instructed by the ENGINEER and shall **not** assume that the materials are suitable for the directed use.

END OF SECTION

SECTION 02271

RIPRAP

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
1. CONTRACTOR shall provide all labor, materials, tools, equipment, testing, and incidentals required to furnish and place riprap as shown on the Contract Drawings, and as otherwise directed by the ENGINEER. Riprap applications shall include, but shall not be limited to, splash pads, swales, temporary sediment basins, and temporary sediment trap outlets.

B. Related Work Sections:
1. Section 02220, Excavation and Backfill.
2. Section 02230, Crushed Stone and Gravel.

1.2 SUBMITTALS

A. Provide certificates from supplier that materials are clean fill (not a waste material) and meet the requirements of this section (prior to delivery).

B. CONTRACTOR shall advise the ENGINEER of the proposed source location(s) and provide representative sample(s) from each source and type. Source(s) shall be subject to OWNER approval.

PART 2 - PRODUCTS

A. Riprap shall consist of sound, tough, hard, durable, angular field or quarry stone. Refer to Contract Drawings for types, sizes and gradations, which are generally based on definitions contained in the State of Connecticut Department of Transportation's "Standard Specifications for Roads, Bridges, and Incidental Construction" (latest edition). Stones salvaged from excavation and meeting the above requirements maybe used for riprap if approved by the ENGINEER. Provide soil-filled modified riprap where indicated.

B. Provide soil-filled modified riprap where indicated. Soil-filled modified riprap shall consist of a uniform mixture of soil and riprap with no voids. Soil shall be from an approved source.

PART 3 - EXECUTION

3.1 MODIFIED RIPRAP

A. Minimum total thickness of the riprap layer shall be as shown on the Contract Drawings.

B. Where required by the ENGINEER, the stones shall be placed so that the weight of the stone is carried by the underlying material and not by the adjacent stones. On slopes, the largest of stones

shall be at the bottom. Riprap shall be of proper size to form a compact solid blanket to protect the slopes. Stones shall be placed over geosynthetics and geomembranes in a manner to prevent damage to these materials.

C. Riprap shall be placed so as to conform as closely as practicable in size and character to existing riprap, if any.

D. Riprap may be placed with equipment, however, care shall be taken in placing to obtain a good gradation of materials so that the riprap will be firm and solid. Surfaces shall be leveled to the required alignment and slopes by hand, placing the stone so as to fill large voids and to make the surface even.

3.2 SOIL-FILLED MODIFIED RIPRAP

A. Adjacent stockpiles of riprap and soil shall be created and mixing shall be done at the stockpile location, not at the location where soil riprap is to be placed. Alternatively, with prior approval of the ENGINEER of planned procedures, layering the riprap and soil instead of premixing may be allowed if the soil is granular.

B. Use additional moisture and control procedures that ensure a homogenous mixture, where the soil fills the inherent voids in the riprap.

C. The mixture shall be consolidated by large vibratory equipment or backhoe bucket to create a tight, dense, interlocking mass.

D. The soil shall be further wetted to encourage void filling with soil.

E. Any large voids shall be filled with rock and small voids filled with soil.

F. Excessively thick zones of soil prone to washing away shall not be created (for example, no thicknesses greater than six (6) inches).

G. The final surface shall be thoroughly wetted for good compaction, smoothed and compacted by vibrating equipment.

END OF SECTION 02271

SECTION 02514

ASPHALT PAVING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope of Work
   1. CONTRACTOR shall provide all labor, equipment, tools, and materials necessary to install asphalt pavement and curbing as shown on the Contract Drawings.

B. Related Sections
   1. Section 02220, Excavation and Backfill
   2. Section 02226, Subbase Material
   3. Section 02227, Cover Soil Material

C. Work shall be in accordance with applicable requirements of the State of Connecticut Department of Transportation Specifications for Road, Bridges, and Incidental Construction, Form 813, latest version applies.

D. Articles and Sections listed herein refer to these Specifications. Where the term "ENGINEER" is used, it shall mean TRC. Where the term "OWNER" is used, it shall mean "Town of Stamford."

1.2 REFERENCE DOCUMENTS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.
   1. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM):
      a. ASTM D 1188 Bulk Specific Gravity of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens
      b. ASTM D 2922 Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth)
   2. CONNECTICUT DEPARTMENT OF TRANSPORTATION
      a. FORM 816 Standard Specifications for Roads, Bridges and Incidental Construction (most recent version).

1.3 SUBMITTALS

A. Submit Certificates of Conformance with the specified requirements (for gradation, and characterization as clean fill as applicable) and field test results (as applicable) for the following materials:
   1. Aggregate base materials
   2. Subbase materials
   3. Asphalts and asphalt cement

4. Tack and prime coat
5. Bituminous concrete mix

1.4 DEFINITION OF TERMS

A. Subgrade (for pavement) - Existing or borrow earth foundation upon which pavement is constructed. *Distinguished from landfill cap "subgrade", consisting of waste material and soil.*

B. Subbase (for pavement) - Course of crushed stone or bank run gravel between the subgrade and the aggregate base course. *Distinguished from landfill cap "subbase", consisting of soil between waste and geomembrane*.

C. Aggregate Base Course - Gravel or crushed stone course immediately below the bituminous concrete binder course. Also to be used as surface coarse of gravel roads.

D. Bituminous Concrete Binder Course - Bituminous concrete layer immediately below the bituminous concrete wearing course. It is referred to as a base course in the specified reference documents.

E. Bituminous Concrete Wearing Course - Top traffic bearing layer of the pavement. It is referred to as a surface course in the specified reference documents.

F. Prime Coat - Low viscosity liquid asphaltic material applied to subbase, aggregate base course, concrete base course, and all cut surfaces to receive new bituminous concrete pavement.

G. Tack Coat - Low viscosity liquid asphaltic material applied to the new bituminous concrete binder course.

PART 2 - PRODUCTS

2.1 SUBBASE MATERIALS

A. Shall conform to Section M.02.02, "Subbase," of the CTDOT Standard Specifications.

2.2 AGGREGATE BASE COURSE MATERIALS

A. Shall conform to Section M.05.01, "Processed Aggregate Base," of the CTDOT Standard Specification.

2.3 BITUMINOUS CONCRETE BINDER (BASE) COURSE

A. NOT USED

2.4 BITUMINOUS CONCRETE WEARING (SURFACE) COURSE

A. Shall conform to Section M.04.03, "Bituminous Concrete Class I," and “Bituminous Concrete Class II” of the CTDOT Standard Specifications.

2.5 PRIME COAT

A. Shall conform to Section M.04.01 "Bituminous Concrete Materials," of the CTDOT Standard Specifications.

2.6 TACK COAT

A. Shall conform to Section M.04.01, "Bituminous Concrete Materials," of the CTDOT Standard Specifications.

2.7 BITUMINOUS CONCRETE CURBING

A. Shall conform to Section M.04.03, “Bituminous Concrete Class III”, of the CTDOT standard Specifications, or as approved by the ENGINEER.

PART 3 - EXECUTION

3.1 SUBGRADE (FOR PAVEMENT)

A. Prepare subgrade in accordance with Section 02220 "Excavation and Backfill."

3.2 SUBBASE (FOR PAVEMENT)

A. Construct in accordance with Section 2.12, "Subbase" of the CTDOT Standard Specifications.

3.3 AGGREGATE BASE COURSE

A. Construct and compact in accordance with Section 3.04, "Process Aggregate Base Course" of the CTDOT Standard Specifications.

3.4 BITUMINOUS CONCRETE BINDER (BASE) COURSE

A. Construct in accordance with Section 4.06, "Bituminous Concrete" of the CTDOT Standard Specification.

3.5 BITUMINOUS CONCRETE WEARING (SURFACE) COURSE

A. Construct in accordance with Section 4.06, "Bituminous Concrete " of the CTDOT Standard Specification.

3.6 PRIME COAT

A. Apply in accordance with Section 4.06, "Bituminous Concrete", of the CTDOT Standard Specification to subbase, aggregate base course, Portland cement concrete base course and to all cut areas to receive bituminous pavement patch.

3.7 TACK COAT

A. Apply in accordance with Section 4.06, "Bituminous Concrete ", of the CTDOT Standard Specifications.

3.8 BITUMINOUS CONCRETE CURBING

A. Construct in accordance with Section 8.15, “Bituminous Concrete Curbing”, of the CTDOT Standard Specification, and as shown on the Contract Drawings.

3.9 FIELD TESTING

A. Subbase, Aggregate Base, and Aggregate Surface Courses
   1. Smoothness Tests - Correct deviations in the surface in excess of 3/8 inch when tested with a 10-foot straightedge, applied parallel with and at right angles to the center line of the paved area, by loosening, adding or removing material, reshaping, watering, and compacting. The smoothness requirements specified herein apply only to the top layer when subbase and base courses are constructed in more than one layer.
   2. Density Tests - Perform density tests in accordance with ASTM D 2922 as follows: one test per 300 square yards, minimum 1 test per paving location.
   3. Thickness Tests - Measure thickness of subbase and base course at intervals such that there will be a depth measurement for at least each 300 square yards of complete base course, minimum 3 tests. Make depth measurement by test holes, at least 3 inches in diameter, through the subbase and base courses. Where deficiency is more than 2 inches, correct by scarifying, adding mixture of proper gradation, reblading, and recompacting. Where the measured thickness is more than 2 inch thicker than indicated, consider it as the indicated thickness plus 2 inch for determining the average. The average thickness is the average of the depth measurements and shall not underrun the thickness indicated by more than 1/4 inch.

B. Bituminous Concrete Courses
   1. Smoothness - Test the compacted surface of the bituminous concrete binder and wearing courses with a straightedge as the work progresses. Apply straightedge parallel with and at right angles to the centerline after final rolling. Evenness of the binder course shall not vary more than plus or minus 1/4 inch in 10 feet; variations in the wearing course shall not vary more than plus or minus 1/8 inch in 10 feet. Correct any portion of the pavement showing irregularities greater than that specified.
   2. Density - One laboratory test for the project and one field test for each 300 square yards of bituminous concrete binder and wearing courses, minimum three tests; in accordance with ASTM D 1188. Field density shall be at least 96 percent of density obtained in laboratory test.

   3. Thickness - Maximum allowable deficiency at any point shall not be more than 1/4 inch less than the indicated thickness for any course. The average thickness of the course shall be not

less than the indicated thickness. Where the deficiency is more than the specified tolerances, the Contractor shall correct such area or areas by removing the pavement in question and replacing with new pavement.

END OF SECTION

SECTION 02610

PASSIVE GAS VENT WELLS

PART 1 GENERAL

1.1 DESCRIPTION

F. Scope: The CONTRACTOR shall provide all material, equipment, and labor needed to install passive gas vent wells as shown on the Contract Drawings or as directed by the ENGINEER. The CONTRACTOR shall, at his own expense, obtain all boring/well permits and other permits, certificates, and licenses required of him by law for the execution of the work.

B. Related Sections:
1. Section 01320, Health, Safety and Emergency Response
2. Section 02050, Demolition and Abandonment
3. Section 02200, Excavation and Backfill
4. Section 02112, Erosion and sediment Control
5. Section 02226, Subbase
6. Section 02227, Cover Soil Material
7. Section 02230, Crushed Stone and Gravel
8. Section 06643, Geomembranes
9. Section 06644, Geosynthetics

1.2 RESERVED

1.3 SUBMITTALS

A. Prior to construction, the CONTRACTOR shall submit six (6) copies of manufacturer's catalog data and installation instructions for well components shown on the Contract Drawings.

B. Boring logs and monitoring well installation logs shall be prepared by the CONTRACTOR in accordance with section 3.2 and submitted to the ENGINEER as a basis for payment.

C. Schedule of Values for passive gas vent well installation (as described herein) prior to drilling work.

D. Proof of current OSHA HAZWOPER training for applicable personnel (prior to drilling work).

E. Driller qualifications of firm with at least 5 years specialized experience in similar conditions and materials (subject to ENGINEER'S approval).

F. Copies of Call-Before-You-Dig confirmation/ticket and private utility locator reports (prior to drilling work).

1.4 JOB CONDITIONS

A. Unless approved otherwise, passive gas vent wells shall be installed at the indicated locations to depths to be determined by the ENGINEER after the Cover Soil material has been installed. The CONTRACTOR shall employ temporary means necessary to provide access to such locations, and shall repair geosynthetic and other cap components, as required.

B. Comply with requirements for working near overhead utilities described in Section 02220.

C. The CONTRACTOR shall perform all his operations in accordance with the rules, regulations and ordinances of those governing bodies having jurisdiction.

D. All well construction operations shall be carried out under the direct control of the ENGINEER by a qualified Connecticut State licensed well drilling company approved by the ENGINEER. The well driller shall be an experienced environmental drilling firm with at least 5 years specialized experience in work similar in conditions, material, and extent to that indicated for this project. All drilling personnel shall also provide the ENGINEER with proof of current OSHA HAZWOPER training in accordance with 29 CFR 1910.120.

E. All equipment required under these specifications must be provided by the CONTRACTOR or approved SUBCONTRACTOR in first-class working order. The CONTRACTOR or approved SUBCONTRACTOR shall use equipment having the minimum capabilities necessary to do the described work. No unnecessary delays or work stoppages will be tolerated because of equipment failure. These will not be considered as valid reasons for extending the length of the contract. The CONTRACTOR will not be paid for downtime due to equipment failure. The CONTRACTOR shall be held responsible for any damages through any cause of negligence and faulty operation of equipment.

F. The CONTRACTOR or approved SUBCONTRACTOR shall employ only competent workmen, expert in the performance of the type of work required by these Specifications. The crew shall be under the direct supervision of an experienced driller. The crew and driller shall be in the employ of the CONTRACTOR or approved SUBCONTRACTOR.

PART 2 -PRODUCTS

2.1 MATERIALS

A. Well casing/riser shall be solid Schedule 40 stainless steel. Well screen shall meet the design requirements shown on the Contract Drawings. Provide screens with adequate strength to resist external forces during and after installation. Provide welded or flush threaded stainless steel end cap. Provide threaded joints in accordance with ASME B1.20.1.

B. Stone backfill shall be as shown on the Contract Drawings and described in Section 02230.

C. Provide neat, high solids (20%), polymer free, volclay bentonite grout.

D. Soil backfill shall meet the requirements of Sections 02226 or 02227 of these specifications.

E. Geomembrane boots shall meet the requirements of Section 06645 of these specifications.

F. Straps and fasteners shall be stainless steel.

PART - 3 EXECUTION

3.1 GENERAL

A. Prior to the start of any drilling activities, the CONTRACTOR shall contact "Call-Before-You-Dig" and then employ a private underground utility locating company to locate any utilities not marked by "Call Before You Dig". The CONTRACTOR is solely responsible for location of underground utilities.

B. The CONTRACTOR shall furnish materials, which fully comply with Section 2.1 at all times.

C. The CONTRACTOR shall submit all submittals as required by Section 1.3. Work shall not commence on this item until written approval of the pre-construction submittal is received from the ENGINEER.

D. Unless approved otherwise, the vent wells shall be installed after placement of the Cover Soil materials.

E. Ensure locations are clear of buried existing at planned future utilities prior to drilling.

3.2 DRILLING

H. The borehole for each passive gas vent well shall be drilled to the depths shown on the Contract Drawings using a caisson or bucket drill with a Kelly bar extension system (or approved equal). The passive gas vent wells shall be drilled using dry drilling equipment. Wet rotary drilling equipment shall not be used.

I. If during the drilling of a hole, an obstruction is reached, the driller shall use all reasonable, approved means to advance the drilling. If the drilling rate falls to less than 2 feet per hour and the well cannot be completed as shown on the Contract Drawings, the ENGINEER shall be consulted as to whether the borehole has advanced to a sufficient depth. If the hole is abandoned, the CONTRACTOR shall backfill drill tailings in the hole. The CONTRACTOR shall be paid for drilling and abandonment per the approved Schedule of Values.

C. The driller shall keep a boring log, for submittal to the ENGINEER, as drilling progresses indicating stratum/soil and solid waste descriptions, water levels, and total depth drilled.

D. Unless approved otherwise, all drill tailings shall be placed and compacted under the geomembrane (prior to completion of the entire capped area).

3.3 WELL INSTALLATION

A. The borehole for the well shall be straight, and the well pipe shall be installed plumb in the center of the borehole. Derricks, ropes, or other suitable equipment or manual labor shall be used for lowering the pipe into the well borings, subject to the approval of the ENGINEER. Well screen and casing shall not be dropped or allowed to fall in an uncontrolled manner into the borehole.

3.4 BACKFILLING

A. The CONTRACTOR shall take all necessary precautions to maintain the well pipe vertically plumbed during the backfill operation of the borehole. Care shall be taken during installation of backfill materials to prevent damage to the well piping.

If the borehole collapses partially or completely during backfill operations, the CONTRACTOR shall be required to redrill the borehole, at no additional cost, upon the direction of the ENGINEER.

B. Backfilling shall proceed upon completion of well pipe installation. Stone backfill and soil backfill shall be placed in accordance with the Contract Drawings and to the satisfaction of the ENGINEER.

C. Bentonite shall be installed dry, but the CONTRACTOR shall add 10 gallons of water after every 50 pounds of bentonite.

3.5 BOOTING

A. During final cover installation, the CONTRACTOR shall place a boot around each riser pipe as shown on the Contract Drawings and to the satisfaction of the ENGINEER.

END OF SECTION

SECTION 02630

STORM-DRAINAGE SYSTEM

PART 1 - GENERAL

1.1 REFERENCES

G. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
   1. State of Connecticut Department of Transportation
      a) Form 816, Standard Specifications for Roads, Bridges, and Incidental Construction (latest edition)
   2. American Association Of State Highway And Transportation Officials (AASHTO)
   3. AASHTO M 294 Corrugated Polyethylene Pipe, 300- to 1200-cm Diameter (latest edition)
   4. American Society for Testing and Materials (ASTM)
      a) ASTM F 2648 Standard Specifications for 2 to 60 inch Annular Corrugated Profile Wall Polyethylene (PE) Pipe and Fitting for Land Drainage Applications (latest edition).

1.2 SUBMITTALS

A. Product Data: The CONTRACTOR shall submit manufacturer's catalog data, shop drawings, and installation procedures for the applicable products described herein and shown on the Contract Drawings. The CONTRACTOR shall provide sufficient data indicating conformance to specified requirements on materials provided under the section. Submittals for piping and drainage structures shall include joints and specified accessories.

B. Provide a plan describing component sources, mixture ratio, methods of preparation, and resultant mixture properties for the bioretention basin media, as indicated on the Contract Drawings. Include a signed statement from an approved, qualified soil analysis laboratory or landscape architect that the proposed plan is suitable for establishing the indicated species.

C. Test Data:
   1. Provide the same laboratory testing and field test reports for pipe bedding sand as required for Cover Soil material indicated in the respective section (prior to delivery and placement).
   2. Laboratory analyses for sand, topsoil (silt and clay) and organic (peat moss and compost) components of proposed bioretention media mix (one per 500 cubic yards of each source prior to delivery and placement):
      a. Gradation, ASTM D 422
      b. Soil fertility analysis (pH, salinity, nitrogen, ammonium, nitrate, phosphorous, phosphate, sulfur, sodium, potassium, calcium, magnesium, manganese, iron, copper, and zinc)
      c. Environmental testing (as described in Section 02227)
   3. Laboratory analyses resulting bioretention media mix (one per 500 cubic yards resulting mixture to be installed prior to placement):
      a. Gradation, ASTM D 422

b. Phosphorous content or soil phosphorous sorption index
c. pH
d. Organic matter, ASTM D 2974
e. Cation exchange capacity
f. Salinity
g. Potassium and magnesium
h. Environmental testing (as described in Section 02227)

4. Field density tests results for the installed bioretention media as described herein, demonstrating conformance with applicable requirements for bulk density.

D. Survey Data: Provide as-built survey data as described herein and other applicable portions of the Contract Documents.

E. Seed Certificates: Seed vendor's certified statement for each seed mixture required for the bioretention basin, stating botanical and common name, percentage by weight and percentages of purity, germination, and weed seed for each species.

F. Schedule: Planting schedule showing scheduled dates for plantings in bioretention basin.

G. Operation and Maintenance Data: Typewritten instructions recommending procedures to be established by OWNER for the maintenance of bioretention basin plantings for one full year. Submit prior to expiration of required maintenance period(s). Include moisture requirements of each type of planting, and special winter protection measures required for each planting.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Storage

1. Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. Before, during, and after installation, plastic pipe and fittings shall be protected from any environment that would result in damage or deterioration to the material. The Contractor shall have a copy of the manufacturer's instructions available at the construction site at all times and shall follow these instructions unless directed otherwise by the ENGINEER. Solvents, solvent compounds, lubricants, elastomeric gaskets, and any similar materials required to install plastic pipe shall be stored in accordance with the manufacturer's recommendations and shall be properly disposed offsite if the storage period exceeds the recommended shelf life. Solvents in use shall be discarded when the recommended pot life is exceeded. Delivery and storage shall be in accordance with the manufacturer's recommendations.

B. Handling

2. Materials shall be handled in a manner that ensures delivery to the place of use in sound, undamaged condition. Pipe shall be carried, not dragged. Handling and all aspects of installation shall be in accordance with the manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 PIPING

A. Piping for Storm Drains

1. Pipe for storm drains shall be of the sizes indicated and shall conform to the requirements specified. Provide corrugated, smooth bore HDPE piping meeting ASTM F 2648 requirements and having water tight joints per ASTM D 3212. Gaskets meeting ASTM F477 shall be installed by the pipe manufacturer and covered with a removable, protective wrap to ensure the gasket is free from debris. A joint lubricant available from the manufacturer shall be used on the gasket and bell during assembly. Provide ADS N-12 WT IB pipe or approved equal, including required fittings, couplings, and gaskets.

B. Interceptor Piping

1. Interceptor piping shall be of the sizes indicated, and shall conform to the requirements specified. Provide corrugated, smooth bore, plain end piping with Class II perforations (per AASHTO). Provide ADS N-12 or approved equal. Include geotextile wrapping where indicated. Provide required fittings for making joints and bends.

2.2 DRAINAGE STRUCTURES AND APPURTENANCES

A. Flared End Sections

1. Flared-end sections shall be of a standard design fabricated from HDPE as indicated on the Contract Drawing and referenced within the Contract Specifications.

B. Catch Basins

1. Pre-cast concrete catch basins shall include the drain basin type as indicated on the Contract Drawing and referenced within the Contract Specifications. The grates are to be considered an integral part of the surface drainage inlet and shall be furnished by the same manufacturer.

C. Manholes

1. Pre-cast concrete manholes shall be provided as indicated on the Contract Drawings and referenced within the Contract Specifications. The cover is to be considered an integral part of the surface drainage inlet and shall be furnished by the same manufacturer. Precast reinforced concrete manholes shall conform to ASTM C 478. Joints between precast concrete risers and tops shall be made with flexible watertight, rubber-type gaskets.

D. Bioretention Basin Outlet Structures

1. Pre-cast concrete bioretention basin structures and associated components shall be provided as indicated on the Contract Drawings and referenced in the Contract Specifications.

E. Wing Type Endwall Structures

1. Pre-cast concrete wing type endwall structures and associated components shall be provided as indicated on the Contract Drawings and referenced in the Contract Specifications.

F. Hydrodyamic Separator

1. Hydrodynamic separator and associated components for stormwater treatment shall be provided as indicated on the Contract Drawings and referenced in the Contract Specifications. Provide VortSentry HS by Contech Engineered Solutions, or approved equal.

2.3 PIPE BEDDING SAND

A. Clean, coarse-grained sand, all of which passes a 3/8" sieve and not more than 10 percent passes a #200 sieve.

2.4 BIORETENTION BASIN MEDIA AND PLANTINGS

A. Bioretention media shall be a loamy peat-sand mixture meeting the requirements indicated on the Contract Drawings and as described herein. The surface of the bioretention media shall be planted with a riparian seed mix as indicated on the Contract Drawings and as described herein.

B. Lime incorporated as a component of the bioretention media for pH adjustment shall be a calcitic form of natural limestone that also meets the requirements for lime described in Section 02900.

C. Organic materials (aged sphagnum peat moss, compost) to be incorporated as components of the bioretention media shall meet the requirements indicated on the Contract Drawings, and as described herein.

2.5 GROUT

A. Grout to be used for the new storm drain system shall be a watertight, non-shrink grout.

PART 3 - EXECUTION

3.1 EXCAVATION FOR PIPE STORM DRAINS AND DRAINAGE STRUCTURES

A. Excavation of trenches, and for appurtenances and backfilling for storm drains, shall be in accordance with the applicable portions of Section 02220, "Excavation and Backfill".

3.2 BEDDING REQUIREMENTS

J. The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe and shall be free of debris. Pipe bedding shall be installed as indicated on the Contract Drawings and comply with the requirements of Section 02220, "Excavation and Backfill."

3.3 PLACING AND INSTALLING PIPE

B. Prior to installation, confirm required inverts and tie-in points for storm drainage and interceptor pipe with the ENGINEER.

C. Each pipe shall be thoroughly examined before being laid; defective or damaged pipe shall not be used. Pipe shall be protected from exposure to direct sunlight prior to laying, if necessary to maintain adequate pipe stiffness and meet installation deflection requirements. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Pipe shall not be laid in water, and pipe shall not be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary. Deflection of installed flexible pipe shall not exceed 7.5 percent. Do not bend pipe beyond manufacturer’s recommended limits.

D. Laying shall be with the separate sections joined firmly on a bed shaped to line and grade and shall follow manufacturer's recommendations.

3.4 DRAINAGE STRUCTURES

A. Manholes

1. Construction shall be precast reinforced concrete, complete with frames and covers, and with fixed ladders where indicated. Structures and construction to conform to the Connecticut Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction Form 816 Section 5.07. Provide watertight, non-shrink grout for pipe penetrations.

B. Catch Basins

1. Construction shall be precast reinforced concrete, complete with frames and grates. Structures and construction to conform to the Connecticut Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction Form 816 Section 5.07. Provide watertight, non-shrink grout for pipe penetrations.

C. Bioretention Basin Outlet Structures

1. Construction shall be pre-cast reinforced concrete, complete with indicated components. Structures and construction to conform to the Connecticut Department of Transportation standard Specification for Roads, Bridges, and Incidental Construction, Form 816, Section 5.07 (as applicable). Provide watertight, non-shrink grout for pipe penetrations. Installation of structures and components (e.g., trash racks) shall be in accordance with manufacturer’s recommendations.

3.5 BACKFILLING

B. Backfilling Pipe in Trenches and Drainage Structures

1. Backfilling for storm drains and drainage structures shall be in accordance with the applicable portions of Section 02220, "Excavation and Backfill ".

C. Movement of Construction Machinery

1. When compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert or storm drain at any stage of construction shall be at the Contractor's risk. Any damaged pipe shall be repaired or replaced.

D. Compaction

1. Compact pipe bedding sand to 90% of ASTM 698 maximum density. Compact structural fill material under or adjacent to structures to 95% of the ASTM 698 maximum density. Compaction of bioretention media shall be in accordance with the Contract Drawings.
2. Place backfill adjacent to structures and compact to prevent wedging action or eccentric loading upon or against the structures. Step or serrate slopes bounding or within areas to be backfilled to prevent sliding of the fill. Do not use equipment for backfilling operations or for the formation of embankments against structures that will overload the structure. Backfilling against concrete shall be done only after approval has been obtained from the ENGINEER.

3.6 BIORETENTION BASINS

A. The bioretention basins shall be installed as indicated on the Contract Drawings and as described herein. Installation requirements include specific methods of materials placement, and requirements for scarification of the indicated layer. Perform field density testing in accordance with the requirements described in Section 02227, in order to verify specified maximum allowable density in each lift has not been exceeded. Additional requirements regarding installer qualifications, quality assurance, and job conditions described in Sections 02900 and 06642 shall also apply for installation of the bioretention basin.

3.7 SURVEYS

A. Provide final as-built survey of the storm-drainage system showing spot elevations, prepared and sealed by a Connecticut licensed surveyor. Copies of all field notes shall accompany the as-built survey.

END OF SECTION

SECTION 02730

GROUNDWATER MONITORING WELLS

PART 1 – GENERAL

1.1 DESCRIPTION

A. General Requirements: Work of this section, as shown or specified, shall be in accordance with the General Conditions and Division 1 Specification sections.

B. Work Includes: Requirements for furnishing all labor, materials, tools and equipment, and performing all operations necessary for the construction of new/replacement groundwater monitoring wells as indicated on the Contract Drawings, specified herein, and at the direction of the ENGINEER. The CONTRACTOR shall, at his own expense, obtain all boring/well permits and other permits, certificates, and licenses required of him by law for the execution of the work.

C. Related Work
1. Section 01320, Health, Safety and Emergency Response
2. Section 02050, Demolition and Abandonment
3. Section 02200, Excavation and Backfill
4. Section 02112, Erosion and sediment Control
5. Section 02226, Subbase
6. Section 02227, Cover Soil Material
7. Section 02230, Crushed Stone and Gravel
8. Section 06643, Geomembranes
9. Section 06644, Geosynthetics

1.2 REGULATORY REQUIREMENTS

A. All work performed under this section will conform to applicable sections of the following:
1. "Connecticut General Statutes", Section 25-128 and 130.
2. Connecticut Remediation Standard Regulations (RSRs), Section 22a-113k-1 through 22a-113k-3 of the Regulations of Connecticut State Agencies.
3. 29 CFR 1910.120, "HAZWOPER" Regulations, and 29 CFR 1910.1200, "HAZCOM" Regulations.
4. OSHA Regulations for Excavation and Trenching 29 CFR 1926-(650-653)
5. 29 CFR 1910.134(e).
6. Code of Federal Regulations Title 40, Part 264.
7. NIOSH: National Institute for Occupational Safety and Health.
8. U.S. EPA: United States Environmental Protection Agency Standard Operating Safety Guides.

1.3 SUBMITTALS

A. Qualifications Submittals (15 days prior to drilling work):
   1. For entity to perform drilling as specified in paragraph 1.4B to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses and other information specified. Include evidence of current valid permits, licenses, and certifications.
   2. Submit the name of the registered driller and copy of their Certificate of Registration, as indicated in the Connecticut Department of Consumer Protection Regulations, section 25-129, at least fourteen (14) days prior to starting well drilling work.
   3. Proof of current OSHA HAZWOPER training for applicable personnel.

B. Product Data: Submit shop drawings or manufacturer's catalog cuts for all well components, including but not limited to:
   1. Sand (for well screen sand pack)
   2. Bentonite
   3. Cement Grout
   4. Locking Steel Cover
   5. Well Plug
   6. Concrete
   7. Well Casing
   8. Well Screen
   9. Geomembrane Boots, Straps and Fasteners

C. Quality Control Submittals
   1. Installation Procedures:
      a. Detailed systematic procedure for installation and development of all monitoring wells, including samples of the installation record sheets and logs and decontamination procedures.
      b. The monitoring well installation procedures including, but not be limited to, the following:
         1) Manufacturer and model of drill rig(s).
         2) Drilling methods and equipment.
         3) Method to be used for cleaning/decontaminating the inside of casing or augers and other materials and equipment that are exposed to waste materials.
         4) Specifications for proposed grout mixes, including commercial names, proportions of admixtures and water, mixing sequence, mixing methods and duration, pumping methods and tremie pipe type, size, and quality.
         5) Drill casing or auger type and size.
         6) Depth increments for backfilling boreholes with sand and granular bentonite.
         7) Method of sealing joints in well casing to prevent ingress of grout.
         8) Method(s) for protecting completed monitoring wells from damage.
         9) Method for collection, containerization and disposal or well cuttings, development and purged water.
         10) Method of developing wells.
         11) Health and Safety measures (with references to applicable documents).

2. Field Reports: Within fourteen days after installing all monitoring wells, submit logs and well installation record sheets to ENGINEER for all wells.
3. Well Records: copies of completed well records submitted to the CTDEEP, CTDCP, and other authorities having jurisdiction.
4. Copy of Call-Before-You-Dig ticket/confirmation, and private utility locator reports.

1.4 JOB CONDITIONS

A. The CONTRACTOR shall perform all his operations in accordance with the rules, regulations and ordinances of those governing bodies having jurisdiction.

B. All well construction operations shall be carried out under the direct control of the ENGINEER by a qualified Connecticut State licensed well drilling company approved by the ENGINEER. The well driller shall be an experienced environmental drilling firm with at least 5 years specialized experience in work similar in conditions, material, and extent to that indicated for this project. All drilling personnel shall also provide the ENGINEER with proof of current OSHA HAZWOPER training in accordance with 29 CFR 1910.120.

C. All equipment required under these specifications must be provided by the CONTRACTOR or approved SUBCONTRACTOR in first-class working order. The CONTRACTOR or approved SUBCONTRACTOR shall use equipment having the minimum capabilities necessary to do the described work. No unnecessary delays or work stoppages will be tolerated because of equipment failure. These will not be considered as valid reasons for extending the length of the contract. The CONTRACTOR will not be paid for downtime due to equipment failure. The CONTRACTOR shall be held responsible for any damages through any cause of negligence and faulty operation of equipment.

D. The CONTRACTOR or approved SUBCONTRACTOR shall employ only competent workmen, expert in the performance of the type of work required by these Specifications. The crew shall be under the direct supervision of an experienced driller. The crew and driller shall be in the employ of the CONTRACTOR or approved SUBCONTRACTOR.

PART 2 – PRODUCTS

2.1 GENERAL

A. Materials used shall not contribute to or remove contaminants from the site soil or groundwater . Materials and equipment that have contact with soil, waste, or groundwater shall be decontaminated between well installations.

B. Solvents or glues shall not be used.

2.2 MATERIALS

A. PVC well casing shall be Schedule 40 well pipe and comply with ASTM D 1785. Riser pipe shall have self-sealing flush joints. Joints shall either have modified pipe threads or O-rings such that

they sustain an internal water pressure of 50 pounds per square inch. Standard square threads without appropriate O-rings are not acceptable.

B. PVC well screens shall be Schedule 40 PVC well screen, 10 feet long, with 0.01 inch machines slot size, and comply with ASTM D 1785.

C. Steel casing shall be schedule 40, low carbon steel with threaded and coupled, or field welded joints.

D. Filter sand pack shall be #1 Morie (or approved equivalent) well sand and comply with ASTM C 778. The sand shall be water washed and free of foreign material, additives, or contaminants.

E. Provide neat bentonite grout, type Volclay grout, a high solids (20%), POLYMER FREE GROUT. The mixed grout shall contain no more than 24 gallons or water (potable only) per 50 pound bag.

F. cement/bentonite well casing grout seal shall consist of the following mixture of materials: One 94 pound sack of cement/5 pounds granular bentonite/6 gallons of potable water. Use Portland cement meeting the requirements of ASTM C 150.

G. The protective casing for the wells shall be standard 6-inch diameter steel casing with a small hole (approximately 1/4-inch diameter) drilled through the side of the casing within the top 8 inches. The protective casing shall also have a rust proof paint coating on its surface prior to installation. The protective casing shall have a steel cover with a padlock locking arrangement at its top. The locks for the protective well casing shall be new, keyed alike, and equivalent to exterior use, brass-coated, Master No. 2 locks.

H. Soil backfill shall meet the requirements of Sections 02226 or 02227 of these specifications.

I. Geomembrane boots shall meet the requirements of Section 06645 of these specifications.

J. Straps and fasteners shall be stainless steel.

PART 3 – EXECUTION

3.1 PREPARATION

A. Prior to the start of any drilling activities, the CONTRACTOR shall contact “Call-Before-You-Dig”, and then shall employ a private underground utility locating company to locate any utilities not marked by “Call-Before-You-Dig”. The CONTRACTOR is solely responsible for location of underground utilities.

B. Install monitoring well as directed by the ENGINEER.

C. Install monitoring wells following all referenced standards and applicable regulations.

3.2 GENERAL WELL INSTALLATION PROCEDURES

A. Install monitoring wells one per borehole, at the locations, to the elevations and in the manner shown on the Contract Drawings, and as directed by the ENGINEER.

B. Volumes of each increment of backfilling with sand, bentonite pellets, and grout seal shall be small enough that no bridging occurs in the well annulus. Place bentonite pellets and grout in well annulus in increments of 2 feet or less. The depth to the top of each increment shall be physically checked and verified by the driller at 2-foot intervals throughout backfill placement.

C. Place grout in well annulus using a tremie method with side discharge ports on the tremie pipe.

D. Before installing wells through drill casing or augers, thoroughly remove all material adhering to the inside of the casing or augers and all cuttings.

E. Whenever withdrawing drill casing or augers during instrumentation installation in a borehole, take care to minimize the length of unsupported borehole and the rate of casing or auger withdrawal. Do not allow collapse of the borehole. Do not allow backfill material to build-up inside the casing or auger such that the instrument is lifted as the casing or auger is withdrawn. Withdraw the casing or auger without rotation.

F. Spread well borehole soil cuttings on surface immediately surrounding the respective well location unless otherwise directed by the ENGINEER. Any soil cuttings observed to have signs of significant contamination different than the landfill materials exposed at the surface (e.g., oily), shall be collected by the CONTRACTOR on plastic sheeting and placed in CTDOT-approved 55-gallon, DOT 17E/H steel drums for waste characterization for proper offsite transport and disposal. If water or mud is required to drill the well, all water and mud shall be collected in drums for proper offsite transport and disposal. All drums shall be clearly labeled with permanent markers identifying the specific source well number and waste type (e.g., soil cuttings, development water).

G. Do not leave partially completed well installations overnight or longer without prior permission of the ENGINEER.

H. Do not allow foreign objects to enter the riser pipe of monitoring wells (partially or fully completed)

I. Monitoring well as-built locations and elevations (well casing and ground) shall be surveyed by the Contractor's Surveyor within one week of installation and the survey information added to the well installation record.

J. Installation Record: As each well is installed, prepare an installation record sheet including appropriate items from the following list and submit within 14 days of completing all well installations.
   1. Project name.
   2. Contract name and number.
   3. Planned/actual location in horizontal position and elevation.

4. Planned/actual orientation.
5. Planned/actual depth and thickness of backfill materials.
6. Personnel responsible for installation.
7. Plant and equipment used including diameter and depth of any drill casing or augers used.
8. Date and time of start and completion of installation.
9. A geologic log of subsurface data indicating the elevations of strata changes encountered in the borehole. Strata soil nomenclature shall be based on profiles and boring logs developed from prior site investigations. Soils shall be classified for lithology using the United Soil Classification System (USCS). The presence and type of any fill material or debris shall also be noted in the log along with any signs of staining and odors.
10. Types and quantities of well construction materials used.
11. As-built location in horizontal position and elevation in accordance with paragraph 3.3K including:
    a. Elevation referenced to the Project Elevation Datum to the nearest 0.01 foot.
    b. Horizontal position referenced to the Project horizontal control system.
12. As-built orientation.
13. Weather conditions at the time of installation.
14. Notes of importance on the installation including problems encountered, delays, unusual features of the installation (i.e., sheen, floating product), and details of any events that may have a bearing on the well yield or groundwater data.
15. Types and quantities of well installation derived wastes collected in drums for each well.

K. After installation, surface protection covers including the concrete encasement apron shall be free-draining. Repair or replace surface covers that are not free draining at no additional cost to the OWNER.

3.3 INSTALLATION OF GROUNDWATER MONITORING WELLS

A. Ensure locations are clear of buried existing or planned future utilities prior to drilling.

B. The drilling method shall consist of the hollow-stem auger technique or air rotary technique. Previous investigations tend to indicate that the hollow stem auger technique is generally sufficient for the drilling planned through overburden materials. However, the presence of cobbles, rock, and concrete rubble may require the use of air rotary and/or air hammer drilling (which shall be included in the Schedule of Values) even above bedrock.

C. Drill boreholes required for groundwater monitoring wells to depths specified or indicated on the Contract Drawings and directed by the ENGINEER.

D. Install well screens at elevations indicated on the Contract Drawings or specified by the ENGINEER.

E. Check depth to the top of each increment of granular bentonite using a cylindrical sounding hammer. Do not tamp the granular bentonite.

F. Joints, caps, and end plugs shall be secured through the use of welds, threads with Teflon tape or force fittings.

G. The space between the borehole and the well casing above the sampling depth shall be sealed as indicated on project drawings (using bentonite and cement/bentonite grout) to prevent contamination of groundwater and samples.

H. Decontaminate equipment in accordance with driller's approved detailed systematic procedure for well installation and development. At a minimum, decontamination of down-hole drilling and soil sampling equipment between uses shall consist of hot water steam cleaning.

I. Develop the groundwater monitoring wells by surge-block pumping or other method approved by the ENGINEER. Well development shall not be performed until a minimum of 24 hours after completing well installation to allow time for the grout to fully set prior to development. Development shall be conducted until general field measured water quality parameters (temperature, pH, conductivity and turbidity with a portable meter) stabilize to within 10% and turbidity level below 30 NTU is achieved, unless otherwise approved in the field by ENGINEER. Submit the method of development for review and approval by the ENGINEER.

J. The top of the PVC well riser pipe shall be permanently marked at its highest point to establish a reference for surveying and future water level measurements.

K. After completion of installation, determine the as-built location of top of PVC well casing and adjacent ground in horizontal position to accuracy of 0.1-foot and in elevation to an accuracy of plus or minus 0.01-foot.

L. Stage containerized drill cuttings and well development/purged water at the direction of the ENGINEER and in accordance with applicable Federal, State and local regulations. Well development water shall be allowed to discharge to the ground unless directed otherwise by the ENGINEER.

M. Restore all surrounding surfaces affected by the well installation to the specified condition before completion of the work unless otherwise approved by the ENGINEER.

3.4 MAINTENANCE AND PROTECTION

A. Maintain and protect new wells and any existing wells prior to proper closure from damage or deterioration due to construction activities, weather, traffic, and vandalism.

B. Maintain and, where necessary or as directed by the ENGINEER, construct access to all monitoring wells to ensure accessibility.

C. If a monitoring well is damaged or becomes inoperative during construction, the CONTRACTOR shall repair or replace the damaged or inoperative well within 1 week. The ENGINEER will be the sole judge of whether repair or replacement is required. The ENGINEER may impose a work stoppage in the vicinity of the damaged or inoperative well until it is again operational. All damaged inoperative wells that cannot be sufficiently repaired shall be decommissioned by the CONTRACTOR in accordance with Section 02050, 'Demolition and Abandonment" at the direction of the at no cost to the OWNER.

END OF SECTION

SECTION 02810 – TEMPORARY IRRIGATION SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown and required to furnish and install a temporary irrigation system. The work includes, but not limited to, installation of piping, fittings, drip irrigation, valves, valve boxes, controller, electrical wire and equipment (including all necessary electrical connections) and related equipment and materials necessary to provide a fully functioning automatic system, which efficiently irrigates all areas indicated.

B. CONTRACTOR shall coordinate all locations for sleeves with the GENERAL SITE CONTRACTOR prior to the start of work. GENERAL SITE CONTRACTOR shall install all PVC sleeves required under bituminous concrete or concrete surfaces as shown on the Drawings.

1.2 QUALITY ASSURANCE

A. The work shall conform to State Standards regarding special conditions, materials of Construction, and technical specifications. Where conflicts with these Specifications occur, the more stringent shall apply. The work contemplated by theses Specifications consist of the CONTRACTOR furnishing all material, labor, equipment, permits and service required for all work described herein to install a fully automatic irrigation system.

B. Unless otherwise specified, the Drawings and Specifications are intended to include everything obviously requisite and necessary for the proper installation and completion of the work whether each item is mentioned herein or not.

C. The Drawings and Specifications are intended to be cooperative and any item called for in one and not the other shall be as binding as if called for in both. If discrepancy exists between an item called for in the Drawings and the Specifications, the more stringent takes precedence.

D. All work herein specified or called for on the Drawing shall be executed in compliance with all governing ordinances, laws and regulations of the State or any other authority having jurisdiction over the work. Additionally, any changes and/or additions in work necessary to meet these ordinances, laws, regulations, and/or conditions will be made without additional cost to the OWNER.

1.3 SUBMITTALS

Product Data:

1. CONTRACTOR shall submit product data (cut-sheets and literature) for all equipment and materials prior to performing any work. Equipment and materials installed or furnished and not matching submitted product data shall be rejected by the OWNER and shall require the CONTRACTOR to remove such equipment or materials from the site at its own expense.

B. Controller Charts:

1. CONTRACTOR shall provide one controller chart for each controller installed that will show the areas controlled by each automatic controller and shall be the maximum size which each controller door will allow. Charts shall be a blackline print and a different color used to indicate areas for each station. When completed and approved, charts shall be hermetically sealed between two pieces of plastic, each piece being a minimum of 5mils.

C. After completion and testing of the system, CONTRACTOR shall instruct OWNER in the proper and full operation and maintenance of the system. Confirmation of such instruction shall be furnished in writing at conclusion of the project.

1.4 QUALIFICATION OF BIDDER

A. The bidder must be a licensed contractor, having licensed journeymen and registered apprentices. CONTRACTOR must submit a list of three (3) previously completed projects of a similar nature to this project. The OWNER reserves the right to request additional data information necessary to qualify the Bidder. The OWNER reserves the right to reject any bid, if in the opinion of the OWNER, the contractor is not qualified.

1.5 SERVICE AND GUARANTEE

A. The CONTRACTOR shall guarantee that all portions of the work are in accordance with the contract requirements.

i. The CONTRACTOR shall guarantee all work against faulty and improper material and workmanship for a period of one (1) year from the date of final acceptance by the Owner, except that where guarantees or warranties for longer terms are specified herein, such longer terms to apply. Manufacturer's warranties shall not relieve the CONTRACTOR of its liabilities and responsibilities under these specifications. Within forty-eight (48) hours after notification, CONTRACTOR shall correct any deficiencies which occur during the guarantee period at no additional cost to the OWNER.

B. The CONTRACTOR shall be responsible for any and all leaks in the system, due to faulty workmanship or defective material for a period of one (1) year from the date of final acceptance by the OWNER. Within forty-eight (48) hours after notification, CONTRACTOR shall repair any and all leaks at no additional cost to the OWNER. The CONTRACTOR shall also be responsible for damage caused by such leaks and repairs.

C. Defects caused by vandalism, damage by vehicles, acts of God, fire or acts of neglect are not included in the warranty

D. The CONTRACTOR shall provide all services necessary to maintain the system for a period of one (1) year from the date of final acceptance by the Owner. This shall include properly winterizing the system in the Winter (on or before November 15) and starting the system in the Spring (on or before April 15).

1.6 PROJECT CONDITIONS

A. Water for the irrigation system will be taken from a 2" supply from access locations as noted on contract plans, sheet L-2. A licensed plumber will install the master valve and backflow preventer as required per local and state requirements. The Irrigation Contractor will supply all materials necessary, including the backflow & master valve for the irrigation system.

B. When uncharted or incorrectly marked underground utilities are encountered, notify ENGINEER immediately.

C. Protect existing and new trees, plants, lawns and other features designated as part of the landscape work.

D. Examine the areas and conditions under which site work is to be performed, promptly notify ENGINEER of unexpected conditions. Do not proceed with work until unsatisfactory conditions are corrected.

E. Perform work operations and the removal of debris and waste materials to assure minimum interference with adjacent facilities.

F. Obtain and pay for all required inspections, permits, fees and provide notices required by governmental authorities.

1.7 COORDINATION

A. Review installation procedures under other Sections and coordinate with the Work that is related to this Section.

B. CONTRACTOR shall coordinate and schedule the Work of this section with all trades involved to prevent interferences, and in order to allow adequate time at the proper stage of construction to properly perform all work of this section.

PART 2 – PRODUCTS

2.1 GENERAL

A. All materials shall be new and without flaws or defects and of the best quality. All items shall be as specified or **Approved Equal**.

2.2 ACCEPTABLE MANUFACTURES

A. Hunter Industries, San Marcos, California

B. Rain Bird, Azusa, California

C. Netafim USA, Fresno, California

D. Polystar Products Inc, Trenton, New Jersey

E. Rain Bird, Glendora, California

F. Irritrol Systems, Riverside, California

G. CMB, Industries, Fresno, California

H. Weathermatic, Dallas Texas

I. Carson-Brooks Products, Inc., Flora, Mississippi

J. Paige Electric Corp., Union, New Jersey

K. 3M Corp., St. Paul, Minnesota

2.3 CONTROLLER

A. Model #ICC1600PL Series 16 Station Controller in plastic locking box as manufactured by Hunter Industries.

B. Mounting location to be approved by Landscape Architect. Provide electrical service to the controller location to meet needs of the irrigation system.

2.4 VALVES

A. Model #HV 1" Model Rain Bird Series Automatic Control Valves as manufactured by Rain Bird.

B. Model #8200CR 1" Series Automatic Brass Control Master Valve as manufactured by Weathermatic.

C. Model #825Y 1" Series Backflow Preventer as manufactured by CMB Industries.

2.5 DRIP IRRIGATION

A. Model #TLDL9 Series drip tubing, TLDL9-12 installed at twelve (12) inch maximum spacing as indicated (see detail sheet) manufactured by Netafim USA
B. Model #PRVO75HF45 Pressure regulating valve as manufactured by Netafim, USA
C. Model #DFO75-120 Disc filter as manufactured by Netafim, USA

D. Model #TLO50MFV-1 Line flushing valve as manufactured by Netafim, USA
E. Model #TLAVRV Air\vacuum relief valve as manufactured by Netafim, USA
F. Model # TLSOV Manual shut off valve (see detail sheet) as manufactured by Netafim, USA.
G. Model # TLS6, 6" Soil staples every three (3) feet, if buried under two (2) inches of mulch and two (2) staples crossed over each other at every tee, elbow and change of direction as manufactured by Netafim USA.

2.6 PIPING AND FITTINGS

A. All piping shall be new and be continuously and permanently marked with manufacturer's name, material, size and schedule or type.
B. Main Line and Laterals to be Polyethylene, (Poly) 100 P.S.I., NSF as manufactured by Polystar Products Inc.
C. Sleeves to be PVC Schedule 40, ASTM 1785, as manufactured by Crestline Plastic Pipe. Size as specified on Drawing #IRR-1.

2.7 VALVE COVER BOXES

A. Model # 1419-12 Series. The number of valves within the box not to exceed four (4) in order to provide approximately three (3) inches clearance on all sides. Valve Cover to be as manufactured by Carson-Brooks Products, Inc.

B. The color of valve cover boxes to be approved by the Landscape Architect.

C. Valve boxes will not be allowed in lawn areas and must be installed out of site. Location to be approved by Landscape Architect.

2.8 ELECTRICAL WIRE AND EQUIPMENT

A. Valve control wire P70790-3 copper, UL listed, direct burial, common ground with white insulating jacket 14-1 (minimum) and multi strand shall be #18 sized properly in field, as manufactured by Paige Electric. All wiring to be placed in poly conduit and laid in trench adjacent to main line.

B. Wire Splices shall be Model DBY Low voltage (24 VAC) wire splice kit as manufactured by 3M.

C. Provide minimum twenty-four (24) inches of slack at remote control valves and at all wire splices to allow raising the valve bonnet or splice to the surface, without disconnecting the wire for repair.

2.9 BACKFILL MATERIALS

A. Drainage fill at valve boxes shall be ¾" washed gravel.

B. Trench Backfill shall be suitable common fill material free of clay, wood, plastic and other foreign or deleterious materials and rocks over ten (10) inch diameter.

MISCELLANEOUS EQUIPMENT

A. Any shut-off valves, drain valves, blow-off fittings, etc, to be highest quality brass. Type and size as specified on Drawings #IRR-1 and #IRR-2

PART 3 - EXECUTION

3.1 GENERAL

A. Install material and equipment as shown, specified and as recommended by the Manufacturer.

B. If there is a conflict between manufacturers' recommendations and the Drawings or Specifications, request instructions from ENGINEER before proceeding.

C. Earthwork required is specified in the applicable Section of Division 2.

D. Locate irrigation equipment in order to provide complete coverage of all areas to be watered as indicated on the Drawing #L-2.

E. Stake all proposed pipe and wire routes, valves and the controller locations in accordance with the Drawings and review with Landscape Architect prior to installation.

F. Do not commence installation of irrigation system until final layout of trees, shrubs and other planting beds has been accepted by OWNER and without approval of Landscape Architect.

3.2 INSTALLATION REQUIREMENTS

A. The word "piping" in this specification means pipe, fittings and nipples and shall be considered as such in this installation.

B. The Drawings indicate the areas to be served by the irrigation system. The irrigation system shall be installed and coordinated with the landscaping requirements and further changes or additions needed to water the indicated areas shall be included as part of the contract without additional cost to the OWNER. Install piping to meet irrigation needs of new plantings identified on the drawings. The location of valves, controller, pipes, wire and related items shall be accurately laid out in the field by the CONTRACTOR. Should it be found that any work is laid out where interference would occur, report the interference to the ENGINEER immediately and proceed as directed by the City.

3.3 GENERAL INSTALLATION

A. It is the intent of this design to provide temporary irrigation for a period of 2 years for all the shrub and tree areas. All irrigated areas are to be installed to achieve uniform water distribution.

B. Main Line and lateral lines are pulled to a depth minimum of 8” to 12”. Cap main and laterals until ready to use. Test and repair and retest for leaks. Tamp and restore deficient areas and fine rake for LANDSCAPE CONTRACTOR to take over and resume his operation. Test entire system again for proper spray coverage.

C. Pipe line assembly: Install pipes and fittings in accordance with manufacturers printed specifications. Clean all pipe and fittings of dirt, scale and moisture before assembly. All threaded joints on PVC shall receive Teflon Tape. All polyethylene pipes shall be held on fittings with stainless steel worm drive clamps. Remove all rocks, clods or deleterious material encountered and replace with clean, suitable backfill material. Where possible allow for expansion by snaking pipe from side to side in trench.

D. Backflow Preventer: To be installed by licensed plumber per manufacturer’s instructions and as approved by the local Water Authority.

E. Control Wiring: Install all direct burial irrigation wire in 1” poly conduit in common trench with main line. Provide slack at valve box to allow for servicing. Wire shall not be smaller than #14-1 common and #18 multi cable, sizing to be determined in field by manufacturer’s specification.

F. Controller: Install controller in location on outside of building as indicated on Drawing #IRR-1 and per local codes and manufacture's specifications. Connect remote control valves to controller in clockwise sequence to correspond with station setting beginning with station 1,2,3, etc.

G. Control Valves: Install in valve boxes and where possible group together in location out of site or where approved by Landscape Architect. Where two or more valve boxes are installed adjacent to each other allow 12" separation and align boxes in row.

3.4 PIPE INSTALLATION

A. The CONTRACTOR must provide effective protection at all times to prevent dirt, rubbish or other debris from entering the piping. When work is stopped at night, or any other times, the ends of the pipe must be closed with plugs and properly secured. Sidewalks shall be clear of project debris and equipment at all times and barricades and/or tape shall be installed around trenches left open. Piping shall be trenched to the following depths:

1” Polyethylene lines 8” to 12” minimum (surface placement is permitted through landscape areas)

B. Sleeving for locations that pass areas of vehicular traffic shall be installed 12” to 18” minimum depth.

3.5 ELECTRICAL INSTALLATION

A. The CONTRACTOR shall mount controller to location as approved by Landscape Architect.

B. The joining of all underground wires shall be by use of wire nuts covered by DBY waterproof connections per instructions provided by manufacturer. All wire splices shall be made in 6" round valve cover boxes.

C. Wire shall be coiled at all solenoid connections by wrapping at least five (5) turns of wire around a rod or pipe approximately one (1) inch diameter then withdrawing the rod.

D. All electrical work shall comply with the National Electrical Code, local electrical inspector's requirements and the requirements of the local utility company.

3.6 EXCAVATING , BACKFILLING AND RESTORATION

A. The CONTRACTOR shall do all necessary excavating and backfilling required for the proper installation of work except as noted on the Drawings.

B. When backfilling, all backfill material shall be free of clay, wood, plastic and other foreign or deleterious materials and rocks over one(1) inch diameter. Backfilling of plastic pipe shall be done when the pipe is cool to avoid excessive contraction in cold weather.

B. All backfill material will be compacted and brought up to finish grade so as to ensure no settling results. Dress off all areas to finish grades with approved materials.

3.7 ADJUSTING AND BALANCING SYSTEM

A. CONTRACTOR shall adjust all s valves for optimum performance and to prevent, as much as possible.

B. Following all tests for water tightness and integrity and completed adjustments CONTRACTOR shall perform complete coverage test of system in presence of Landscape Architect and confirm adequate and complete coverage to their full satisfaction.

3.8 FIELD QUALITY CONTROL

A. Work included under this section includes all tests required under laws, ordinances, rules and regulations of the State of Connecticut or any other authority having jurisdiction over the work, and shall be made in accordance therewith to prove water tightness of system.

B. System shall be tested by the CONTRACTOR for a minimum time limit of two (2) hours at the normal system hydrostatic pressure and upon visual inspection of the ground, should any leak be found, it shall be promptly repaired. The line shall then be re-tested until proven watertight.

C. Perform test to determine if water coverage for planting and lawn areas is adequate. Confirm sprinkler heads are adjusted to prevent overspray. Demonstrate controller, review scheduling program to determine if adequate without causing runoff.

D. The work under this section shall include the furnishing of all testing instruments, gauges, pumps, etc, and other equipment with appurtenances required or necessary for any and all testing.

E. Engineer shall be notified at least forty-eight (48) hours in advance of all tests and all tests shall be conducted to the ENGINEER'S full satisfaction.

3.9 CLEANING

A. Clean up shall be performed as each portion of work progresses. Refuse, rubbish and excess dirt shall be removed from the site. Upon completion of the job, the CONTRACTOR shall clean up all debris caused by his work and leave the job in a neat and clean condition. All sidewalks and paving are to be swept clean. All debris removed from the job will be taken away from the premises.

END OF SECTION

PART 1 – GENERAL

1.1 ***SECTION INCLUDES***

A. Provide all materials, labor, equipment, and services necessary to furnish and deliver work of this Section as shown on the Drawings, as specified and as required by job conditions including, but not limited to, the following:

1) Steel Entry Gate.

1.2 ***RELATED SECTIONS***

A. Section 02200 – Earthwork.

B. Section 03300 – Site Concrete.

1.3 ***SYSTEM DESCRIPTION***

A. Provide and install steel entry gates as shown on the Drawings. Provide all components (i.e., rails, posts, gates, hinges, latches, hardware, etc.) as necessary for a complete installation. Coordinate with the work of other trades to supply mounting hardware, sleeves, and other items as may be necessary.

1.4 ***STANDARDS***

A. Provide metal gate as complete units with each produced by a single manufacturer, including all necessary erection accessories, fittings and fasteners.

B. Installer: the contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

1.5 ***SUBMITTALS***

A. In accordance with the General Requirements, submit samples, materials certifications, manufacturer's product data and test reports as hereinafter required.

B. Shop Drawings: Submit shop drawings for metal fabrication components showing the following:

1) Types of materials, including sizes and weights of members.

2) Location, types and details of connections.

3) Openings.

4) Accessories

5) Cleaning and painting schedules.

1.6 ***REFERENCES***

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

1) ASTM D523 - Test Method for Specular Gloss.

2) ASTM D822 - Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.

3) ASTM D1654 - Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

4) ASTM D2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.

5) ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

6) ASTM D3359 - Test Method for Measuring Adhesion by Tape Test.

PART 2 – PRODUCTS

1.1 ***FENCE COMPONENTS***

A. Steel tubing: ASTM A500, Grade B.

B. Paint:

1) First Coat: Sherwin Williams # E41N1 Metal Primer, as manufactured by Sherwin Williams Company, or approved equal. Primer is an alkyd oil, flat finish.

2) Second & Third Coat: Sherwin Williams Industrial Enamel HS, or approved equal. Finish color shall be "Chinchilla" (manufacturer's no. FN12 / SW6011). Provide deviation of color between coats.

Quality Characteristics	ASTM Test Method	Performance Requirements
Adhesion	D3359 – Method B	Adhesion (Retention of Coating) over 90% of test area (Tape and knife test).
Corrosion Resistance	B117 & D1654	Corrosion Resistance over 1,000 hours (Scribed per D1654; failure mode is

		accumulation of 1/8" coating loss from scribe or medium #8 blisters).
Impact Resistance	D2794	Impact Resistance over 60 inch lb. (Forward impact using 0.625" ball).
Weathering Resistance	D822 D2244, D523 (60˚ Method)	Weathering Resistance over 1,000 hours (Failure mode is 60% loss of gloss or color variance of more than 3 delta-E color units).

B. Provide metal gates as complete units with each produced by a single manufacturer.
   a. Gate systems shall be constructed of steel frame. All members shall be welded together to form a rigid, one-piece frame. Rail and frame components shall be sized per gate opening as shown on the drawings

PART 3 – EXECUTION

3.1 ***GENERAL***

A. Install fencing and gates in accordance with manufacturer's instructions.

3.2 ***INSPECTION***

A. General: do not commence metal gate installations before final grading is complete, with finish elevations established.

B. Inspection: examine the conditions under which all new metal gates are to be installed. Installation of metal gates shall not proceed until all unsatisfactory conditions, if any, have been corrected.

C. Landscape Architect shall inspect gate prior to application of primer and second and third paint coatings.

3.3 ***FOOTINGS***

A. Drill / excavate holes for footings in firm, undisturbed or compacted soil. Footings shall have a minimum diameter of 4 times the nominal outside dimension of the posts, and 6" deeper than post bottoms. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads. Place concrete around post in a continuous pour. Trowel finish around posts and slope to direct water away from posts.

3.4 ***POST INSTALLATION***

A. Space posts uniformly to accommodate manufacturer's standard panel length.

B. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.

3.5 ***GATE INSTALLATION***

A. Install gates plumb, level and secure for full opening without interference.

B. Attach hardware by means which will prevent unauthorized removal.

C. Adjust hardware to provide smooth operation.

3.6 ***CLEAN-UP***

A. Clean up debris and unused material, and remove from site.

END OF SECTION
SECTION 02900

Base Bid TURF ESTABLISHMENT AND LANDSCAPING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:
1. CONTRACTOR shall provide all labor, tools, materials, testing, equipment and incidentals as shown, specified and required to furnish and perform landscaping work.
2. The extent of the turf establishment and landscaping Work shall be performed as shown on the Contract Drawings and as specified in the Contract Documents. This section is intended to address the requirements for turf establishment and general vegetative cover at the site. Separate specifications for establishment of vegetation within the bioretention basin are contained in Section 02630.
3. The turf establishment and landscaping Work required includes the following:
   a. Importing topsoil from off-site sources if existing cover soils are unacceptable.
   b. Maintenance Work as specified until completion of the Contract.
   c. Soil amendments.
   d. Fertilizers.
   e. Grass materials.
   f. Flexible Growth Medium (FGM)
   g. Guarantees.

B. Coordination:
1. Review installation procedures under other Sections and coordinate the installation of items that must be installed with the landscaping.
2. Notify other contractors in advance of the installation of the landscaping to provide the other

contractors with sufficient time for the installation of items included in their contracts that must be installed before landscaping.

C. Related Sections:
1. Section 02220, Excavation and Backfill
2. Section 02228, Topsoil Material
3. Section 06642, Erosion Control Geosynthetics
4. Section 02630, Storm Drainage System
5. Other Landscaping or Planting sections (as applicable)

1.2 QUALITY ASSURANCE

A. Landscape Subcontractor Qualifications:
1. Subcontract the landscape portions of the Work to a single firm specializing in landscape Work.
2. The landscape subcontractor shall have a minimum of five years of experience of performing substantially similar work.

B. Source Quality Control:
1. General:
   a. Ship materials with certificates of inspection as required by governmental authorities.
   b. Comply with governing regulations applicable to turf establishment and landscape materials.
   c. ENGINEER will request inspection of delivery slips for materials to verify specified quantities of bulk deliveries of soil amendments and fertilizers.
2. Analysis and Standards: Package standard products with manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Analytical Chemists, wherever applicable or as further specified.
3. Off-Site Topsoil: Obtain topsoil from local sources or from areas having similar soil characteristics to that found at the site of the Work. Obtain topsoil only from naturally well-drained sites where topsoil occurs in depth of not less than 4- inches; do not obtain from bogs or marshes.
4. Topsoil stockpiled for reuse: Existing cover soils will be inspected by ENGINEER prior to particle size testing to determine suitability for reuse. At the time of inspection ENGINEER will require representative soil samples to be tested for physical properties, pH value, organic matter, and available phosphoric acid and potassium if proposed for use as topsoil. Contractor shall supply twenty pound samples and perform tests at no additional expense to OWNER.
5. All Topsoil shall meet the testing requirements of Section 02228.

C. Reference Standards: Comply with the applicable provisions and recommendations of the following, except as otherwise shown or specified.
1. ASTM C 602, Agricultural Liming Materials.
2. American Joint Committee on Horticultural Nomenclature, Standardized Plant Names.
3. Official Seed Analysts of North America, Standards of Quality.
4. FSO-F-241D, Fertilizer, Mixed, Commercial.
5. FSO-F-166E, Peat Moss; Peat, Humus; and Peat, Reed-sedge.

1.3 SUBMITTALS

A. Shop Drawings: The CONTRACTOR shall submit six (6) copies of the following for approval (15 days prior to start of applicable work):
   1. Planting schedule showing scheduled dates for turf establishment and landscaping in each area of site.
   2. Before delivery of off-site topsoil, written statement giving the location of the properties from which the topsoil is to be obtained, the names and addresses of the suppliers, the depth to be stripped and the crops grown during the past 2 years.
   3. Manufacturer's specifications and installation instructions for all materials required.
   4. Signed Certificates of Compliance with the project Stormwater Pollution Control Plan.

B. Test Reports: Submit for approval the following (15 days prior to start of applicable work):
   1. Before delivery of peat humus an analysis made by an approved laboratory stating the mechanical and chemical analysis of the peat humus proposed for use.

C. Certificates: Submit for approval the following (15 days prior to start of applicable work):
   1. Certificates of inspection as may be required by governmental authorities to accompany shipments, and manufacturer's or vendors certified analysis for soil amendments and fertilizer materials. For standard products submit other data substantiating that materials comply with specified requirements.
   2. Seed vendor’s certified statement for each seed mixture required, stating botanical and common name, percentage by weight and percentages of purity, germination, and weed seed for each species.

D. Operation and Maintenance Data: Submit for approval the following (15 days prior to start of applicable work):
   1. Typewritten instructions recommending procedures to be established by OWNER for the maintenance of landscape Work for one full year. Submit prior to expiration of required maintenance period(s). Include moisture requirements of each type of planting and insect prevention measures including types of spray and application instructions, and special winter protection measures required for each planting.

E. Guarantee (15 days prior to start of applicable work): Submit for approval a written guarantee, in the terms specified under "Guarantee" provision of these Specifications, signed by CONTRACTOR.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery of Materials:
   1. Deliver packaged materials in original, unopened containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery.
   2. Furnish seed in sealed, standard containers.
   3. Notify ENGINEER of delivery schedule in advance so materials may be inspected upon arrival at job site.
   4. Remove unacceptable material immediately from project site.

B. Storage of Materials:
1. Store and cover materials to prevent deterioration. Remove packaged materials which have become wet or show deterioration or water marks from the site. Replace at no further cost to OWNER.
2. Seed that is wet or moldy or that has been otherwise damaged in transit or storage is not acceptable. Replace at no further cost to OWNER.

1.5 JOB CONDITIONS

A. Environmental Requirements:
1. Proceed with and complete the Work as rapidly as portions of the Site become available, working within the seasonal limitations for each kind of landscape Work required.
2. Do not spread seed when wind velocity exceeds 5 miles per hour.
3. Do not plant when drought, or excessive moisture, or other unsatisfactory conditions prevail.

B. Scheduling:
1. Plant or install materials only during normal planting seasons for each type of turf establishment and landscape Work required. Correlate planting with specified maintenance periods to provide maintenance until occupancy by OWNER.

C. Wetlands
1. Heavy equipment working in wetlands shall be avoided and if required shall be placed on mats to minimize soil/vegetation disturbance. Disturbed areas in wetlands shall be restored to preconstruction contours upon completion of the work.
2. Temporary fills shall be disposed of at an upland site and suitably contained to prevent erosion and/or transport to a waterway or wetland. Temporary fill areas shall be restored to their original elevations. No temporary fill shall be placed in waters and/or wetlands.
3. The CONTRACTOR shall make every reasonable effort to carry out the construction or operation of the Work in a manner so as to maintain as much as is practicable, and to minimize any adverse impacts on, existing fish, and wildlife, and natural environmental values and to discourage the establishment or spread of plant species identified as non-native invasive species by any federal or state agency.

1.6 ALTERNATIVES

A. Substitutions are not allowed.

1.7 GUARANTEE

A. Guarantee landscaping and turf through the specified maintenance period, until Final Acceptance of the Work.

B. Immediately remove and replace landscaping and turf found to be dead or in unhealthy condition during guarantee period and through the specified maintenance period. Make replacements during growth season following end of guarantee period. Furnish and plant replacements which comply with requirements shown and specified. ENGINEER will make another inspection at end

of extended guarantee period, if any, to determine acceptance or rejection. Only one replacement will be required at end of guarantee period, except for losses or replacements due to failure to comply with specified requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil:

1. Existing cover soils shall be analyzed in accordance with Section 02228 to determine the suitability for reuse as topsoil. Soils approved by the ENGINEER for use as topsoil shall be stockpiled by the CONTRACTOR for reuse in turf establishment and landscape Work. If quantity of stockpiled topsoil is insufficient, the CONTRACTOR shall provide additional topsoil as required to complete landscape Work in accordance with Section 02228.

B. Soil Amendments:

1. Lime: Natural limestone containing not less than 85 percent of total carbonates, ground so that not less than 90 percent passes a 10-mesh sieve and not less than 50 percent passes a 100-mesh sieve.
2. Peat Humus: Provide peat humus which is a natural product of with sphagnum moss, reed, or sedge peat, taken from a fresh water site. Supply shredded material, fee from lumps, roots, stones and other extraneous foreign matter, capable of passing through a 1/2-inch screen, which can easily be incorporated with the topsoil. Supply material which has been conditioned in storage piles after excavation for at least 6 months, including one freezing and thawing period. Supply peat humus with the following analysis:
   a. Not less than 90 percent organic matter by weight on an oven dry basis.
   b. pH range 5 to 7.5.
   c. Moisture content 35 percent at time of incorporation into soil.
   d. Water absorbing ability 150 percent to 350 percent by weight.
3. Ferrous Sulfate: Commercial grade and unadulterated.

C. Commercial Fertilizers:

1. Complete fertilizer of neutral character, with a minimum of 75 percent nitrogen derived from natural organic sources or ureaform; 40-50 percent of the nitrogen shall be water soluble. Available phosphoric acid derived from superphosphate, bone, or tankage. Potash derived from muriate of potash, containing 60 percent potash. Uniform in composition, freeflowing and suitable for application with approved equipment. Provide fertilizer with the following percentages of available plant nutrients.
   a. For lawns, provide fertilizer with not less than 4 percent phosphoric acid and not less than 2 percent potassium, and the percentage of nitrogen required to provide not less than 1.5 pounds of actual nitrogen per 1000 square feet of lawn area. Provide nitrogen in a form that will be available to the lawn during the initial period of growth.
2. Bonemeal: Commercial, raw, finely ground; 4 percent nitrogen and 20 percent phosphoric acid.
3. Superphosphate: Soluble mixture of treated minerals; 20 percent available phosphoric acid.

4. Hydroseeding Fertilizer:
   a. Commercial designation of 18-24-6. Provide a complete fertilizer of neutral character with a minimum of 75 percent nitrogen derived from natural organic sources.
   b. Minimum 40-50 percent of nitrogen shall be water soluble.
   c. Uniform in composition, free-flowing and suitable for application with approved equipment.
   d. Product and Manufacturer: Provide one of the following:
      1) Scotts Starter Fertilizer by the Scotts Company.
      2) Or equal.

D. Grass Materials:
   1. Grass Seed Mixture: Provide fresh, clean, new-crop seed complying with the, tolerance for purity and germination established by the Official Seed Analysts of North America. Provide seed of the grass species, proportions and minimum percentages of purity, germination, and maximum percentage of weed seed, as specified. Birdsfoot trefoil shall be inoculated before planting.
   2. The "Schedule of Grass Seed Requirements" is as follows:

GRASS SEED MIX SEEDING SCHEDULE*

BOTANICAL NAME	COMMON NAME	MIXTURE PERCENT BY WEIGHT	MINIMUM PERCENT PURITY/ GERMINATION
Agrastis tenuis	Colonial Bentgrass	5%	95/90%
Festuca rubra	Chewings Fescue	35%	97/80%
Festuca longifolia	Hard Fescue	30%	96/85%
Lotus corniculatus	Birdsfoot Trefoil	10%	96/90%
Lolium perenne	Perennial Ryegrass	20%	98/90%

*** See section 02630 for specifications for seeding of bioretention basins.**

The seeding rate for the mixture shall be 175 pounds per acre. The acceptable planting periods are from April 1 through June 15 and September 1 through October 15.

E. Miscellaneous Landscape Materials:
   1. Hydromulch:
      a. On areas and slopes within the Limit of Cap as shown on Contract Drawings, provide a hydraulically applied flexible growth medium (FGM) at the rate of 3,500 pounds per acre.
      b. Provide the following:
         1) Product and manufacturer:
            a) Flexterra FGM by Profile Products, LLC
            b) or equal.
   2. Water: Potable.

PART 3 - EXECUTION

3.1 INSPECTION

A. CONTRACTOR and his installer shall examine the subgrade, verify the elevations, observe the conditions under which Work is to be performed, and notify ENGINEER of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the ENGINEER.

3.2 PREPARATION

A. Soil Preparation:

1. Loosen subgrade of turfbed areas as required to prepare seedbed. Remove debris over 1-1/2 inches in any dimension and sticks, roots, rubbish and other extraneous matter. Limit preparation to areas which will be planted promptly after preparation.
2. Spread topsoil to minimum depth of 6-inches after natural settlement and light rolling to 85 percent Modified Proctor density.
   a. Do not spread topsoil while in frozen condition or when moisture content is so great that excessive compaction will occur nor when so dry that dust will form in the air or that clods will not break readily.
3. Apply ground limestone, by machine, over all areas to receive turf, as required, to bring the soil to a neutral pH. Work lightly into the top 3 inches of topsoil at least five days before applying the commercial fertilizers.
4. Apply commercial fertilizers in the following quantities:
   a. For grass apply only at a rate sufficient to supply 1.5 pounds of nitrogen per 1000 square feet. For 5-10-5 use 30 pounds per 1000 square feet.
5. Apply commercial fertilizers within 10 days of seeding.
6. Apply commercial fertilizers in 2 operations. First application shall be 3/4 of total amount.
7. Thoroughly and evenly incorporate commercial fertilizers with the soil to depth of 3 inches by discing, or other approved method.
   a. In areas inaccessible to power equipment, use hand tools.
8. Apply superphosphate for grass areas at the rate of 20 pounds per 1000 square feet and incorporate into the top 3 inches of topsoil.
9. Grade turfbed areas to smooth, even surface with loose, uniformly fine texture-Remove all stones and extraneous foreign material in excess of 3/4 inch in diameter. Roll and rake and remove ridges and fill depressions, as required to meet finish grades. Limit fine grading to areas which can be planted immediately after grading.
10. Apply a second dressing of fertilizer. Use 1/4 of the total amount.
11. Moisten prepared turfbed areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before planting. Do not create a muddy soil condition.
12. Restore turfbed areas to specified condition if eroded or otherwise disturbed after fine grading and prior to planting.

B. Adequate sedimentation and erosion control management measures, practices and devices, such as phased construction, vegetated filter strips, geotextile silt fences, or other devices shall be installed and properly maintained to reduce erosion and retain sediment on-site during and after construction in accordance with the Contract Drawings and the Stormwater Pollution Control

Plan. These devices shall be capable of preventing erosion, of collecting sediment, suspended and floating materials, and of filtering fine sediment. These devices shall be removed upon completion of work and the disturbed areas shall be stabilized. The sediment collected by these devices shall be removed and placed at an upland location, in a manner that will prevent its later erosion into a waterway or wetland. If the ENGINEER determines that the on-site placement of the collected sediment may adversely affect the integrity of the site, the collected sediment will be removed and disposed of at no additional cost to the OWNER. All exposed soil and other fills shall be permanently stabilized at the earliest practicable date. See Section 02112 "Sedimentation and Erosion Controls".

3.3 INSTALLATION

A. Hydroseeding

1. Strictly comply with manufacturer's installation instructions and recommendations. For optimum pumping and application performance use approved mechanically agitated, hydraulic seeding/mulching machines with a fan-type nozzle (50-degree tip). Apply FGM from opposing directions and to achieve best soil coverage.
2 Erosion Control and Revegetation:
   a. For maximum performance, apply FGM in a two-step process:
   b. Step One: Mix and apply seed and soil amendments with small amount of FGM for visual metering.
   c. Step Two: Mix and apply FGM at a rate of 50 lb per 125 gallons (23 kg/475 liters) of water over freshly seeded surfaces. Confirm loading rates with equipment manufacturer. Do not leave seeded surfaces unprotected, especially if precipitation is imminent.
   d. Depending upon site conditions FGM may be applied in a one-step process where all components may be mixed together in single tank loads. Consult with manufacturer for further details.
3 Mixing:
   A mechanically agitated hydraulic-application machine is recommended:
   a. Fill tank to middle of agitator shaft or tank about 1/3 full of water. Turn on pump to wet or purge lines. Begin agitating. Keep adding water slowly while adding the FGM at a steady rate.
   b. Consult application and loading charts to determine number of bags to be added. Mix at a rate of 50 lbs. of FGM per 125 gallons (23kg/475 liters). Contact equipment manufacturer to confirm optimum FGM mixing rates.
   c. All FGM should be loaded when the tank is approximately 3/4 full.
   d. Fertilizer should be added once the tank is nearly full.
   e. Before applying, mix the slurry for at least 10 minutes after adding the last amount of FGM. This is very important to fully activate the bonding additives and to attain proper viscosity.
   f. Turn off recirculation valve to minimize potential for air entrainment within the slurry.
4. Application:
   a. Use a fan-type nozzle (50-degree tip) whenever possible for best soil surface coverage. Apply FGM from opposing directions to soil surface, reducing the "shadow effect" and assuring a minimum of 95% of soil surface coverage. Slope interruption devices or water diversion techniques are recommended when slope lengths exceed 100 ft (30m).
   b. Install materials at an application rate of 3500 pounds per acre.

c. Increase application rates on highly erosive soils or chiseled, disked, furrowed or tracked slopes. Contact Manufacturer for additional details.
d. Material should not be applied in channels, swales or other areas where concentrated flows are anticipated, unless installed in conjunction with a temporary erosion control blanket or non-degradable turf reinforcement mat.
e. After application, thoroughly flush the tank, pumps and hoses to remove all FGM material. Wash all material from the exterior of the machine and remove any slurry spills. FGM will be more difficult to remove once it dries.

5. Prevent foot or vehicular traffic, or the movement of equipment over the seeded areas. Reseed areas damaged as a result of such activity.
6. Prevent the seeded areas from drying out. After seedlings appear in about 2-3 weeks reseed all bare spots larger than 18-inches in diameter. Areas to be reseeded shall be hand raked to scarify the surface and seed shall be applied by cyclone spreader. Lightly rake the seed into the soil.

B. Reconditioning Existing Turf:

1. Recondition existing turf areas damaged by CONTRACTOR'S operations including storage of materials and equipment and movement of vehicles. Also recondition existing turf areas where minor regrading is required.
2. Provide fertilizer, seed or sod, soil amendments, and erosion control matting as specified for new turf and as required to provide a satisfactorily reconditioned turf. Provide new topsoil as required to fill low spots and meet new finish grades.
3. Cultivate bare and compacted areas thoroughly to provide a satisfactory planting bed.
4. Remove diseased and unsatisfactory turf areas; do not bury into soil. Remove topsoil containing foreign materials resulting from CONTRACTOR'S operations including, but not limited to oil drippings, stone, gravel and other loose building materials.
5. In areas approved by ENGINEER, where substantial turf remains (but is thin), mow, rake, aerate if compacted, fill low spots, remove humps and cultivate soil, fertilize, and seed. Remove weeds before seeding or if extensive, apply selective chemical weed killers as required. Apply a seedbed mulch, if required, to maintain moist conditions.
6. Water newly planted areas and keep moist until new turf is established.

3.4 MAINTENANCE

A. Begin maintenance immediately after planting.

B. Maintain turf for not less than the period stated below, and longer as required to establish an acceptable stand, as determined by ENGINEER.

1. Grass seed lawns, not less than 60 days.
2. If seeded in fall and not given a full 60 days maintenance, or if not considered acceptable at that time, continue maintenance the following spring until acceptable lawn is established.

3.5 CLEANUP AND PROTECTION

A. During turf establishment and landscape Work, store materials and equipment where directed. Keep pavements clean and work area in an orderly condition.

B. Protect turf establishment and landscape Work and materials form damage due to landscape operations, operations by other contractors and trades and trespassers. Maintain production during installation and maintenance periods. Treat, repair or replace damaged turf or landscaping Work as directed.

C. Take all precautions to insure that hydroseed slurry, is only placed on the areas designated. Completely clean any overspray, on areas not designated to receive slurry, to the satisfaction of ENGINEER.

D. Remove all rubbish, equipment and rejected materials from the site.

E. Protection includes all temporary fences, barriers and signs and other Work incidental to proper maintenance.

3.6 INSPECTION AND ACCEPTANCE

A. When the turf establishment and landscape Work are completed, including maintenance, the ENGINEER will make associated inspections to determine acceptability.

B. Where inspected turf or landscaping Work does not comply with the requirements, replace rejected Work and continue specified maintenance until reinspected by ENGINEER and found to be acceptable. Remove rejected plants and materials promptly from the project site.

C. Any damage, disturbance, or settlement that occurs as a result of the CONTRACTOR'S stockpiling of material or equipment on site shall be the responsibility of the CONTRACTOR to repair and/or supply additional materials to compensate for settlement caused by the CONTRACTOR'S actions.

D. The thickness of the in-place Topsoil will be checked by the CONTRACTOR after the completion of the work on a grid pattern not to exceed 50-foot by 50-foot by digging, by hand, with a plastic shovel in the presence of and as directed by the ENGINEER. The size of the test hole shall not be less than one-foot in diameter. Measurements shall be made perpendicular to the slope. The CONTRACTOR shall be responsible for digging holes in the Topsoil to allow for the measurements to be taken by the ENGINEER. After measurements have been made, the CONTRACTOR shall backfill the holes with Topsoil, and hand tamp. During digging and backfill of test holes, the CONTRACTOR shall use plastic shovels and exercise care not to damage any materials. Any such damage shall be repaired at the expense of the CONTRACTOR.

END OF SECTION

SECTION 02901 – Add Alternate 1 PLANTING

PART 1 – GENERAL

1.1 SUMMARY

A. **The work in this section includes, but is not limited to, the following:**

1. ***Locate, purchase, deliver and install all specified trees, shrubs, groundcovers, and perennials.***
2. ***Mulch, fertilize, and prune all specified plantings.***
3. ***Provide maintenance of all specified plantings.***

1.2 RELATED DOCUMENTS AND REFERENCES

A. **Related Sections:**

1. ***Section - Manufactured Soil***

B. **References:**

1. ***ANSI Z60.1 – 2004 American Standard for Nursery Stock, most current edition.***
2. ***ANSI A 300 – Standard Practices for Tree, Shrub and other Woody Plant Maintenance, most current edition.***
3. ***Interpretation of plant names and descriptions shall reference HORTUS THIRD – A Concise Dictionary of Plants Cultivated in the United States and Canada, Cornell University, L.H. Bailey Horitorium, MacMillian Publishing Co., New York, NY, most current edition.***
4. ***Pruning practices shall conform with recommendations in An Illustrated Guide to Pruning, Second Edition, Edward F Gilman, Delmar Publishing, Albany, NY, most current edition.***
5. ***Glossary of Arboricultural Terms, International Society of Arboriculture, Champaign Il, most current edition.***

1.3 Definitions

All terms in this specification shall be as defined in the "Glossary of Arboricultural Terms" or as modified below.

A. **Container: All types of plastic or fabric containers that have not been certified by the grower to produce root systems with roots approximately radial to the trunk, reasonably free of stem girdling and kinked roots.**

B. **Container Grown Trees: Trees that have been grown in a container at any point in the production cycle without corrective pruning of roots at each point in the production cycle, or the use of root safe containers to eliminate stem girdling and kinked roots.**

C. **Containerized trees: Field grown trees that are packaged into a container within 12 months of the growing season they are to be planted.**

D. **Field Grown Trees: Trees growing in field soil at the time of harvest. Field grown tree shall have been root pruned after each transplant cycle to remove Stem Girding and Kinked Roots or which are grown in root safe container systems during earlier parts of the production cycle.**

E. **Kinked Root: A root within the root package that bends 60 degrees or greater, around the trunk, or up, or down including roots deflected by the current or previous container.**

F. **Plant Acceptance: The date at the end of the plant installation where the City accepts that all work in this section is complete and the Warranty period has begun. This date may be different that the date of substantial completion for the other sections of the project.**

G. **Plant Final Acceptance: The date when the City accepts that the plants and work in this section meet all the requirements of the warranty.**

H. **Reasonable and Reasonably: When used in this specification relative to plant quality, it is intended to mean that the conditions cited will not affect the establishment or long term stability, health or growth of the plant. This specification recognizes that it is not generally possible to produce plants free of all defects. This specification also recognizes that some decisions cannot be totally based on measured findings and that profession judgment is required. In cases of differing opinion, the City's expert shall determine when conditions within the plant are judged as reasonable.**

I. **Root Ball: The mass of roots including any soil or potting mix that is shipped with the tree within the root ball package.**

J. **Root Ball Package. The material that surrounds the root ball during shipping.**

K. **Root Crown: The area where the majority of the main roots join the plant stem, usually at or near ground level (also known as the trunk flare). A single root emerging root perpendicular from the trunk ABOVE the Root Crown and / or the swelling of the trunk at the point of a previous graft should not be considered the root crown. For trees that develop two locations, one above the other, where three or more main roots emerge from the stem, the upper set shall be considered as the root crown.**

L. **Shrub: Woody plants with mature height approximately less than 5 meters.**

M. **Stem: The trunk of the tree. The portion of the plant above the roots.**

N. **Stem Girdling Root: Any root, 1/4 inch in diameter or greater, within the root package that crosses over the top of a structural root approximately tangential to the trunk circumference. Roots shall be considered as Stem Girdling that have or are likely to have root to trunk bark contact.**

O. **Structural Root: Large woody root emerging from the root crown, approximately radial to the trunk and at approximately the same depth, with a diameter approximately 1/2 to 1/3 of the root crown diameter.**

P. **Tree: Single and multi-stemmed plants with mature height approximately greater than**

5 meters.

1.4 SUBMITTALS

A. **Product Data: Submit manufacturer product data and literature describing all products required by this section to the City for approval. Provide submittal eight weeks before the installation of plants.**

B. **Plant Growers Certificates: Submit Plant Growers certificates for all plants indicating that each plant meets the requirements of the specification, including the requirements root system quality, to the City for approval. Provide submittal eight weeks before the installation of plants.**

C. **Samples: Submit samples of each product and material where required by the specification to the City for approval. Label samples to indicate product, characteristics, and locations in the Work. Samples will be reviewed for appearance only. Compliance with all other requirements is the exclusive responsibility of the contractor.**

   1. ***Mulch: 5 lb (2 kg) of mulch in labeled plastic bags.***

D. **Plant Sources: Submit sources of all plants as required by Article – "Selection of Plants" to the City for approval.**

E. **Close Out Submittals: Submit to the City for approval.**

   1. ***Plant maintenance data and requirements.***

F. **Warranty Period Site Visit Record: After each site visit during the warranty period, by the contractor, as required by this specification, submit a written record of the visit, including any problems, potential problems, and any recommended corrective action to the City for approval.**

1.5 QUALITY ASSURANCE

A. **Plant Acceptance:**

   1. ***The City will inspect all work for Plant Acceptance upon written request of the Contractor. The request shall be received at least ten calendar days before the anticipated date of inspection.***

   2. ***Plant Acceptance by the City shall be for general conformance to specified size, character and quality and not relieve the Contractor of responsibility for full conformance to the contract documents, including correct species.***

   3. ***Any plant that is deemed defective as defined under the warranty provisions below shall not be accepted.***

   4. ***The Contractor is responsible for the condition and quality of work and materials during construction, and until Plant Acceptance. Contractor shall bear the total cost of replacing any and all plants until this time.***

B. **Warranty:**

   1. ***The contractor agrees to replace defective Work and plants as defined below.***

   2. ***Plants warranty shall begin on the date of Plant Acceptance and continue for the***

following periods:

a. Trees – Two (2) Year.
b. Shrubs - Two (2) Year.
c. Groundcover / Perennials - One (1) Year.

3. ***When the work is accepted in parts, the warranty periods shall extend from each of the partial acceptances to the terminal date of the last warranty period. Thus, all warranty periods for each class of warranty, shall terminate at one time.***

4. ***All plants shall be warranted to be healthy, reasonably free of defects, in flourishing condition, and shall bear foliage of normal density, size, and color for the species at the end of the warranty period.***

5. ***Defective Plants: Plants shall be deemed defective that are dead, diseased, insect infested, or not in a vigorous, thriving condition, during or at the end of the warranty period. The following conditions shall be deemed as indicating a defective plant.***

   a. Any plant that has a canopy or root system with 25% or more of its volume dead, diseased, insect infested, or not in a vigorous, thriving condition.

   b. Evidence of damage to plants, which diminishes the aesthetic character and form or structural integrity of the plant or group of plants. Plants that have had more than 25% of the canopy reduced by removed limbs that were not removed under the direction of the City.

   c. Plants that do not meet the requirements for Stem girdling and kinked roots and proper depth of the root crown.

   d. Plants packaged with non-biodegradable fabrics or twine that have not been removed during the planting process.

   e. Any tree that has open wounds (not completely healed over) that penetrates the cambium into the wood on trunks or major limbs, the removal of which would result in the loss of 25% or more of the structure and form of the tree.

   f. The City shall make the final determination that plants are defective.

6. ***Plants determined to be defective shall be replaced without cost to the City, as soon as weather conditions permit and within the specified planting period.***

7. ***Any work required by this specification or the City during the progress of the work, to remediate plant defects including the removal of roots or branches, or planting plants that have been bare rooted during installation to inspect for or correct root defect shall not be considered as grounds to void any conditions of the warranty. In the event that the contractor feels that such remediation work may compromise the future health of the plant, the plant or plants in question shall be rejected and replaced with plants that do not contain defects that require remediation.***

8. ***The Contractor is exempt from replacing plants, after Plant Acceptance and during the warranty period, that are removed by others, lost or damaged due to occupancy of project, lost or damaged by a third party, vandalism, or any natural disaster.***

9. ***Replacements shall closely match adjacent specimens of the same species. Replacements shall be subject to all requirements stated in this specification. Make all***

necessary repairs due to plant replacements. Such repairs shall be done at no extra cost to the City.

10. ***The warranty of all replacement plants shall extend for an additional one-year period from the date of their acceptance after replacement. In the event that a replacement plant is not acceptable during or at the end of the said extended warranty period, the City may elect one more replacement items or credit for each item. These tertiary replacement items are not protected under a warranty period.***

11. ***During and by the end of the warranty period, remove all tree wrap, ties, and guying unless agreed to by the City to remain in place. All trees that have leaned shall be straightened.***

C. **Plant Final Acceptance:**

1. ***At the end of the warranty period, the City shall inspect all warranted work, upon written request of the Contractor. The request shall be received at least ten calendar days before the anticipated date for final inspection.***

2. ***Plant Final Acceptance will be given only when all the requirements of this specification have been met.***

D. **Contractor's Quality Assurance Responsibilities: The contractor is solely responsible for quality control of the Work.**

E. **Qualified Installer: the installer shall be a firm having at least 5 years of successful experience of a scope similar to that required for the Work, including the handling and planting of large specimen trees in urban areas. The installer of the work in Sections: Planting Soil, Shrubs and Ground Covers, and or Lawns, where applicable, shall be the same firm installing the work in this section.**

1. ***The bidders list for work under this section shall be approved by the City.***

2. ***Installer Field Supervision: When any planting work is in progress, installer shall maintain, on site, an experienced full-time supervisor who can communicate in English with the City.***

3. ***The installer's crew shall be experienced in the installation of plantings and large trees and interpretation of planting plans in urban areas.***

4. ***Submit references of past projects, employee training certifications that support that the contractor meets all of the above installer qualifications.***

F. **Regulatory requirements: Comply with applicable requirements of the laws, codes, ordinances and regulations of federal, State and municipal authorities having jurisdiction. Obtain necessary approvals from all such authorities.**

1.6 SELECTION and inspection OF PLANTS

A. **Submit to the City, for approval, Plant Sources including the names and locations of nurseries proposed as sources of acceptable plants, and a list of the plants they will provide. The plant list shall include the botanical and common name and the size at the time of selection. Inspect all nursery materials to determine that the materials meet the requirements of this section.**

B. **Trees shall be purchased from the growing nursery. Re-wholesale plant suppliers shall not be used as sources unless the contractor can certify that the required trees are not directly available from a growing nursery. When Re-wholesale suppliers are utilized, the contractor shall submit the name and location of the growing nursery from where the trees were obtained by the re-wholesale seller. The re-wholesale nursery shall be responsible for any required plant quality certifications**

C. **Schedule with the City, trips for viewing plants at nurseries. Ensure that there is sufficient material of the required size, quality and quantity at the nursery before scheduling a trip. The trips to the nurseries shall be efficiently arranged to allow the City to maximize viewing time. Where possible each trip should include visiting more than one nursery. Compliance with all other requirements is the exclusive responsibility of the contractor.**

D. **The contractor shall require the grower or re-wholesale supplier to permit the City to inspect the root system of all plants including random removal of soil around the base of the plant. Inspections may be as frequent and as extensive as needed to verify that the plants meet the requirements of the specifications and conform to the grower's root quality certifications.**

   1. ***For field grown plants, viewing of plants by the City may be at the growing nursery prior to the harvesting of the plant.***

E. **Each field grown tree shall have a numbered seal applied by the contractor. The seal shall be placed on a lateral branch the north side of the tree, to identify the tree orientation during the installation process. The seal shall be a tamper proof plastic seal bearing the contractors name and a unique seven-digit number embossed on the seal.**

   1. ***Do not place seals on branches that are so large that there is not sufficient room for the branch growth over the period of the warranty.***

F. **The City may choose to attach their seal to each plant, or a representative sample. Viewing and/or sealing of plants by the City at the nursery does not preclude the City's right to reject material while on site. The Contractor is responsible for paying any up charge for the City to attach their seal to specific plants.**

G. **Where requested by the City, submit photographs of plants or representative samples of plants. Photographs shall be legible and clearly depict the plant specimen. Each submitted image shall contain a height reference, such as a measuring stick. The approval of plants by the City via photograph does not preclude the City's right to reject material while on site.**

H. **Growing nurseries shall be located in USDA plant hardiness zones 5-6, American Horticultural Society heat hardiness zones 4-5 and no more than 250 miles from the project site.**

1.7 PLANT SUBSTITUTIONS FOR PLANTS NOT AVAILABLE

A. **Submit all requests for substitutions of plant species, or size to the City, for approval, prior to purchasing the proposed substitution. Request for substitution shall be accompanied with a list of nurseries contacted in the search for the required plant and a record of other attempts to locate the required material. Request shall also include sources of plants found that may be of a smaller or larger size than specified, or plants**

of the same genus and species but different cultivar origin, or which may otherwise not meet the requirements of the specifications, but which may be available for substitution.

1.8 SITE CONDITIONS

A. **It is the responsibility of the Contractor to be aware of all surface and sub-surface conditions, and to notify the City, in writing, of any circumstances that would negatively impact the health of plantings. Do not proceed with work until unsatisfactory conditions have been corrected.**

B. **It is the responsibility of the Contractor to be familiar with the local growing conditions, and if any specified plants will be in conflict with these conditions. Report any potential conflicts, in writing, to the City.**

C. **This specification requires that work in Section 32 91 10 Topsoil, be completed and accepted prior to the installation of any plants.**

D. **Do not install plants into saturated or frozen soils. Do not install plants during inclement weather, such as rain or snow or during extremely hot, cold or windy conditions.**

1.9 PLANTING AROUND UTILITIES

A. **Contractor shall carefully examine the civil, record, and survey drawings to become familiar with the existing underground conditions before digging.**

B. **Determine location of underground utilities and perform work in a manner that will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until parties concerned mutually agree upon removal.**

C. **Notification of "Call Before You Dig" , tel.: 1-800-922-4455, is required for all planting around utilities with root balls deeper than 18 inches: The Contractor is responsible for knowing the location and avoiding utilities that are not covered by the "Call Before You Dig" service.**

PART 2 – PRODUCTS

2.1 PLANTS: GENERAL

A. **Standards and measurement: Provide plants of quantity, size, genus, species, and variety or cultivars as shown and scheduled in contract documents.**

1. ***All plants shall conform to ANSI Z60.1 "American Standard for Nursery Stock", unless modified by provisions in this specification. In the event that there is a conflict between this specification and ANSI Z60.1, this specification section shall be considered correct.***

2. ***Caliper measurement shall be taken at a point on the trunk 6 inches above root crown for trees smaller than 4" in caliper, and at a point 12" above the root crown for trees 4" in caliper or larger.***

3. ***Plants larger than specified may be used if acceptable to the City. Use of such plants shall not increase the contract price. If larger plants are accepted the root ball size shall be increased in proportion to the size of the plant. Larger plants may not be acceptable if the resulting root ball cannot be fit into the required planting space.***

4. ***If a range of size is given, no plant shall be less than the minimum size and not less than 50 percent of the plants shall be as large as the maximum size specified. The measurements specified are the minimum size acceptable and are the measurements after pruning, where pruning is required.***

B. **Plant Quality:**

1. ***General: Provide healthy, vigorous stock, grown in a recognized nursery and reasonably free of disease, insects, eggs, bores, and larvae. At the time of planting all plants shall have root system, stem, and branch form that will not restrict normal growth, stability and vigor for the expected life of the plant.***
2. ***Plant quality above the soil line:***
   a. Plants shall be of exceptional quality with the color, shape, size and distribution of trunk, stems, branches, buds and leaves normal to the plant type specified.
   b. Trees shall not have co dominant leaders or significant branch unions with included bark between stems. All trees are assumed to be single leader plants unless a different form is specified in the plant list or drawings.
   c. Tree trunks shall be reasonably straight with lateral limbs reasonably symmetrical and evenly distributed along the trunk.
   d. The trunk and branches shall be reasonably free of knots, scrapes, broken or split wood, fresh limb cuts, sunscald, injuries, and abrasions. All graft unions, where applicable, shall be completely healed without visible sign of graft rejection. All grafts shall be visible above the soil line.
3. ***Plant quality at or below the soil line:***
   a. The roots shall be reasonably free of scrapes, broken or split wood.
   b. A minimum of three structural roots reasonably distributed around the trunk shall be found in each plant.
      1.) Plants with structural roots on only one side of the trunk (J roots) shall be rejected.
   c. The root crown must not be more than 2 inches below the soil line. The top two structural roots shall be no more than 3 inches below the soil line and the rest of the structural roots shall be no more than 5 inches below the soil line when measured 4 inches radial to the trunk. The grower may request a modification to this requirement for species with roots that rapidly descend, provided that the grower removes all circling roots above the structural roots across the top of the root ball.
   d. The root system shall be reasonably free of stem girdling roots above the root collar, vertical roots and or kinked roots from nursery production practices. Stem girdling roots, vertical and kinked roots include roots on the interior of the root ball.
      1.) The final plant grower shall be responsible to have determined that the plants have been root pruned at each step in the plant production process to remove stem girdling roots and kinked roots, or that the previous production system use Root Safe Containers or practices that produce a root system throughout the root ball that meets these specifications. Regardless of the work of previous growers, the plant's root system shall be modified at the final production stage to produce the require plant root quality. The final grower shall certify in writing that all plants

are reasonably free of stem girdling and kinked roots as defined in this specification, and that the tree has been grown and harvested to produce a plant that meets these specifications.

C. **Submittals: Submit for approval the required plant quality certifications from the grower where plants are to be purchased, for each plant type. The certification must state that each plant meets all the above plant quality requirements.**

1. ***The grower's certification of plant quality does not prohibit the City from inspecting any plant or rejecting the plant if it is found to not meet the specification requirements.***

2.2 ROOT BALL PACKAGE OPTIONS: The following root ball packages are permitted. Specific Root Ball Packages shall be required where indicated on the plant list or in this specification. Any type of Root Ball Packages that is not specifically defined in this specification shall not be permitted.

A. **BALLED AND BURLAPPED PLANTS**

1. All Balled and Burlapped Plants shall be field grown, and the root ball packaged in a burlapped and twine and or burlap and wire basket package.
2. Plants shall be harvested with the following modifications to standard nursery practices.

   a. Prior to digging any tree, using hand tools or an air spade, carefully removed the soil from the top of the root ball of each plant to locate the root crown. Care must be exercised not to damage the surface of the root crown and the top of the structural roots.

   b. Balled and burlapped trees shall be dug prior to leafing out (bud break) in the spring or during the fall planting period except for plants know to be considered as fall planting hazards. Plants that are fall planting hazards shall only be dug prior to leafing out in the spring. Plants to be shipped or installed when in leaf shall be pre-dug prior to bud break and stored appropriately protected storage yards with adequate water.

   c. If wire baskets are used to support the root ball, a "low profile" basket shall be used. A low profile basket is defined as having the top of the highest loops on the basket no less that 4 inches and no greater than 8 inches below the shoulder of the root ball package.

   d. Twine and burlap used for wrapping the root ball package shall be natural, biodegradable material. If the burlap decomposes during the storage period the root ball shall be re-wrapped prior to shipping.

B. CONTAINER GROWN PLANTS

1. ***Container grown plants may be permitted only when indicated on the drawing, this specification or approved by the City.***
2. ***Provide plants established and well rooted in removable containers***
3. ***Container class size shall conform to ANSI Z60.1 for container plants for each size and type of plant.***
4. ***Container-grown stock shall have been grown in a container long enough for the root***

system to have developed sufficiently to hold its potting medium together but not so long as to have developed Stem Girdling or matted, circling around the edge of the container. Plants that fail to meet this requirement may be modified to correct deficiencies as describe in Part 3 Execution if approved by the City.

C. **CONTAINERIZED PLANTS**

1. ***Containerized plants may be permitted only when indicated on the drawing, this specification or approved by the City.***
2. ***Provide field grown plants in containers of similar size as the ANSI Z60.1 requirements for Balled and Burlapped plants.***
3. ***Place the field grown plant in the container at the correct depth of the root crown as defined in section Plants: General, sub paragraph Quality, above.***
4. ***Containerized plants shall not held in the container more than 12 months.***
5. ***Remove all stem girdling above the root collar or circling roots around the edge of the container prior to planting as describe in Part 3 Execution if approved by the City.***

D. **BARE ROOT PLANTS**

1. ***Provide plants established and well-rooted field grown plants. Harvest bare root plant while the plant is dormant and a minimum of 4 weeks prior to leaf out (bud break).***
2. ***The root spread of the harvested plants shall conform to ANSI Z60.1 for nursery grown bare root plants for each size and type of plant.***
3. ***Immediately after harvesting, dip the root system into a slurry of hydrogel (cross linked polyacrylamide) and water mixed at a rate of 15 oz of hydrogel in 25 gallons of water. Do not shake off the excess hydrogel. Place the root system in a pleated black plastic bag and tie the bag snugly around the trunk. Bundle and tie the upper branches together.***
4. ***Keep the trees in a cool dark space for storage and delivery. If daytime outside temperatures exceeds 70 degrees F, utilize a refrigerated storage area with temperature between 35 and 50 degrees.***
5. ***Where possible, plan time of planting to be before bud break. For trees to be planted after bud break, place the trees before bud break in an irrigated bed of pea gravel.***
   a. The pea gravel bed shall be 18 inches deep over a sheet of plastic.
   b. Space trees to allow the unbundled branches to grow without shading each other.
   c. Once stored in pea gravel, allow the trees sufficient time for the new root system to flush and spring growth of leaves to fully develop before planting.
   d. Pea gravel stored trees may be kept for up to one growing season.
6. ***Pea gravel stored trees shall be dipped, packaged and shipped similar to the requirements for freshly dug bare root trees above.***

2.3 MULCH

A. **Mulch shall be Compost.** ~~**Material shall be mulching grade, uniform in size and foreign matter. Wood content shall not exceed 15% by volume. Mulch that has become saturated with water and presents an anaerobic odor shall be rejected.**~~

B. **Submit manufacturers product data that product meets the requirements and one**

gallon sample for approval.

2.4 ANTI-DESICCANT

A. **Anti-Desiccant shall be emulsion type, film-forming agent similar to Dowax by Dow Chemical Company, or Wilt-Pruf by Nursery Specialty Products, Inc., Croton Falls, New York, designed to permit transpiration but retard excessive loss of moisture from plants. Deliver in manufacturer's fully identified containers and use in accordance with manufacturer's instructions.**

B. **Submit manufacturers product data for approval.**

2.5 TREE STAKING AND GUYING MATERIAL

A. **Tree guying to be flat woven polypropylene material, 3/4" wide, 900 lb break strength. Color to be Green. Product to be ArborTie, manufactured by Deep Root Partners, L.P. (800) 458-7668, or approved equal.**

B. **Stakes shall be 2"x2" hardwood stakes free of knots and of lengths appropriate to the size plant required for to adequately support the plant.**

C. **Dead men for Large Trees where required on the drawings shall be 4" x 4" x 4' long, wood. Wood shall NOT be treated to protect from rot.**

D. **Submit manufacturers product data for approval.**

2.6 TREE Bark Protector

A. Tree Bark Protectors shall be black extruded resin mesh, 100mm diameter, 5 feet long. As manufactured by Industrial Netting, Minneapolis, MN, USA or approved equal.

B. Fasten the split side of the Tree Bark Protector together in three places with black plastic tape.

C. Submit manufacturers' product data for approval.

~~***2.7 WATERING BAGS***~~

~~A. **Watering bags shall be Treegator Irrigation Bags, sized to the appropriate model for the requirements of the plant, manufactured by Spectrum Products, Inc, Youngsville, NC 27596. Or approved equal.**~~

B. **Submit manufacturers product data for approval.**

2.8 CHEMICAL, biological, or physical ADDITIVES

A. **Chemical or Biological Additives: Chemicals and biological materials designed to increase soil fertility. All material shall be delivered to the site in unopened containers and stored in a dry enclosed space suitable for the material and meeting all environmental regulations. Biological additives shall be protected from extreme cold and heat. All products shall be freshly manufactured and dated for the year in which the products are to be used.**

1. ***Fertilizer: Fertilizer for planting shall be organic fertilizer with a salt index of 25 or less. The majority of the nutrient elements are from organic sources. Fertilizer***

selections shall be based on the recommendations of the soil test.

a. Bonemeal: Commercial, raw, finely ground; minimum of 4 percent nitrogen and 20 percent phosphoric acid.
b. Superphosphate: Commercial, phosphate mixture, soluble; minimum of 20 percent available phosphoric acid.
c. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea-form, phosphorous, and potassium in the following composition:
   1.) Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.
d. Slow-Release Fertilizer: Granular fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
   1.) Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

2. ***Lime: ASTM C602-95a, Class T, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent, with a minimum 99 percent passing a No. 8 (2.36 mm) sieve and a minimum 75 percent passing a No. 60 (250 micrometer) sieve.***
   a. Provide lime in the form of dolomitic limestone.
3. ***Aluminum Sulfate: Commercial grade, unadulterated.***
4. ***Sand: Clean, washed, natural or manufactured sand, free of toxic materials.***
5. ***Sturctural Enhancing Materials***
   a. Vermiculiter
   b. Expanded of Calcined Clay, such as “Ridgelite”, or approved equal.
   c. Diatomaceous Earth, such as “Isolite”, “Axis”, or approved equal.
   d. Perlite, horticultural soil amendment grade.
6. ***Mycorrhizal Inoculant: A mycorrhizal (ecto- and endomycorrhizal) inoculation, such as Horticultural Alliance’s DIEHARD™ Transplant, (P.O. Box 5744, Sarasota, FL 34277, Tel: 800-628-6373) or approved equal.***
7. ***Hydrogel Soil Amendment:: Shall be Terra-Sorb Hydrogel, an acrylamide copolymer gel, of Medium or Coarse Grade, as supplied by Plant Health Care, Inc., 440 William Pitt Way, Pittsburgh, PA 15238, tel 800-421-9051, or approved equal.***
8. ***Submit manufacturers product data for approval.***

PART 3 – Execution

3.1 SITE EXAMINATION

A. **Examine the surface grades and soil conditions to confirm that the requirements of Specification Section – Planting Soil and the soil and drainage modifications indicated on the Planting Soil Plan and Details have been completed. Notify the City in writing of any unsatisfactory conditions.**

3.2 DELIVERY, STORAGE AND HANDLING

A. **Protect materials from deterioration during delivery and storage. Adequately protect plants from drying out, exposure of roots to sun, wind or extremes of heat and cold temperatures. If planting is delayed more than 24 hours after delivery, set plants in a**

location protected from sun and wind. Provide adequate water to the root ball package during the shipping and storage period.

1. ***Using a soil moisture meter, periodically check the soil moisture in the root balls of all plants to assure that the plants are being adequately watered.***

B. **Do not deliver more plants to the site than there is space with adequate storage conditions. Provide a suitable remote staging area for plants and other supplies.**

1. ***The City shall approve the duration, method and location of storage of plants.***

C. **Provide protective covering over all vehicles during delivery of all plants.**

D. **Before shipping, apply 1/8 inch thick, wax sealed, corrugated cardboard trunk protection around the trunk of all trees from the top of the root ball package to the first branch. Cardboard shall be coated to reduce water penetration, and fabricated for this application. Secure the cardboard with plastic tape.**

E. **If trees are moved when in full-leaf, spray with anti-desiccant per manufacturer's recommendations at nursery no greater than 48 hours prior to digging, and again two weeks after transplanting. Spraying should take place in early morning hours with foliage at maximum turgidity.**

3.3 PLANTING SEASON

A. **Planting shall only be performed when weather and soil conditions are suitable for planting the materials specified in accordance with locally accepted practice. Install plants during the planting time as described below unless otherwise approved in writing by the City. In the event that the contractor request planting outside the dates of the planting season, approval of the request does not change the requirements of the warranty.**

1. ***Deciduous trees and shrubs April 1 to June 15 and September 1 to December 1***
2. ***Evergreen trees and shrubs April 1 to June 15 and September 1 to October 15.***
3. ***Plants identified as "Fall Planting Hazards" shall not be installed unless they have been secured as "Spring Dug Material", certified by the Nursery.***

3.4 COORDINATION WITH PROJECT WORK

A. **The Contractor shall coordinate with all other work that may impact the completion of the work.**

B. **Prior to the start of Work, prepare a detailed schedule of the work for coordination with other trades.**

C. **Coordinate the relocation of any irrigation lines, heads or the conduits of other utility lines that are in conflict with tree locations. Root balls shall not be altered to fit around lines. Notify the City of any conflicts encountered.**

3.5 LAYOUT AND PLANTING SEQUENCE

A. **When applicable, plant trees before other plants are installed. Where spacing dimensions or locations are not clear, notify the City before installation.**

B. **Notify the City, one (1) week prior to layout. Lay out all individual tree and shrub**

locations. Place plants above surface at planting location or place a labeled stake at planting location. Layout bed lines with paint for the City's approval. Secure the City's acceptance before digging and start of planting work.

C. **It is understood that plants are not precise objects and that minor adjustments in the layout will be required as the planting plan is constructed. These adjustments may not be apparent until some or all of the plants are installed. Make adjustments as required by the City including relocating previously installed plants.**

3.6 SOIL PROTECTION DURING plant DELIVERY and installation

A. **Protect soil from compaction during the delivery of plants to the planting locations, digging of planting holes and installing plants.**

1. ***Where possible deliver and plant tress to that require the use of heavy mechanized equipment prior to final soil preparation and tilling.***
2. ***Till and restore grades to all soil that has been driven over or compacted during the installation of plants.***

3.7 INSTALLATION OF plants: General

A. **Inspect each plant after delivery and prior to installation for damage of other characteristics that may cause rejection of the plant. Notify the City of any condition observed.**

B. **The root system of each plant, regardless or root ball package type, shall be inspected by the contractor, at the time of planting to confirm that the roots meet the requirements for plant root quality in Part 2 Products: Plants General: Quality. The contractor shall undertake at the time of planting, all modifications to the root system required by the City to meet these quality standards.**

1. ***Modifications, at the time of planting, to meet the specifications for the depth of the root crown and removal of stem girdling roots and circling roots may make the plant unstable or stress the plant to the point that the City may choose to reject the plant rather than permitting the modification.***
2. ***Any modifications required by the City to make the root system conform to the plant quality standards outlined in Part 2 Products: Plants General: Quality or other requirements related to the permitted root ball package shall not be considered as grounds to modify or void the plant warranty.***
3. ***The contractor remains responsible to confirm that the grower has made all required root modifications noted during any nursery inspections.***

C. **Container Root Ball Shaving: The outer surfaces of ALL plants in containers, including the top, sides and bottom of the root ball shall be shaved to remove all circling and matted roots. Shaving shall be performed using saws, knives, sharp shovels or other suitable equipment that is capable of making clean cuts on the roots. Shaving shall remove a minimum of one inch of root mat or deeper as required to remove all roots that are not growing reasonably radial to the trunk and all kinked and vertical roots.**

D. **Exposed Stem Tissue after Modification: The required root ball modifications may result in stem tissue that has not formed trunk bark being exposed above the soil line.**

If such condition occurs, wrap the exposed portion of the stem in a protective wrapping such as Dewitt Tree Wrap fabric. Secure the fabric with biodegradable tape such as "3M Scotch 234 or 232" masking tape. DO NOT USE string, twine or any other material that may girdle the trunk if not removed.

E. **Using hand tools, back hoe or mini-excavator, excavate the planting hole into the Planting Soil to the depth of the root ball measured after any root ball modification to correct root problems, and wide enough for working room around the root ball or to the size indicated on the drawing.**

1. ***The measuring point for root ball depth shall be the average height of the outer edge of the root ball after any required root ball modification.***
2. ***Planting holes may not be dug with a mechanical auger.***

F. **For trees to be planted in prepared Planting Soil that is deeper than the root ball depth, compact the soil under the root ball using a mechanical tamper to assure a firm bedding for the root ball. If there is more than 12 inches of planting soil under the root ball excavate and tamp the planting soil in lifts not to exceed 12".**

G. **Set top outer edge of the root ball at the average elevation of the proposed finish. Set the plant plumb. The tree graft, if applicable, shall be visible above the grade. Do not place soil on top of the root ball.**

H. **Trees shall be oriented so their north side, as marked in the nursery, faces north. The Architect may require trees to be oriented slightly in another direction based on the form of the tree or other conditions.**

I. **Brace root ball by tamping Planting Soil around the lower portion of the root ball. Place additional Planting Soil around base and sides of ball in six-inch (6") lifts. Lightly tamp each lift using hand tools to settle backfill and eliminate voids.**

J. **Where indicated on the drawings, build a 3" high, level saucer of Planting Soil around the outside of the root ball to retain water. Tamp the saucer to reduce erosion of the saucer.**

K. **Thoroughly water the Planting Soil and root ball immediately after planting**

L. **Remove all nursery plant identification tags and ribbons. The City's seals are to remain on plants until the end of the warranty period.**

M. **Remove corrugated cardboard trunk protection after planting.**

N. **Follow additional requirements for the permitted root ball packages.**

3.8 Permitted Root ball packages and Special planting requirements

A. **The following are permitted root ball packages and special planting requirements that shall be followed during the planting process in addition to the above General planting requirements.**

B. **BALLED AND BURLAPPED PLANTS**

1. ***After the root ball has been backfilled, remove all twine and burlap from the top of the root ball. Cut the burlap away, do not fold down onto the Planting Soil.***

2. ***If the plant is shipped with a wire basket that does not meet the requirements of a "Low Rise" basket, remove the top 6-8 inches of the basket wires just before the final backfilling of the tree.***

C. **CONTAINER GROWN PLANTS**

1. ***This specification assumes that most container plants have significant stem girdling and circling roots, and that the root crown is too low in the root ball.***
2. ***Remove the container.***
3. ***Cut all circling roots on the perimeter of the root ball such that the roots are emerging out to remaining root system are oriented approximately radial to the trunk.***
4. ***Remove all roots and potting soil above the root crown and the main structural roots.***
5. ***Remove all potting soil at the bottom of the root ball that does not contain roots.***
6. ***Using a hose, power washer or air knife, wash out the potting mix from around the trunk and top of the remaining root ball and find and remove all stem girding roots within the root ball above the top of the structural roots.***
7. ***The resulting root ball may need additional staking and water after planting. The city may reject the plant if the root cutting process makes the tree unlikely to be vigorous at the end of the warranty period.***

D. **CONTAINERIZED PLANTS**

1. ***Remove the container.***
2. ***Cut all circling roots on the perimeter of the root ball such that the roots are emerging out to remaining root system are oriented approximately radial to the trunk.***
3. ***Remove all roots, root mat and potting soil above the root crown and the main structural roots.***
4. ***Remove all potting soil at the bottom of the root ball that does not contain roots.***

E. **BARE ROOT PLANTS**

1. ***Dig the planting hole twice diameter of the spread of the roots. Dig the planting hole in the center to the depth that maintains the root collar at the elevation of the surrounding finished grades and slightly deeper along the edges of the hole.***
2. ***Spread the roots out radial to the trunk around the prepared hole.***
3. ***Maintain the trunk plumb while backfilling soil around the roots.***
4. ***Lightly tamp the soil around the roots to eliminate voids and reduce settlement.***

3.9 TREE STAKING AND GUYING

A. **Do not stake or guy trees unless specifically required by the Contract Documents, or in the event that the Contractor feels that staking is the only alternative way to keep particular trees plumb.**

1. ***The City shall have the authority to require that trees are staked or to reject staking as***

an alternative way to stabilize the tree.

2. ***Trees that have had heavily modified root balls to meet the root quality standards may become unstable. The City may choose to reject these trees rather than utilize staking to temporarily support the tree.***

B. **Trees that are guyed shall have their guys and stakes removed after one full growing season or at other times as required by the City.**

C. **Tree guying shall utilize the tree staking and guying materials specified. Guying to be tied in such a manner as to create a minimum 12" loop to prevent girdling. Refer to manufacturer's recommendations for installation. Plants shall stand plumb after staking or guying.**

3.10 Tree bark protection

A. **For all trees or as identified in Contract Drawings, apply a Tree Bark Protector to each tree.**

3.11 STRAIGHTENING PLANTS

A. **Maintain all plants in a plumb position throughout the warranty period. Straighten all trees that move out of plumb including those not staked. Plants to be straightened shall be excavated and the root ball moved to a plumb position, and then re-backfilled.**

B. **Do not straighten plants by pulling the trunk with guys.**

3.12 INSTALLATION OF FERTILIZER AND OTHER CHEMICAL ADDITIVES

A. **Do not apply any fertilizer to plantings during the first year after transplanting unless soil test determines that fertilizer or other chemical additives is required. Apply chemical additives only upon the approval of the City.**

B. **Fertilizers shall be applied according to the manufacturer's instructions and standard horticultural practices.**

3.13 PRUNING OF TREES AND SHRUBS

A. **Prune plants as directed by the City. In general, preserve the natural character of the plant and follow recommendations in "An Illustrated Guide to Pruning, Second Edition".**

B. **All pruning shall be performed by a person experienced in landscape pruning.**

C. **Wherever possible and appropriate to the species, preserve or create a central leader.**

D. **Pruning of large trees shall be done using pole pruners or if needed, from a ladder or hydraulic man lift to gain access to the top of the tree. Do not climb in newly planted trees**

E. **Remove and replace excessively pruned or malformed stock resulting from improper pruning.**

F. **Pruning shall be done with clean, sharp tools.**

G. **No tree paint or sealants shall be used.**

3.14 MULCHING OF PLANTS

A. **Apply 1-2 inches of mulch top of root balls and planting beds, covering the entire planting bed area. Do not install mulch any closer than 8 inches to the trunk. I**

B. **For tree planted in lawn areas the mulch shall extend to a 6' diameter around the tree or to the extent indicated on the plans. Cut a clean, smooth edge between the mulch and lawn.**

C. **Lift all leaves, low hanging stems and other green portions of small plants out of the mulch if covered.**

3.15 WATERING

A. **The Contractor shall be fully responsible to ensure that adequate water is provided to all plants from the point of installation until the date of Plant Acceptance. The contractor shall adjust the automatic irrigation system, if available and apply additional water, using hoses as required.**

B. **Hand water root balls of all plants to assure that the root balls have adequate moisture. Test the moisture content in each root ball and the soil outside the root ball to determine the water content.**

C. **The Contractor shall install one set (two bags) of watering bags for each tree to be maintained and used for tree watering during the warranty period. Watering bags shall be removed between December 1 and March 1.**

1. The watering bags shall remain the property of the City at the completion of the work.

3.16 CLEAN-UP

A. **During installation, keep the site free of trash, pavements reasonably clean and work area in an orderly condition at the end of each day.**

B. **Once installation is complete, wash all soil from pavements and other structures. Ensure that mulch is confined to planting beds and that all tags and flagging tape are removed from the site. The City seals are to remain on the trees and removed at the end of the warranty period.**

3.17 PROTECTION DURING CONSTRUCTION

A. **The Contractor shall protect landscape work and materials from damage due to planting operations, operations by other Contractors or trespassers. Maintain protection during installation until Plant Acceptance. Treat, repair or replace damaged planting work immediately.**

B. **Damage done by the Contractor, or any of their sub contractors to plants, or any other parts of the work, shall be replaced by the Contractor at no expense to the City.**

3.18 PLANT MAINTENANCE PRIOR TO PLANT ACCEPTANCE

A. **During the project work period and prior to Plant Acceptance, the Contractor shall maintain all plants.**

B. **Maintenance during the period prior to Plant Acceptance shall consist of pruning, watering, cultivating, weeding, mulching, removal of dead material, repairing and replacing of tree stakes, tightening and repairing of guys, repairing and replacing of damaged tree wrap material, resetting plants to proper grades and upright position,**

and furnishing and applying such sprays as are necessary to keep plantings reasonably free of insects and disease, and in healthy growing condition. The threshold for applying insecticides and herbicide shall follow established Integrated Pest Management (IPM) procedures. Mulch areas shall be kept reasonably free of weeds, grass.

3.19 MAINTENANCE DURING THE WARRANTY PERIOD

A. Once the project is Accepted, the Contractor shall make periodic site visits to inspect the City's maintenance until the date of Plant Final Acceptance.

1. ***Notify the owner in writing if maintenance including watering, is not sufficient to maintain plants in a healthy condition. Such notification must be in a timely period so that the City may take corrective action.***

   a. Notification must define the maintenance needs and describe any corrective action required.

2. ***In the event that the contractor fails to visit the site and or notify, in writing, the City of maintenance needs, lack of maintenance shall not be used as grounds for voiding or modifying the provisions of the warranty.***

END OF SECTION 32 93 20

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Providing new topsoil, if required.
2. Testing topsoil.
3. Delivering and spreading manufactured topsoil.
4. Soil Amendments.
5. Fine grading.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Section 02227, Vegetative Support Soil
2. Section 02900 Planting
3. Section 02920 Seeding

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product certificates signed by suppliers certifying that their products comply with specified requirements.

1. Name and location of proposed supply source of materials per Contract specifications of minineral component, compost, new topsoil with certified analysis by recongnized, independent testing service including tests for quality requirements Part 1.4.

C. Submit test reports for the following:

1. Analysis of imported mineral component.
    a. Testing of mineral component shall include requirements for testing as per Section 02227, Vegetative Support Soil.
2. Analysis of imported compost.
3. Analysis of manufactured topsoil, as mixed on site.

4. Analysis of manufactured topsoil post installation on site.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed landscaping work similar in material, design, and extent to that indicated for this Project and with a record of successful landscape establishment. Installer shall have aminimum of 5 (five) years experience, of working on similar projects.

1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on the Project site during times that landscaping is in progress.

B. Testing Agency Qualifications: Provide and pay for materials testing by recognized, independent testing service approved by Landscape Archtiect.

2. Take representative samples for testing (paid for by the Contrator) from materials as they are delivered, in presence of and in manner satisfactory to Landscape Architect as follows:

a. Mineral Component: Each 500 Cubic Yards.

b. Manufactured Topsoil, following blending: work: Every 500 cubic yards, or 25,000 square feet for areas with depth of 6” maximum.

c. Tests for manufactured topsoil shall be conducted 4 (no more than) weeks prior to installation.

d. Testing of soil post placement

e. Test for compost as described below.

i. Provide a minimum of two (2) tests for compost, for every 500 cubic yards of compost.

3. Provide testing of following materials for analysis of data indicated:

a. Furnish an analysis of manufactured topsoil by a qualified independent soil-testing agency stating percentages of organic matter, soluble salts, mineral component (percentage of silt, clay, and sand as determined by USDA Classification), deleterious material, pH, and mineral and plant-nutrient content of topsoil. Addtionally, Landscape Architect shall visually inspect manufactured topsoil.

1) Report suitability of topsoil for growth of applicable planting material. State recommended quantities of nitrogen, phosphorus, and potash nutrients and any limestone, aluminum sulfate, or other soil amendments to be added to produce a satisfactory topsoil.

b. Compost Analysis: Furnish a compost analysis made by a qualified independent soil-testing agency stating percentages of organic matter, pH, Solvita

Compost Maturity Test, moisture content, soluble salts, conductivity, and mineral and plant-nutrient content of compost.

c. Mineral Component Analysis: Furnish a particle size distribution analysis, per ASTM D-7422-63.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Keep manufactured topsoil from being mixed with subgrade materials, or other stockpiled materials, waste materials, debris and other contaminants.

1.6 PROJECT CONDITIONS

A. Utilities: Determine location of above grade and underground utilities and perform work in a manner which will avoid damage. Hand excavate, as required. Maintain grade stakes until removal is mutually agreed upon by parties concerned.

B. Fine grading shall be accepted by Landscape Architect prior to seeding.

C. Do not work with soggy, muddy or frozen topoil or install toposoil during rain or on subgrades which are muddy, under water, or frozen.

PART 2 - PRODUCTS

2.1 TOPSOIL

A. Mineral Component: ASTM D5268-02, pH range of 5.5 to 7.0, free of stones 1 ½" (inch) (40 mm) or larger in any dimension and 97% - 100% will pass **½"** mesh sieve, and no other extraneous materials harmful to plant growth.

1. Where specified in Contract Documents, Topsoil shall comply with profile as defined.
2. Topsoil characteristics shall include:

   a. Texture: Sandy, Sandy loam, loamy sand to silty clay loam as per USDA Classifications.

   b. Structure: Granular, crumb, or fine subangular blocky. Single-grained soils are discouraged.

   c. Soluble Salts: less than 200 ppm.

   d. Soils domininat in silt, or clay singularly are not permitted.

3 Source: Contractor shall identify material sources prior to the start of contstruction, and verify availability of material for entire project.

2.2 SOIL AMENDMENTS

A. Lime: ASTM C602-95a, Class T, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent, with a minimum 99 percent passing a No. 8 (2.36 mm) sieve and a minimum 75 percent passing a No. 60 (250 micrometer) sieve.

1. Provide lime in the form of dolomitic limestone.

B. Aluminum Sulfate: Commercial grade, unadulterated.

C. Sturctural Enhancing Materials
1. Vermiculiter
2. Expanded of Calcined Clay, such as “Ridgelite”, or approved equal.
3. Diatomaceous Earth, such as “Isolite”, “Axis”, or approved equal.
4. Perlite, horticultural soil amendment grade.

D. Compost: : Compost shall be a stable, humus-like organic material produced by the biological and biochemical decomposition of source separated compostable materials, separated at the point of generation, that may include, but are not limited to, leaves and yard trimmings, food scraps, food processing residuals, manure and/or other agricultural residuals, forest residues and bark and soiled or non-recyclable paper. Compost shall not be altered by the addition of materials such as sand, soil or glass. Compost shall contain no substances toxic to plants and shall not contain more than 0.1 percent by dry mass of man-made foreign matter. Compost shall pose no objectionable odor and shall not closely resemble the raw material from which it was derived. Compost shall have a minimum organic matter content of thirty percent (25%) dry unit weight basis as determined by loss on ignition in accordance with ASTM D 2974. Compost shall be loose and friable, not dusty, have no visible free water and have a moisture content of thirty-five to sixty percent (35 – 60%) in accordance with ASTM D 2974. The particle size of compost shall be one hundred percent (100%) less than 25 mm in accordance with AASHTO T27 and shall be free of sticks, stones, roots or other objectionable elongated material larger than 50 mm in greatest dimension. The pH of compost shall be in the range of 5.5 – 8.0. The maturity of the compost shall be tested and reported using the Solvita Compost Maturity Test and must score six (6) or higher to be acceptable. The soluble salt content of compost shall not exceed 4.0 mmhos/cm as determined by using a dilution of one (1) part compost to one (1) part distilled water. Compost may be either commercially packaged or used in bulk form. All compost material must be from CT DEEP regulated, permitted or approved facilities. The Landscape Architect reserves the right to draw samples and perform tests as may be deemed necessary to assure that the material conforms to these specifications..

E. Manure: Well-rotted, unleached stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

2.3 FERTILIZER

A. Bonemeal: Commercial, raw, finely ground; minimum of 4 percent nitrogen and 20 percent phosphoric acid.
B. Superphosphate: Commercial, phosphate mixture, soluble; minimum of 20 percent available phosphoric acid.

C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea-form, phosphorous, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

D. Slow-Release Fertilizer: Granular fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive landscaping for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Examine areas to receive manufactured topsoil with Landscape Architect and Engineer and identify poorly draining subgrades for corrective preparatory work. Include areas that may have been formerly compacted, and compacted by construction operations and activities.

3.2 PLANTING SOIL PREPARATION

A. Before blending, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.

B. Blending of mineral component and compost shall be conduction via windrowing, disking and ripping, or via machine.
   a. Disking shall not exceed compost lift applications in excess of 2”.
   b. Blending in windrows is not permitted by a bucket loader.
   c. Do not mix when material is very wet, or very dry, raining or snowing.

C. Mix soil amendments and fertilizers with topsoil at rates indicated on plans. Delay blending fertilizer if planting does not follow placing of planting soil within a few days.

1. Planting soil amendments and components shall be applied as indicated by soil tests. Amendments shall be reviewed with Landscape Architect.

D. For tree pit or trench backfill, mix planting soil before backfilling and stockpile at site.

E. For planting beds and seeded areas, mix manufactured soil either prior to planting or place compost on surface of mineral component and mix thoroughly before planting.

E. Placement of Manufactured Soil and Subsoil

1. Placement of Planting Bed and Turf Soil shall be carried out to prevent excessive traffic over soil lifts and the final grade so as to prevent the creation of undesirable soil compaction.
2. Planting Bed and Turf Soil shall be placed in lifts not to exceed 8 inches in thickness and compacted to meet minimum and maximum requirements as specified below:
   a. Planting Bed and Turf Soil shall be compacted to between 84 and 86 percent Standard Proctor.
   b. Slopes along the northern boundary and along Scofieldtown Road, at 1:3 shall be compacted to 90% proctor density, maximum of 95%.
   d. In all cases, the soil being placed shall be in a dry to damp condition. No wet soils shall be placed. All testing of in-place density for planting materials shall be made according to ASTM D1556.

3. Contractor shall rake to intermingle blended soils with Vegetative Support Soil layer.

3.3 SEEDING PLANTING PREPARATION

A. Limit subgrade preparation to areas that will be planted in the immediate future.

B. Spread manufactured soil mixture to depth required to meet thickness, grades, and elevations shown, after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen.

C. Grade turf and grass areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future. Remove trash, debris, stones larger than 1 ½" (inch) in any dimension, and other objects that may interfere with planting or maintenance operations.

1. Shape and rake surfaces to lines, finish grades and thickness required providing a smooth, uniform surface with an uninterupted drainage pattern free of hollows and pockets.
2. Fill, trim, blend and feather proposed grades to meet surrounding existing terrain, paving, curb, edge and building base conditions in smooth transition without abrupt level changes.

D. Moisten prepared lawn areas before planting when soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

E. Restore prepared areas if eroded or otherwise disturbed after fine grading and before planting.

3.4 CLEANUP AND PROTECTION

A. During landscaping, keep pavements clean and work area in an orderly condition.

3.5 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of it off the Owner's property.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Soil amendments and fertilizing.

B. Seeding.

C. Maintenance.

1.2 RELATED SECTIONS

A. Section 02915 , Manufactured Topsoil

B. Section 02900, Plantings

1.3 STANDARDS

A. All landscaping work shall be done by a single firm specializing in landscape work.

1.4 QUALITY CONTROL

A. General: furnish certificates of inspection of landscape materials, to accompany shipments, as required by governmental authorities. Comply with applicable federal, state, county, and local regulations governing landscape materials.

B. Contractor qualifications: engage an experienced contractor who has successfully completed landscape installations similar in scope and complexity to this project.

C. The use of pesticides (including fungicides, insecticides and herbicides) shall be performed in strict accordance with applicable state law. Pesticide applications shall only be performed by individuals holding a registered commercial applicator license.

D. Do not make substitutions. If specified landscape material is not obtainable, submit to Landscape Architect, proof of non-availability and proposal for use of substitute material. When authorized, adjustment of contract amount will be made.

E. Analysis and standards: for standard products, submit manufacturer's certified analysis. For other materials, submit analysis by recognized laboratory made in accordance with methods established by the Association of Official Agricultural Chemists and/or the American Association for Laboratory Accreditation, wherever applicable or as further specified.

F. Furnish vendor's certified statement of composition, mixture and percentages of purity, germination, weed seed, other crop seed and other inert ingredients for each grass seed species required.

1.5 SUBMITTALS

A. Refer to Section 01 33 00.

B. Certification: submit certificates of inspection as required by governmental authorities. Submit manufacturer's or vendor's certified analysis for soil amendments and fertilizer materials. Submit seed vendors certified statement for each grass seed mixture required, stating botanical and common name, date of testing, percentage by weight, and percentages of purity, germination, and weed seed for each grass seed species, tested within last 6 months from projected date of seeding on job. Submit other data substantiating that all other materials comply with specified requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver seed, fertilizers, additives, amendments and other materials in original, sealed bags and containers with original tags and label securely attached.

1. Labels and tags will show vendor's, producer's or manufacturer's name, weight, and material analysis.

B. Deliver and store materials so that they remain uniform in composition, dry and free-flowing and do not deteriorate or lose effectiveness.

C. Have materials delivered and stored on site in supply sufficient to complete work without further shipments. Obtain Architect's inspection of supply and approval of seals, tags and labels prior to opening bags and containers and beginning any installation and application.

1.7 JOB CONDITIONS

A. General: cooperate with other contractors and trades in and adjacent to the landscape work area. Examine drawings which show the development of the entire site and become familiar with the scope of other work required.

A. Planting time:

1. Turf Seed: Sow turf seed in the Fall between August 15th and October 1st or in the Spring between April 1st and May 1st, or at such other times as approved by the Landscape Architect.
2. Grassland / Wildflower Seed Mix: Spring seeding as late as June 15, or fall / Winter as late as Deceber 1.
3. Summer seeding requires supplemental irrigation.

B. Coordination with lawns: plant trees and shrubs after final grades are established, and prior to planting of lawns, unless otherwise acceptable to the Landscape Architect. If planting of trees and shrubs occurs after lawn work, protect lawn areas and promptly repair damage to lawns resulting from planting operations.

1.8 WARRANTIES

A. Turf Areas: warranty lawns through the specified maintenance period, and until final acceptance.

B. Conservation Seed Mix Areas: warranty Seed Mix Areas through the specified maintenance period, and until final acceptance.

PRODUCTS

2.0 MATERIALS

2.1 Limestone: natural ground limestone containing not less than 85% of total carbonates, ground so that not less than 90% passes a 10 - mesh sieve and not less than 50% passes a 100 - mesh sieve.

2.2 Lawn fertilizer: complete fertilizer containing Nitrogen (N), Phosphate and Potash in ratio 10-20-10. Fertilizer shall be uniform in composition, dry and free flowing and suitable for application with standard fertilizer equipment. Fertilizer shall be delivered in bags or suitable containers, each fully labeled with manufacturer's guaranteed analysis. Fertilizer which has become damaged or caked will be deemed unsuitable for use, and unacceptable to the Landscape Architect.

2.3 Seed mulch: straw. Straw shall be oats, wheat, rye or other approved crop, free of noxious weeds.

2.4 Seed: provide fresh, clean, new crop grass seed complying with the tolerance for purity and germination established by the Official Seed Analysts of North America. All seed shall have been tested within the 6 months immediately preceding the date of sowing such material on this job. Seed mixtures shall not contain more than 2.5% weed seed. Seed containing prohibited or restricted noxious weeds will not be accepted. Seed shall be of the species, percentage, minimum purity and minimum germination as stated below.

2.5 Turf seed mix for general lawn areas shall be as follows:

Percentage By weight	Species	Percent Purity	Percent Germination
35%	*Victory Chewings Fescue	99%	85%
35%	*Flyer II Creeping Red Fescue	99%	85%
30%	*Predator Hard Fescue	99%	90%

Species marked with an asterisk shall be high endophyte.
Submit seed mix for approval by Landscape Architect."

2.6 Conservation Seed Mix – The following seed mixes shall be as supplied by Ernst Conservation Seeds, Meadville, Pa (www.ernstseed.com) or equal as approved by Landscape Architect. See contract drawings for mix description.

PART 3 - EXECUTION

3.1 PRE-CONSTRUCTION MEETING The Landscape Contractor shall attend a pre-construction meeting with the Landscape Architect prior to the commencement of any landscaping work. Contact the Landscape Architect at least 14 days in advance of the anticipated start of landscape work to schedule and coordinate the pre-construction meeting.

3.2 INSPECTION Examine the conditions under which landscape work is to be performed. Landscape work shall not proceed until all unsatisfactory conditions, if any, have been corrected.

A. Examine the grades and ensure their accuracy with the contract documents. If any discrepancy exists, contact the Landscape Architect immediately, and do not proceed with any work until all discrepancies have been resolved.

3.3 SOIL AMENDMENTS WITHIN SEEDED AREAS: using an approved applicator or other suitable device, spread limestone evenly over areas to be seeded. Application rate of limestone shall be as required to correct soil acidity to the optimum pH for seeding (pH 6.5) based upon topsoil test results. Notify Landscape Architect of topsoil test results for pH. Cultivate and mix limestone uniformly to a depth of 6” with a chisel plow or other approved equipment.

A. Areas of Conservation Seed Mix shall not receive soil amendments without approval of Landscape Architect

3.4 PREPARATION FOR SEEDED AREAS After topsoil has been spread, rake up large stiff clods, hard lumps, roots, litter, other foreign matter and stones larger than ½” in any dimension. Remove from the premises or dispose where directed in a satisfactory manner. Do not finish grade during unsuitable weather.

A. Fine grading: final grades shall be within 0.1’ of required elevations.

B. Loosen sub-grade of lawn areas to a minimum depth of 4". Remove rocks over 1-1/2" in any dimension. Remove all sticks, roots, rubbish, weeds and other extraneous matter. Limit preparation to areas which will be planted promptly after preparation.

C. Spread topsoil to provide minimum 6" depth to meet lines, grades, and elevations shown, after light rolling and natural settlement.

D. Apply specified commercial fertilizer at rates specified and thoroughly mix into upper 2" of topsoil. Delay application of

fertilizer if lawn planting will not follow within a few days. See "Schedule of Planting Soil Mixture Requirements".

E. Apply crabgrass pre-emergent control as specified by manufacturer, if spring seeding (not required for fall seeding).

1. Apply approved herbicide such as glyphosate (Rodeo®) as approved by landscape architect.

2. Provide two (2) application of glyphosate, a minimum of 2 weeks apart. Do not seed until 10 days after herbicide application. Second application is necessary only if first application is insufficient per review by landscape architect.

F. Fine grade seeding areas to smooth, even surface with loose, uniformly fine texture. Limit fine grading to areas which can be planted immediately after grading.

G. Apply Roots™ biostimulant at rate recommended by manufacturer, for turf areas.

H. Moisten prepared seeding areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before planting seed. Do not create a muddy soil condition.

I. Restore turf areas to specified condition if eroded or otherwise disturbed after fine grading and prior to planting.

3.5 SEEDING OPERATIONS Inspection: Notify the Landscape Architect to perform an inspection of manufactured topsoil conditions prior to seeding. Seeding operations shall not proceed until all unsatisfactory conditions, if any, have been corrected. No seeding is to be done until the site has been brought to proper elevations and all underground work has been completed. No seeding is to be performed until written approval of topsoiling, fine grading and seed bed preparation has been received from the Landscape Architect.

A. Scope: seed general turf and seeding areas as shown on the drawings, and all other topsoiled areas that are not indicated for other plantings and/or seeding.

B. Schedule:

A. Turf Seed shall be sown only between August 15 and September 15, and only during periods when weather conditions are favorable, unless otherwise approved by the Landscape Architect.

B. Conservation Seed Mix shall be applied during "Spring Seeding Season", up to June 15.

a) Fall seeding is permitted up to December 1.

b) Do not seed during summer months.

C. Do not use wet seed or seed that is moldy or otherwise damaged in transit or storage.

D. Fertilizing: apply fertilizer (10-20-10) at 440 pounds per acre and incorporate to a depth of 1" +/- with a spike tooth harrow or other suitable equipment.

A. Do not fertilize Conservation Seed Mix areas.

E. Seeding: Methods include using a cultipacker seeder (Brillion or equal), or via Drill Seeding (such as Truax Drill Seeder), to distribute seed. Total seed quantity shall be divided into two equal portions and the seeding shall be performed in 2 passes (via a cultipacker) over the area with the second pass being at a 75 degree angle to the first pass.

1. Sow at the rate as recommended per plans, for turf seed, 5 lbs. per 1000 s.f. minimum, or per suppliers recommended rate.

2. Rake seed lightly into top 1/8" of soil, roll lightly to ensure good seed-soil contact, and water with a fine spray.

3. Mulch: Protect seeded areas against erosion by spreading specified lawn mulch after completion of seeding operation. Spread clean straw mulch evenly over seeded areas at the rate of 1-1/2 tons per acre, but not to exceed a thin layer allowing 40-60% of soil surface to be exposed over conservation species.. Spread uniformly to form a continuous blanket not less than 1-1/2" loose measurement over seeded areas. Provide and stake netting where required.

4. Water newly planted Turf areas and keep moist until new grass is established and until they are accepted by Landscape Architect.

F. Hydroseeding:

1. Hydroseeding may be an acceptable alternate method. If elected, contractor shall submit a detailed program including mix ratios, schedules, application rates, etc., for Landscape

Architects review and approval. All other specifications shall be met by blending, including mixing amendments into soil before hydroseeding.

a) A small amount of mulch can be applied with the seed as a marker, but must be limited to a minimum as native seeds will not germinate if suspended in the mulch with little or no seed-to-soil contact. A secondary application of mulch may be applied on top.

2. Mix specified seed, fertilizer and pulverized mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application.

3. Apply slurry uniformly to all areas to be seeded. Rate of application shall meet specified seed sowing rate. Mask and/or thoroughly clean all paving, building and other non-lawn areas.

4. Apply and anchor straw mulch as approved by netting or adhesive spray.

3.6 SEEDED AREA MAINTENANCE - Maintenance period: Seeded area maintenance shall begin immediately following seeding operations. Maintain turf and seeded areas for a period not less than 60 days, or longer as required to establish an acceptable lawn area and receive final acceptance from the Landscape Architect. If turf areas are seeded in the Fall and the maintenance period is not completed prior to turf dormancy, or the turf is not ready for final acceptance, continue maintenance operations the following Spring until an acceptable lawn is established.

A. Protection: protect newly seeded areas from disturbance by equipment and other construction activities throughout the entire maintenance period and until final acceptance.

B. Accepted Conservation Seed Mix area shall have an acceptable coverage of 85% of seeded area. Unacceptable areas shall be reseeded by the Contractor.

1. Conservation Seed Mix Area shall not be disturbed by Contractor. City of Stamford shall maintain Conservation Seed Mix Areas 60 days after initial acceptance.

2. Acceptable coverage shall be determined 12 months after 60 day initial maintenance period by the Contractor.

3.7 TURF AREA MAINTENANCE OPERATIONS: maintain lawns by watering, fertilizing, weeding, mowing, trimming, and other operations, such

as rolling, re-grading and reseeding as required to establish a smooth, acceptable lawn, free of eroded or bare areas. At a minimum, perform the following operations.

A. ***Watering: during the period of germination and early seedling development, apply ¼ acre inch of water per day using 3 sets (intervals) to deep the surface moist and to maintain soil moisture at or near field capacity.***

B. ***Mowing: begin mowing the turf grass seedlings when they reach a height of 2". Mow with a reel mower set at a mowing height of 1-1/2" (bench setting) in which the clip of the reel matches the mowing height. The reel blades and bedknife are to be kept sharp and evenly matched to provide a clean cut. The Contractor shall be responsible for all mowing operations throughout the maintenance period and until final acceptance.***

1. ***Fertilizing: fertilize the new turf (excludes conservation mixes) seedlings with 10-10-10 fertilizer grade 2 weeks after seeding. (See schedule below.) Fertilize at a rate of 440 pounds per acre to supply 44 pounds of nitrogen, phosphate and potassium per acre respectively. All of the nitrogen is to be in a water soluble form. Another grade of fertilizer with the same ratio may be used in place of the 10-10-10 with the rate adjusted to supply the same amount of nitrogen, phosphate and potassium noted above.***

2. ***Apply additional fertilizer applications using IBDU (31-0-0) in conformance with following schedule:***

Weeks after seeding	Fertilizer Grade	Fertilizer Rate (pounds per acre)
2 weeks	10-10-10	440
4 weeks	31-0-0	142
6 weeks	31-0-0	106
8 weeks	31-0-0	106

C. Overseeding (if necessary): overseed bare and eroded areas and all other areas that do not present a thick growth of dense turf. Overseed with specified seed mix.

D. Weed control (if necessary): apply approved herbicide at manufacturer's recommended rates to control and eliminate weed growth.

3.8 INSPECTION AND FINAL ACCEPTANCE – TURF Areas: At the end of the required maintenance period, notify the Landscape Architect to perform an inspection of lawns. Acceptable lawns shall exhibit a uniform stand of

dense turf, true to grades as shown with no depressions, free of weeds and stones in excess of ½" and with no bare or eroded areas. Upon confirmation that all areas meet these requirements, the Landscape Architect shall grant final acceptance.

1. **If final acceptance is not granted, continue maintenance operations as necessary to correct all deficiencies identified during final inspection.**

2. **The City of Stamford shall maintain seeded areas after the 60 day acceptance period, but reserves the right to demand reseeding by the Contractor 12 months after acceptance, if less than 85% coverage is achieved.**

3.9 MAINTENANCE AND WARRANTY COMPLETION

Inspection: at the end of the required maintenance and warranty period, submit a written request to the Landscape Architect to make an inspection of landscaping work. Final end of maintenance and warranty period inspection shall be made in the presence of the Contractor.

1. **Maintenance and warranty completion: if all landscape work has been satisfactorily completed, the work will be accepted and the maintenance and warranty periods will end 1 year from final acceptance. When work is found to be unsatisfactory or deficient in any manner, perform corrective actions and continue maintenance period at no additional cost to the contract sum.**

2. **Maintenance and warranty period is 12 months after inspection and acceptance by the City of Stamford.**

3.10 CLEAN UP AND PROTECTION

General: during landscape work, keep pavements clean and work area in an orderly condition.

A. Protection: protect landscape work and materials from damage due to landscape operations, operations by other contractors and trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

B. Clean up: prior to final acceptance, remove all debris and rubbish accumulated as a result of this work, and dispose of off-site.

END OF SECTION

SECTION 03431

CONCRETE RETAINING WALL SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work shall consist of furnishing and construction of a Concrete Retaining Wall System in accordance with these specifications and in conformity with the lines, grades, design, and dimensions and other requirements shown on the Contract Drawings.

B. Work includes preparing foundation soil, furnishing and installing leveling pad, unit drainage fill and backfill to the lines and grades shown on the Contract Drawings.

C. Work includes furnishing and installing geogrid soil reinforcement of the type, size, location, and lengths designated on the Contract Drawings.

D. Related Sections
1. Section 02220, Excavation and Backfill
2. Section 02230, Crushed Stone and Gravel

1.2 REFERENCE DOCUMENTS

A. American Society for Testing and Materials (ASTM)
1. ASTM C140 Sampling and Testing Concrete Masonry Units
2. ASTM C1372 Specification for Dry-Cast Segmental Retaining Wall Units
3. ASTM D 422 Particle-Size Analysis of Soils
4. ASTM D 698 Laboratory Compaction Characteristics of Soil -Standard Effort
5. ASTM D 1557 Laboratory Compaction Characteristics of Soil -Modified Effort
6. ASTM D 3034 Polyvinyl Chloride Pipe (PVC)
7. ASTM D 4318 Liquid Limit, Plastic Limit and Plasticity Index of Soils
8. ASTM D 4475 Horizontal Shear Strength of Pultruded Reinforced Plastic Rods
9. ASTM D 4476 Flexural Properties of Fiber Reinforced Pultruded Plastic Rods
10. ASTM D 4595 Tensile Properties of Geotextiles - Wide Width Strip
11. ASTM D 5262 Unconfined Tension Creep Behavior of Geosynthetics
12. ASTM D 5818 Evaluate Installation Damage of Geosynthetics
13. ASTM D 6637 Tensile Properties of Geogrids – Single or Multi-Rib
14. ASTM D 6638 Connection Strength - Reinforcement/Segmental Units

15. ASTM D 6706 Geosynthetic Pullout Resistance in Soil
16. ASTM D 6916 Shear Strength Between Segmental Concrete Units

B. American Association of State Highway and Transportation Officials (AASHTO)
   1. AASHTO M 252 Corrugated Polyethylene Drainage Pipe

C. Geosynthetic Research Institute (GRI)
   1. GRI-GG4 Determination of Long Term Design Strength of Geogrids
   2. GRI-GG5 Determination of Geogrid (soil) Pullout

D. National Concrete Masonry Association (NCMA)
   1. NCMA SRWU-1 Test Method for Determining Connection Strength of SRW
   2. NCMA SRWU-2 Test Method for Determining Shear Strength of SRW

1.3 SUBMITTALS/CERTIFICATION

A. Provide indicated submittals at least 15 days prior to delivery of materials and start of the work.

B. Manufacturer’s catalog data and installation instructions for concrete retaining wall system components.

C. CONTRACTOR shall submit a Manufacturer's certification, prior to start of work, that the retaining wall system components meet the requirements of this specification and the structure design.

D. CONTRACTOR shall submit construction drawings and design calculations for the retaining wall system prepared and stamped by a qualified Professional Engineer licensed in Connecticut. The engineering designs, techniques, and material evaluations shall be in accordance with the Manufacturer’s Design Manual, NCMA Design Guidelines For Segmental Retaining Walls, or the AASHTO Standard Specifications for Highway Bridges (whichever is applicable to designer).

E. CONTRACTOR shall submit a test report documenting strength of specific modular concrete unit and geogrid reinforcement connection. The maximum design tensile load of the geogrid shall be equal to the laboratory tested ultimate strength of geogrid / facing unit connection at a maximum normal force limited by the “Hinge Height” of the structure divided by a safety factor of 1.5. The connection strength evaluation shall be performed in accordance with ASTM D 6638 (NCMA SRWU-1).

F. Submittals required under Quality Assurance.

G. Gradation and compaction test results required in this section.

H. Certification that fill materials are clean fill.

1.4 QUALITY ASSURANCE

A. CONTRACTOR shall submit certification, prior to start of work, that the retaining wall system (modular concrete units and specific geogrid):
   1. Has been successfully utilized on a minimum of five (5) similar projects, i.e., height, soil fill types, erection tolerances, etc.; and
   2. Has been successfully installed on a minimum of 1 million (1,000,000) square feet of retaining walls.

B. CONTRACTOR shall submit a list of five (5) previously constructed projects of similar size and magnitude by the wall installer where the specific retaining wall system has been constructed successfully. Contact names and telephone numbers shall be listed for each project.

C. CONTRACTOR shall provide evidence that the concrete retaining wall system design ENGINEER has a minimum of five years of documentable experience in the design for reinforced soil structures. The design ENGINEER shall provide proof of current professional liability insurance with an aggregate coverage limit of not less than $2,000,000.

D. CONTRACTOR shall provide required quality control testing and inspection. CONTRACTOR is responsible for quality control and wall performance regardless of testing or inspections which may be provided by ENGINEER or OWNER.

1.5 DELIVERY, STORAGE AND HANDLING

A. CONTRACTOR shall check all materials upon delivery to assure that the proper type, grade, color, and certification has been received.

B. CONTRACTOR shall protect all materials from damage due to jobsite conditions and in accordance with manufacturer's recommendations. Damaged materials shall not be incorporated into the work.

PART 2 - PRODUCTS

2.1 CONCRETE RETAINING WALL SYSTEM

A. Provide a Keystone Standard Unit modular concrete retaining wall system (or approved equal). Applicable components are further described below and shown on the Contract Drawings. Components shall be provided by a single manufacturer unless approved otherwise by the ENGINEER.

2.2 DEFINITIONS

A. Modular Unit - a concrete retaining wall element machine made from Portland cement, water, and aggregates.

B. Structural Geogrid - a structural element formed by a regular network of integrally connected tensile elements with apertures of sufficient size to allow interlocking with surrounding soil, rock, or earth and function primarily as reinforcement.

C. Unit Drainage Fill - drainage aggregate, which is placed within and immediately behind the modular concrete units.

D. Reinforced Backfill - compacted soil, which is placed within the reinforced soil volume as outlined on the plans.

2.3 MODULAR CONCRETE RETAINING WALL UNITS

A. Modular concrete units shall conform to the following architectural requirements:
   1. Face color - concrete gray, unless otherwise specified. The OWNER may specify standard manufacturers' color.
   2. Face finish - sculptured rock face in angular tri-planer configuration. Other face finishes will not be allowed without written approval of OWNER.
   3. Bond configuration - running with bonds nominally located at midpoint vertically adjacent units, in both straight and curved alignments.
   4. Exposed surfaces of units shall be free of chips, cracks or other imperfections when viewed from a distance of 10 feet under diffused lighting.

B. Modular concrete materials shall conform to the requirements of ASTM C1372 - Standard Specifications for Segmental Retaining Wall Units.

C. Modular concrete units shall conform to the following structural and geometric requirements measured in accordance with ASTM C140 Sampling and Testing Concrete Masonry Units:
   1. Compressive strength: ≥ 3000 psi (21 MPa);
   2. Absorption: 8 % (6% in northern states) for standard weight aggregates;
   3. Dimensional tolerances: ± 1/8" (3 mm) from nominal unit dimensions not including rough split face, ±1/16" (1.5 mm) unit height - top and bottom planes;
   4. Unit size: 8" (203 mm) (H) x 18" (457 mm)(W) x 18" (457 mm)(D) minimum;
   5. Unit weight: 100 lbs/unit (45 kg) minimum for standard weight aggregates.

D. Modular concrete units shall conform to the following performance testing:
   1. Inter -unit shear strength in accordance with ASTM D 6916 (NCMA SRWU-2): 1500 plf (21 kN/m) minimum at 2 psi (13 MPa) normal pressure;
   2. Geogrid/unit peak connection strength in accordance with ASTM D 6638 (NCMA SRWU-1): 900 plf (13 kN/m) minimum at 2-psi (13 MPa) normal force.

E. Modular concrete units shall conform to the following constructability requirements:
   1. Vertical setback: 1/8" (3 mm) ± per course (near vertical) or 1" (25 mm) + per course per the design;
   2. Alignment and grid positioning mechanism - fiberglass pins, two per unit minimum;
   3. Maximum horizontal gap between erected units shall be ≤ 1/2 inch (13 mm).

2.4 SHEAR CONNECTORS

A. Shear connectors shall be 1/2-inch (12 mm) diameter thermoset isopthalic polyester resin-pultruded fiberglass reinforcement rods or equivalent to provide connection between vertically and horizontally adjacent units with the following requirements:
   1. Flexural Strength in accordance with ASTM D 4476: 128,000 psi (882 MPa) minimum;
   2. Short Beam Shear in accordance with ASTM D 4475: 6,400 psi (44 MPa) minimum.

B. Shear connectors shall be capable of holding the geogrid in the proper design position during grid pre-tensioning and backfilling.

2.5 BASE LEVELING PAD MATERIAL

A. Material shall consist of a compacted crushed stone base or non-reinforced concrete as shown on the construction drawings.

2.6 UNIT DRAINAGE FILL

A. Unit drainage fill shall consist of clean 1" (25 mm) minus crushed stone or crushed gravel meeting the following gradation tested in accordance with ASTM 422:

Sieve Size	Percent Passing
1 inch (25 mm)	100
3/4-inch (19 mm)	75-100
No. 4	0 - 10
No. 50	0 - 5

B. One cubic foot (0.028 m3), minimum, of drainage fill shall be used for each square foot (0.093 m2) of wall face. Drainage fill shall be placed within cores of, between, and behind units to meet this requirement.

2.7 REINFORCED BACKFILL

A. Reinforced backfill shall be free of debris and meet the following gradation tested in accordance with ASTM D 422:

Sieve Size	Percent Passing
2-inch (50 mm)	100
3/4-inch (19 mm)	100-75
No. 40	0-60
No. 200	0-35

Plasticity Index (PI) <15 and Liquid Limit <40 per ASTM D 4318.

B. The maximum aggregate size shall be limited to 3/4 inch (19 mm) unless field tests have been performed to evaluate potential strength reductions to the geogrid design due to damage during construction.

C. Material can be site-excavated soils where the above requirements can be met. Unsuitable soils for backfill (high plastic clays or organic soils) shall not be used in the backfill or in the reinforced soil mass.

D. CONTRACTOR shall submit reinforced fill sample and laboratory test results to the ENGINEER for approval prior to the use of any proposed reinforced fill material.

2.8 GEOGRID SOIL REINFORCEMENT

A. Geosynthetic reinforcement shall consist of geogrids manufactured specifically for soil reinforcement applications and shall be manufactured from high tenacity polyester yarn or high-density polyethylene. Polyester geogrid shall be knitted from high tenacity polyester filament yarn with a molecular weight exceeding 25,000 Meg/m and a carboxyl end group values less than 30. Polyester geogrid shall be coated with an impregnated PVC coating that resists peeling, cracking, and stripping.

B. Ta, Long Term Allowable Tensile Design Load, of the geogrid material shall be determined as follows:

Ta = Tult / (RFcr*RFd*RFid*FS)

Ta shall be evaluated based on a 75-year design life.

1. Tult, Short Term Ultimate Tensile Strength shall be determined in accordance with ASTM D 4595 or ASTM D 6637. Tult is based on the minimum average roll values (MARV).

2. RFcr, Reduction Factor for Long Term Tension Creep. RFcr shall be determined from 10,000-hour creep testing performed in accordance with ASTM D 5262. Reduction value = 1.45 minimum.
3. RFd, Reduction Factor for Durability. RFd shall be determined from polymer specific durability testing covering the range of expected soil environments. RFd = 1.10 minimum.
4. RFid, Reduction Factor for Installation Damage. RFid shall be determined from product specific construction damage testing performed in accordance with ASTM D 5818 (GRI-GG4). Test results shall be provided for each product to be used with project specific or more severe soil type. RFid = 1.05 minimum.
5. FS, Overall Design Factor of Safety. FS shall be 1.5 unless otherwise noted for the maximum allowable working stress calculation.

C. The maximum design tensile load of the geogrid shall not exceed the laboratory tested ultimate strength of the geogrid/facing unit connection as limited by the "Hinge Height" divided by a factor of safety of 1.5. The connection strength testing and computation procedures shall be in accordance with ASTM D 6638 Connection Strength between Geosynthetic Reinforcement and Segmental Concrete Units (NCMA SRWU-1).

D. Soil Interaction Coefficient, Ci
1. Ci values shall be determined per ASTM D 6706 (GRI:GG5) at a maximum 0.75-inch (19 mm) displacement.

E. Manufacturing Quality Control
1. The geogrid manufacturer shall have a manufacturing quality control program that includes QC testing by an independent laboratory.
2. The QC testing shall include:
   Tensile Strength Testing
   Melt Flow Index (HDPE)
   Molecular Weight (Polyester)

2.9 DRAINAGE PIPE

A. If required, the drainage pipe shall be perforated, or corrugated HDPE pipe manufactured in accordance with AASHTO M252.

2.10 GEOTEXTILE FILTER FABRIC

A. When required, Geotextile filter fabric shall be 4.0 oz/sy, polypropylene, needlepunched nonwoven fabric.

PART 3 - EXECUTION

3.1 EXCAVATION

A. CONTRACTOR shall excavate to the lines and grades shown on the construction drawings. CONTRACTOR'S qualified geotechnical engineer shall inspect the excavation and approve prior to placement of leveling material or fill soils. Proof roll foundation area as directed to determine if remedial work is required.

B. Over-excavation and replacement of unsuitable foundation soils and replacement with approved compacted fill will be compensated as agreed upon with the OWNER.

C. See applicable requirements of related sections.

3.2 BASE LEVELING PAD

A. Leveling pad material shall be placed to the lines and grades shown on the construction drawings, to a minimum thickness of 6 inches (150 mm) and extend laterally a minimum of 6" (150 mm) in front and behind the modular wall unit.

B. Soil leveling pad materials shall be compacted to a minimum of 95 % Standard Proctor density per ASTM D 698 or 92% Modified Proctor Density per ASTM D 1557.

C. Leveling pad shall be prepared to insure full contact to the base surface of the concrete units.

3.3 MODULAR UNIT INSTALLATION

A. First course of units shall be placed on the leveling pad at the appropriate line and grade. Alignment and level shall be checked in all directions and insure that all units are in full contact with the base and properly seated.

B. Place the front of units side-by-side. Do not leave gaps between adjacent units. Layout of corners and curves shall be in accordance with manufacturer's recommendations.

C. Install shear/connecting devices per manufacturer's recommendations.

D. Place and compact drainage fill within and behind wall units. Place and compact backfill soil behind drainage fill. Follow wall erection and drainage fill closely with structure backfill.

E. Maximum stacked vertical height of wall units, prior to unit drainage fill and backfill placement and compaction, shall not exceed two courses.

3.4 STRUCTURAL GEOGRID INSTALLATION

A. Geogrid shall be oriented with the highest strength axis perpendicular to the wall alignment.

B. Geogrid reinforcement shall be placed at the strengths, lengths, and elevations shown on the construction design drawings or as directed by the ENGINEER.

C. The geogrid shall be laid horizontally on compacted backfill and attached to the modular wall units. Place the next course of modular concrete units over the geogrid. The geogrid shall be pulled taut, and anchored prior to backfill placement on the geogrid.

D. Geogrid reinforcements shall be continuous throughout their embedment lengths and placed side-by-side to provide 100% coverage at each level. Spliced connections between shorter pieces of geogrid or gaps between adjacent pieces of geogrid are not permitted.

3.5 REINFORCED BACKFILL PLACEMENT

A. Reinforced backfill shall be placed, spread, and compacted in such a manner that minimizes the development of slack in the geogrid and installation damage.

B. Reinforced backfill shall be placed and compacted in lifts not to exceed 6 inches (150 mm) where hand compaction is used, or 8 - 10 inches (200 to 250 mm) where heavy compaction equipment is used. Lift thickness shall be decreased to achieve the required density as required.

C. Reinforced backfill shall be compacted to a minimum of 95 % Standard Proctor density per ASTM D 698 or 92% Modified Proctor Density per ASTM D 1557. The moisture content of the backfill material prior to and during compaction shall be uniformly distributed throughout each layer and shall be dry of optimum, + 0%, - 3%.

D. Only lightweight hand-operated equipment shall be allowed within 3 feet (1m) from the tail of the modular concrete unit.

E. Tracked construction equipment shall not be operated directly upon the geogrid reinforcement. A minimum fill thickness of 6 inches (150 mm) is required prior to operation of tracked vehicles over the geogrid. Tracked vehicle turning should be kept to a minimum to prevent tracks from displacing the fill and damaging the geogrid.

F. Rubber tired equipment may pass over geogrid reinforcement at slow speeds, less than 10 MPH (15 KPH). Sudden braking and sharp turning shall be avoided.

G. At the end of each day's operation, the CONTRACTOR shall slope the last lift of reinforced backfill away from the wall units to direct runoff away from wall face. The CONTRACTOR shall not allow surface runoff from adjacent areas to enter the wall construction site.

3.6 CAP INSTALLATION

A. Cap units shall be glued to underlying units with an all-weather adhesive recommended by the manufacturer.

3.7 AS-BUILT CONSTRUCTION TOLERANCES

A. Vertical alignment: ± 1.5" (40 mm) over any 10' (3 m) distance.

B. Wall Batter: within 2 degrees of design batter.

C. Horizontal alignment: ± 1.5" (40 mm) over any 10' (3 m) distance.
Corners, bends & curves: ± 1 ft (300 mm) to theoretical location.

D. Maximum horizontal gap between erected units shall be ≤ 1/2 inch (13 mm).

3.8 FIELD QUALITY CONTROL

A. Quality Assurance - The OWNER may engage inspection and testing services, including independent laboratories, to provide quality assurance and testing services during construction. This shall not relieve the CONTRACTOR from securing the necessary construction control testing.

B. Quality assurance shall include foundation soil inspection. Verification of geotechnical design parameters, and verification that the CONTRACTOR'S quality control testing is adequate shall be provided. Quality assurance shall also include observation of construction for general compliance with design drawings and project specifications. Quality assurance shall be performed by the CONTRACTOR'S geotechnical engineer.

C. Quality Control – The CONTRACTOR shall engage inspection and testing services to perform the minimum quality control testing described in the retaining wall design plans and specifications. Only qualified and experienced technicians and ENGINEERS shall perform testing and inspection services.

D. Quality control testing shall include soil and backfill testing to verify soil types and compaction and verification that the retaining wall is being constructed in accordance with the design plans and project specifications.

END OF SECTION

SECTION 06642

EROSION CONTROL GEOSYNTHETICS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope: CONTRACTOR shall provide all labor, materials, tools, equipment, and incidentals necessary for the placement of erosion control geosynthetics and Turf Reinforcement Mats (TRM) on slopes and drainage swales as shown and specified on the Drawings, or as otherwise directed by the ENGINEER. TRM shall be installed wherever the Green Armor System is shown on the Contract Drawings.

B. Related Sections:
   1. Section 02900, Turf Establishment and Landscaping.

1.2 QUALITY CONTROL

A. Manufacturer Qualifications: Erosion control geosynthetic manufacturer shall be a specialist in the manufacture of the particular geosynthetic.

1.3 SUBMITTALS

A. Shop Drawings:
   1. Submit six (6) copies of manufacturer data, specifications, dimensions and installation instructions for erosive soils and high runoff velocities.
   2. Submit six (6) copies of an affidavit certifying that each geosynthetic furnished complies with all requirements specified herein.
   3. No geosynthetic shall be shipped until the affidavit is submitted to ENGINEER.

PART 2 - PRODUCTS

2.1 ACCEPTABLE PRODUCTS

A. Turf Reinforcement Mat (TRM)
   1. TRM shall be non-biodegradable turf reinforcing erosion control material mesh matrix with stabilizer (as necessary to protect from ultraviolet radiation), supplied in rolls. Permanent Erosion control geosynthetic shall be:
      a. Enkamat 7010 produced by Colbond Geosynthetics, Inc..
      b. Or equal.

B. The TRM shall be made from 100% synthetic material and contain no biodegradable or photodegradable components or materials.

C. The TRM shall be a three-dimensional matrix and maintain the three dimensional stability without laminated or stitched layers. The TRM shall have a sufficient Area Holding Capacity and a minimum 90% open space available for soil and root interaction. The TRM shall not loose its structural integrity and shall not unravel or separate when TRM is cut in the field.

D. The TRM shall exhibit no buoyancy factor (i.e., the specific gravity of the fibers used should be greater than 1.0) so as to allow the TRM to maintain intimate contact with the soil (particularly between fasteners) under low flow conditions.

E. The TRM shall meet the requirements of Table 1.

TABLE 1 – PERMANENT TURF REINFORCEMENT MAT

Property	Test Method	Units	Value
Mass/Unit Area	ASTM D 5261	oz/yd^2	8.0
Thickness	ASTM D 5199	inches	0.4
Tensile Strength (MD)	ASTM D 5035 mod	lb/ft	160.0
Area Holding Capacity	Calculated	in^3/yd^2	450
Porosity	Calculated	%	>95
UV Stability	ASTM D 1682 mod	%	80
Velocity 30 min. Vegetated 50 hr. Vegetated	Flume Testing[1]	ft/sec	 19.0 14.0
Shear 30 min. Vegetated 50 hr. Vegetated	Flume Testing[1]	lb/ft^2	 8.0 6.0

Notes:
1 – Acceptable facilities include Utah State University, Colorado State University

F. Anchoring Devices
   1. The TRM shall be secured in place using heavy-duty metal staples. The metal staples shall be U-shaped, a minimum of 6 inch long (each leg), one and one half (1-1/2) inches wide, and shall be fabricated from 9 gauge diameter metal wire. If difficulties arise installing the staples, then 10 inch pins fabricated from 9 gauge with one and one half (1-1/2) inch diameter washer or 7 inch gutter spike with one and one half (1-1/2) inch diameter washer shall be used. In some cases where loose soil conditions exists and anchors of stated length do not properly secure the TRM to the ground, then longer staple should be used such as a 8-12 inch long staples or pins.

PART 3 - EXECUTION

3.1 PREPARATION

A. The TRM product shall be installed explicitly according to the manufacturer recommendations. The installation site shall be prepared by filling the area to the design grade.

B. The surface to receive the TRM shall be prepared to relatively smooth conditions free of obstructions, depressions, debris and soft or low density pockets of material. The material shall be capable of supporting a vegetative cover.

C. Erosion features such as rills, gullies, etc. shall be graded out of the surface before TRM deployment. Smooth roll drum compaction may be required before deploying TRM to make sure the TRM makes immediate contact with the soil.

D. Cut trenches for initial anchor trenches, termination trench and longitudinal anchor trenches (6 inches wide and 9 inches in depth).

E. CONTRACTOR shall place all cover materials in such a manner to ensure: the erosion control geosynthetics are not damaged; minimal slippage of the erosion control geosynthetics or underlying layers; and no excess tensile stresses are introduced into the erosion control geosynthetic.

F. CONTRACTOR shall consult with manufacturer regarding recommendation as to the sequence for seeding and placement of the erosion control geosynthetic. Following seeding and placement of the erosion control geosynthetic, CONTRACTOR shall hydromulch the surface with FGM in accordance with directions for mulching in Section 02900 Landscaping.

3.2 INSTALLATION - SLOPES

A. Install Erosion control geosynthetics as per Manufacturer's installation procedure, or as described below.

B. Grade subgrade to be stable and firm, but not crusted.

C. Apply erosion control geosynthetic with the length of roll laid perpendicular to the slope.

D. Install an anchor slot at the up slope and down slope ends of the geosynthetic placement. Bury at least 12 inches of the end of the geosynthetic horizontally in the anchor slots. Secure the geosynthetic in the anchor slot by stakes at intervals of 3 feet or less prior to burying. Tamp the soil against the geosynthetic in the slot.

E. Overlap successive lengths of the erosion control geosynthetic at least 3 feet, with the up slope length on top. Stake the overlap by placing 3 staples spaced across the end of each of the overlapping lengths and by placing 3 staples across the width of the center of overlap area.

F. Construct check slots by placing a fold at least 6 inches vertically into the soil. Staple the geosynthetic at each check slot edge, overlap and in the center of the geosynthetic. Coordinate check slots with adjacent rolls such that check slots are not staggered. Check slots shall be placed at a frequency of every 25 feet.

G. Place 1 row of staples, spaced 10 inches on center on each side of check slot and place staples on all longitudinal overlaps at a maximum spacing of 3 feet.

H. Maintain the geosynthetic until all Work has been completed and accepted. CONTRACTOR shall repair areas where damaged by any cause until vegetation final acceptance.

I. Place additional staples to maintain contact of geosynthetic with ground surface as required by manufacturer.

END OF SECTION

SECTION 06643

GEOMEMBRANES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall furnish all labor, materials, tools, testing, equipment and incidentals required to supply, install and test textured linear low density (LLDPE) polyethylene flexible geomembrane as shown on the Drawings and specified herein. Only one type of LLDPE geomembrane shall be used for the entire project, and will at a minimum be utilized within the entire limit of waste
2. The textured LLDPE geomembrane shall be textured on both sides.
3. Subgrade preparation is included under Section 02220 and Section 02225.
4. Refer to Section 06647 for additional requirements relating to cold weather construction and installation.

B. Related Sections:

1. Section 02225, Subgrade Preparation
2. Section 02226, Subbase Material
3. Section 02227, Cover Soil Material
4. Section 06644, Geosynthetics.
5. Section 06647, Cold Weather Installation - Geomembrane.

C. CONTRACTOR shall supply field enclosures, field tensiometers, arbor presses and all other equipment and appurtenances for completing and testing the work.

1.2 DEFINITIONS

A. Roll: One roll shall be a length of liner material delivered to the site, packaged or rolled in some manner as to prevent kinks, creases, pinholes or cold bends in the material.

B. Liner: Another term used for geomembrane for purposes of this Specification Section.

1.3 QUALITY ASSURANCE

A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:

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

B. Single Source:
   1. All liner/geomembrane material shall be obtained from a single material supplier and all liner sheets shall be manufactured by a single liner manufacturer.

C. Liner Manufacturer's Qualifications and Experience:
   1. Liner manufacturer shall be a specialist in the manufacture of textured PE liners/geomembranes and shall demonstrate:
      a. At least five years experience in the manufacture of textured PE liners.
      b. At least 10 million square feet of textured PE liner.
      c. At least 10 completed projects.
   2. Liner Manufacturers:
      a. GSE Environmental, Inc.
      b. Or equal.

D. Liner Installer's Qualifications and Experience:
   1. Liner installer shall be a specialist in the installation of textured PE liners and geosynthetic materials, and shall have installed at least 10 million square feet of PE liner during the last five years. The installer is responsible for field handling, placing, seaming, loading (against wind) and other aspects of geomembranes and geosynthetics. Unless approved otherwise, the liner installer and the installer of the geocomposite shall be the same.
      a. Installer's field crew shall include at least one "master seamer", whose experience conforms to Article 3.4 of this Section.
      b. Submit resume of master seamers.
      c. Submit resume of field superintendent.

E. Liner Installer's Field Services and Reports:
   1. Retain services of liner installer's factory trained representatives with demonstrated ability and experience in the field seaming, field testing and all other pertinent aspects of PE liner installation to perform the services listed below:
      a. Inspect the drainage layer material and supervise any corrective work required. Prepare an inspection report.
      1) Identify ASTM methods and values that result from repairs.
      2) Describe corrective work.
      b. Supervise the unloading handling, and storage of all liner sheets.
      c. Supervise the handling, unrolling and placement of all liner sheets.
      d. Perform all field seaming and testing of liner.
      e. Perform all repairs to damaged liner sections.
      f. Supervise the placement of top drainage layer/liner cover material.
      g. Conduct startup seam testing.
      h. Conduct field destructive and non-destructive seam tests.
      i. Prepare detailed test reports and submit copies of these reports to ENGINEER daily.

j. Prepare a written report at the completion of the work which includes the following:
   1) Complete identification of flexible membrane liner, including but not limited to, resin type, physical properties and other pertinent data.
      a. Identify ASTM methods and values.
   2) Complete description of field seaming system used including material, method, temperatures, seam overlap width and cure or aging time.

3) Complete description of field sampling and testing including test equipment used, location of field tests, copy of test results, conditioning procedure prior to destructive seam testing, method of recording loading and determining average load for destructive test methods and type of failure in tests (i.e. within the seam, within the sheet material, clamp edge, seam edge). Copies of all non-destructive test results for seam and repair areas and discussions on repair methods used for failed seams.

4) "As-built" drawings showing actual layout of liner sheets, destructive sample locations, patch/repair locations, pipe penetration details and anchor trench details.

5) An affidavit of compliance from the liner manufacturer, per Article 3.11.A.5.

F. Quality Control During Manufacturing:

1. Prior to the installation of any geomembrane material, the CONTRACTOR shall submit for approval to the ENGINEER information obtained from the manufacturer.
   a. origin (Resin Supplier's name, resin production plant), identification (brand name, number) and production date of the PE resin;
   b. copy of quality control certificates issued by the PE Resin Supplier; and
   c. reports on the test conducted by the PE Resin Supplier and/or liner Manufacturer to verify the quality of the PE resin used to manufacture the geomembrane rolls tests shall include, specific gravity (ASTM D 1505), density (ASTM D 1505) and percent carbon.
2. Random sampling shall be performed by the Liner Manufacturer, at no additional cost to the OWNER, throughout the liner production run to assure proper quality control. The minimum frequency of such sampling shall be as follows:
   a. Two (2) samples taken from each day's production, and
   b. One (1) sample per two (2) rolls, and
   c. All non-consecutive rolls delivered to the project.
   d. Other sampling as proposed by the CONTRACTOR and approved by the ENGINEER.
3. The samples shall be tested for the following properties:
   a. Uniformity: Visual inspection to assure the material is free of holes, blisters, undispersed raw material, or foreign matter.
   b. Thickness: Measurement along the sample to assure that the sheet is within the specified tolerances of thickness (ASTM D 5199).
   c. Carbon Black: The proper amount, grade and degree of dispersion are imperative to assure proper U.V. radiation protection.

d. Tensile Properties: One (1) dimensional tensile testing which measures tensile strength at yield and at break and elongation at yield and at break shall be made (ASTM D 6693).

4. All pre-assembled panel seems shall be tested at the factory in accordance with the destructive and nondestructive testing specified in Paragraph 3.8 and 3.9 of this Section.
5. The CONTRACTOR shall provide the OWNER and ENGINEER with certified copies of the manufacturer's test results.
6. The OWNER and ENGINEER, at their discretion, may employ and pay for an independent testing laboratory to perform additional testing of the liner materials. This testing may also include all properties specified in Paragraph 2.2E and need not be limited to the testing performed by the Manufacturer. The CONTRACTOR shall, at no additional cost, provide field destructive samples to the OWNER or ENGINEER as required.
7. The CONTRACTOR shall be solely responsible to the OWNER for the quality of the material provided. Should any of the tests performed on the material yield unsatisfactory results, the CONTRACTOR will be responsible for replacing the material with satisfactory material without delaying the total project time and without any cost to the OWNER.

G. Testing Laboratory:

1. The services of a qualified testing laboratory shall be engaged by the CONTRACTOR to make tests and determine the acceptability of the liner materials. CONTRACTOR shall be responsible for coordinating and scheduling all testing with the laboratory so as not to delay completion of the Work.

H. Friction Angle Tests:

Prior to placement of the textured PE geomembranes, CONTRACTOR shall provide ENGINEER with laboratory test results as described below. These tests are intended to verify the side slope stability of the landfill.

1. Textured PE geomembrane, geosynthetics and cover soils: PE liners, geosynthetics and cover soils shall be fabricated, and soils shall be chosen, to achieve a minimum peak friction angle of:
   a. Textured PE and Drainage Geocomposite: 30 degrees with a normal stress of 150 psf between the textured PE geomembrane and the proposed drainage geocomposite,
   b. Textured PE and Geotextile Fabric: 30 degrees with a normal stress of 150 psf between the textured PE geomembrane and the proposed geotextile fabric.
   c. 30 degrees with a normal stress of 150 psf between the all other interfaces including, but not limited to Subbase Material and Geotextile, Cover Soil and Drainage Geocomposite, and between Cover Soil and Topsoil. Interface testing involving paving materials shall not be required unless directed otherwise.
2. During construction and before completion, CONTRACTOR shall repeat the

above tests with applicable materials if the ENGINEER determines that the materials have changed, or if the test materials used in the preparation of the Shop Drawings are not identical to those used in construction.

3. The friction angle testing outlined above shall be conducted using ASTM D 5321 and ASTM 3080 modified to be in general accordance with the following requirements, and is intended to indicate the performance of the various components by attempting to model the field conditions:
   a. The shear box shall be a minimum of 12 inches square in plan dimensions.
   b. Each half of the shear box shall be a minimum of three inches in depth.
   c. Proposed soils shall be compacted to approximately 90 percent Modified Proctor Density, with a moisture content, determined through the laboratory testing and topsoil shall be compacted to approximate 80 percent Modified Proctor density.
   d. The geosynthetics shall be placed in the same sequence as shown on the Drawings. The interface geosynthetics in questions shall be connected to the respective upper or lower shear box frame.
   e. The test shall be performed for a minimum of three normal stresses applied to the geosynthetic to bracket the normal stresses defined above, as required to define the failure plane friction angle. The peak and residual shear stresses shall be recorded and plotted against the normal compressive stresses used. A best fit straight line shall be constructed for each test series.
   f. All samples shall be normally consolidated under the applied load.
   g. The direction of shear for each interface tested shall be in the direction of manufacture (machine direction) for each geosynthetic sample.
   h. Apply the shear force using a constant rate of displacement not to exceed .01 in./min.
   i. All tests shall be continued until a constant shearing force is recorded,
   j. All tests shall be conducted with the soil and geosynthetics in a wet condition, by saturating and maintaining the specimen in water for 24 hours prior to and during testing.

   The actual test methods and equipment shall be proposed by the CONTRACTOR and approved by the ENGINEER. In addition to the prequalification testing, a minimum of three tests shall be performed by the CONTRACTOR during the course of the work to confirm that the frictional characteristics of the products continues to meet the requirements of this specification. Testing shall be performed in accordance with paragraph 1.3.H of this section.

1.4 <u>SUBMITTALS</u>

A. Shop Drawings:

1. Submit shop drawings for approval as soon as possible after award of Contract. Do not install geomembrane until approval has been obtained.
2. Shop drawings shall include:
    a. Drawings showing layout of liner sheets, field seams, anchor trench details, pipe penetration details, and other applicable details. Layout diagram indicating the location of pre-assembled panels. Shop drawings need not identify each sheet and panel by number, per Article 3.2 of this Section; however, quality assurance record shall do so.
    b. Complete description of field seaming procedures.
    c. Work plan for liner installation including manpower and equipment requirements. Include requirements for installing liner around penetrations such as new wells, storm drains, and utilities.
    d. Detailed description of field testing methods to be performed.
    e. Name of liner installer and written description of at least three (3) recent liner installation projects completed by liner installer
    g. Provide a list of at least three (3) references for liner installer
    h. Resume(s) of master seamers for liner installer
    i. Resume(s) of field superintendent for liner installer
    j. Liner installers QA/QC plan and cold weather installation procedures (see related sections).
    k. Provide friction angle test results.

B. Affidavit of Compliance:
1. Provide 6 copies of an affidavit, certifying that all liner materials furnished for this project (reference project title and number) comply with all requirements specified in the Contract Documents.
2. No liner material shall be shipped until the affidavits are submitted to the ENGINEER.

C. Provide friction angle test results for geomembrane and other indicated material as described herein.

D. Test Reports: Provide 6 copies of all factory and field quality control test reports. Manufacturer's quality control test results shall be for the batch and lot numbers of material supplied to the project.

E. Certificate of Surface Suitability per 06643-3.1.B (prior to placement).

F. Pre-weld seaming records, vacuum and pressure test records, and daily as-built information and sketches shall be submitted to the ENGINEER daily for review. Destructive seam testing, results shall be submitted to the ENGINEER as soon as available.

G. Quality Control and Warranty Documentation. Quality control documentation shall include manufacturer's cut sheets and liner installer's qualifications.

H. As-built panel layout indicating panel locations, numbers, and repair locations.

1.5 WARRANTY

A. The Bidder shall submit 3 copies of the liner manufacturer's offer of warranty with his bid. Pipe penetration seals and field seams, shall be included in the warranty. The warranty shall guarantee materials for a minimum period of 20 years and labor for a minimum period of 5 years.

B. CONTRACTOR shall provide the OWNER with a sample warranty in accordance with offer of warranty submitted with his bid.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Labeling - Each roll of geomembrane delivered to the site shall be labeled by the MANUFACTURER. The label will identify:
1. manufacturer’s name
2. product identification
3. thickness
4. length
5. width
6. roll number

B. Delivery- Rolls of liner will be prepared to ship by appropriate means to prevent damage to the material and to facilitate off-loading.

C. Storage- The on-site storage location for geomembrane material, provided by the CONTRACTOR to protect the geomembrane from punctures, abrasions and excessive dirt and moisture for should have the following characteristics:
1. level (no wooden pallets)
2. smooth
3. dry
4. protected from theft and vandalism
5. adjacent to the area being lined

D. Handling- Materials are to be handled so as to prevent damage.

E. CONTRACTOR shall check all materials upon delivery to assure that the proper type, grade, color, and certification has been received. CONTRACTOR shall also provide all labor and equipment required to assist ENGINEER in inspection and sampling of liner materials upon delivery to the site, or as requested by the ENGINEER.

PART 2 -
PRODUCTS

2.1 GEOMEMBRANE PROPERTIES

A. Material shall be textured polyethylene geomembrane as shown on the Contract Drawings. Provide GSE 40 mil UltraFlex (textured on both sides) or approved equal. Color shall be black unless approved otherwise.

B. Resin
1. Resin shall be new, first quality, compounded and manufactured specifically for producing geomembrane.
2. Natural resin (without carbon black) shall meet the following requirements:

Raw Material Properties

Property	Test Method	HDPE	LLDPE
Density (g/cm3)	ASTM D 1505	$\geq$0.932	$\geq$0.915
Melt Flow Index (g/10 min)	ASTM D 1238 (190/2.16)	$\leq$1.0	$\leq$1.0
OIT (minutes)	ASTM D 3895 (1 atm/200^{0}C)	$\geq$100	$\geq$100

C. Geomembrane Rolls
1. Do not exceed a combined maximum total of 1 percent by weight of additives other than carbon black.
2. Geomembrane shall be free of holes, pinholes as verified by on-line electrical detection, bubbles, blisters, excessive contamination by foreign matter, and nicks and cuts on roll edges.
3. Geomembrane material is to be supplied in roll form. Each roll is to be identified with labels indicating roll number, thickness, length, width and MANUFACTURER.
4. All liner sheets produced at the factory shall be inspected prior to shipment for compliance with the physical property requirements listed in section 1.09 D and be tested by an acceptable method of inspecting for pinholes. If pinholes are located, identified and indicated during manufacturing, these pinholes may be corrected during installation.

D. Textured surfaced geomembrane shall meet the requirements shown in the following data sheets below.

Material Property	Test Method	Frequency	Value (40 mil)
Thickness, mil Lowest individual reading	ASTM D 5199	every roll	40 36
Density, g/cm^3 , (max.)	ASTM D 1505	200,000 lbs.	0.939
Tensile Properties (each direction) Strength at Break, lb/in-width Elongation at Break, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in	20,000 lbs	 60 250
Tear Resistance, lb	ASTM D 1004	45,000 lbs	22
Puncture Resistance, lb	ASTM D 4833	45,000 lbs	44
Carbon Black Content, % (Range)	ASTM D 1603*/4218	20,000 lbs	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lbs	Note(1)
Asperity Height, mil	ASTM D 7466	Second roll	18
Oxidative Induction Time, min	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lbs	>100
Typical Roll Dimensions			
Roll Length(2 , ft	Double-Sided Textured		700
Roll Width(2), ft			22.5
Roll Area, ft^2	Double-Sided Textured		15,750

NOTES:

(1) Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.

(2) Roll lengths and widths have a tolerance of ±1%.

GSE UltraFlex Textured is available in rolls weighing approximately 4,000 lb.

All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77°C when tested according to ASTM D 746.

* Modified

E. Extrudate Rod or Bead

1. Extrudate material shall be made from same type resin as the geomembrane.
2. Additives shall be thoroughly dispersed (as applicable).
3. Materials shall be free of contamination by moisture or foreign matter.

2.2 PIPE PENETRATION MATERIALS

A. Extrusion Joining Resin: Resin used for extrusion joining sheets and sheet to pipe shall be PE produced from the same as the sheet resin. Physical properties shall be the same as those of the resin used in the manufacture of the PE liner. The resin shall be supplied in black.

B. Extrusion weld on pipe shall be non-destructively tested and repaired in accordance with the procedures outlined in paragraph 3.8 of this section or as approved by ENGINEER.

C. Factory fabricated boots will be considered as an alternative by ENGINEER providing:

1. The boot assembly has sufficient length of pipe and PE sheeting to facilitate field installation
2. The manufacturer certifies the materials used conform to the applicable portions of these specifications.
3. The manufacturer provides non-destructive test results on the prepared boot assembly.
4. Any boots that appear to be damaged shall be replaced or repaired as required by the ENGINEER.

PART 3 - EXECUTION

3.1 PREPARATION FOR GEOMEMBRANE INSTALLATION

A. Prepare base material to receive the geomembrane in accordance with geomembrane manufacturer's recommendations. Refer to Section 02220 “Excavation and Backfill”, Section 02227 “Cover Soil Material”, and Section 02225 “Subbase Preparation” for additional requirements relating to preparation of subbase material and overlying Cover Soil material layer. As a minimum, this certification shall include date, job name, material used, base composition, roll or panel number, and signature of manufacturer's representative.

B. The geomembrane Manufacturer shall certify in writing that the surface on which the geomembrane will be installed is acceptable. This certificate of acceptance shall be given to the ENGINEER prior to commencement of geomembrane installation.

3.2 GEOMEMBRANE PLACEMENT

A. Panel Identification: A panel is the unit area of geomembrane which is to be seamed in the field. A panel is a roll or a portion of roll cut in the field. Each panel shall be given an "identification code" (number or letter-number) consistent with the layout plan. This identification code shall be agreed upon by the ENGINEER and CONTRACTOR. This identification code shall be as simple and logical as possible. The CONTRACTOR shall establish a table or chart showing correspondence between roll numbers and identification codes. The identification code shall be used for all quality assurance records.

B. Panel Placement:

1. The CONTRACTOR shall verify that panels are installed at the location indicated on the Drawings.
2. Panels placed prior to field seaming shall begin at the low point and proceed upward and outward with "shingle" overlaps to facilitate drainage in the event of precipitation.
3. CONTRACTOR shall record on a drawing the identification code, roll number, location, and date of installation of each panel.

C. Weather Conditions:

1. Geomembrane placement shall not proceed at an ambient temperature above 40°C (104°F) unless otherwise specified or approved by the ENGINEER. For temperatures below 5°C (41°F) refer to Section 06647 Cold Weather Installation - Flexible Membrane Liner. Geomembrane placement shall not be conducted during any precipitation, in the presence of excessive moisture (e.g., fog, dew, or frost), in an area of ponded water, or in the presence of excessive winds, as determined by the ENGINEER.
2. CONTRACTOR shall verify that the above conditions are fulfilled. Additionally, the CONTRACTOR shall verify that the supporting soil has not been damaged by weather conditions.

D. Method of Placement:

1. Visually inspect the geomembrane during deployment for imperfections and mark faulty or suspect areas.
2. Use no equipment that could damage the geomembrane by handling, trafficking, leakage of hydrocarbons, or other means;
3. Prohibit all personnel on the geomembrane from smoking, wearing damaging shoes, or engaging in other activities which could damage the geomembrane;
4. Use methods to unroll the panels that do not cause scratches, folds or crimps in the geomembrane and do not damage the subgrade;
5. Use methods to place the panels that minimize wrinkles (especially differential wrinkles between adjacent panels);
6. Place adequate loading (e.g., sand bags), not likely to damage the geomembrane, to prevent uplift by wind; and
7. Minimize direct contact with the geomembrane (i.e., the geomembrane in traffic areas is protected by geotextiles, extra geomembrane, or other suitable materials).
8. Sufficient material (slack) shall be provided to allow for thermal expansion and contraction of the material.

E. Damage: The ENGINEER shall inspect each panel, after placement and prior to seaming, for damage. The ENGINEER shall advise the CONTRACTOR which panels, or portions of panels, shall be rejected, repaired, or accepted. Damaged panels of portions or damaged panels which have been rejected shall be marked and removed from the work area. The damaged materials shall become the property of the CONTRACTOR.

1. Alternatives for disposition of damaged liner with approval of ENGINEER:
   a. Remove from site at expense of CONTRACTOR.
   b. Use as slip sheets.
   c. Use as protective pads beneath vehicles.
   d. Use as spill protection.
   e. Use as chafe strips along berms.

3.3 <u>ANCHOR TRENCH</u>

A. Excavate anchor trenches to the lines and width shown on the Drawings, prior to geomembrane placement, and as follows:

1. Top of each slope.
2. At end of rolls on slopes.
3. At other points as recommended by manufacturer.

B. Round trench edge to avoid sharp bends in the geomembrane. No loose soil shall be allowed to underlie the geomembrane in the anchor trench.

C. Backfill the anchor trench in accordance with Section 02220, “Excavation and Backfill.”

3.4 FIELD AND SHOP FABRICATED SEAMING

A. Seam Layout: CONTRACTOR shall provide the ENGINEER with a drawing of the facility to be lined showing shop fabricated seams and field seams in a manner which differentiates the seam types. Use a sequential seam numbering system compatible with panel numbering system that is agreeable to the ENGINEER and INSTALLER. To the maximum extent possible, field seams should be oriented parallel to the line of maximum slope (e.g., oriented along, not across, the slope). In corners and odd-shaped geometric locations, the number of field seams should be minimized. No horizontal seam shall be constructed on the slope. The seam at the toe of the slope shall be no less than five (5) feet from the toe of the slope.

B. Requirements of Personnel: All personnel performing seaming operations shall be qualified by experience or by successfully passing seaming tests. At least two seamers shall have experience seaming a minimum of 2,000,000 square feet of PE geomembrane using the same type of seaming apparatus in use at the site. The most experienced seamer, the "master seamer", shall provide direct supervision, as required, over less experienced seamers. No field seaming shall take place without the master seamer being present.

3.5 OVERLAPPING AND TEMPORARY BONDING

A. Overlap panels by a minimum of three (3) inches for extrusion welding and 125 mm (5 inches) for fusion welding, or as approved by ENGINEER. Align seam overlaps consistent with the requirements of the welding equipment being used.

B. Assure that the procedure used to temporarily bond adjacent panels together does not damage the geomembrane; in particular, the temperature of hot air at the nozzle of any spot welding apparatus is controlled such that the geomembrane is not damaged.

C. No solvent or adhesive shall be used unless the product is approved in writing by the ENGINEER.

3.6 SEAM PREPARATION

A. Prior to seaming, confirm that the seam area is clean and free of moisture, dust, dirt, debris of any kind, and foreign material; and clean seam area as necessary to permit seaming.

B. Where seam overlap bonding is required, the process shall be according to the Manufacturer's instructions and in a way that does not damage the geomembrane.

C. Seams shall be aligned with the fewest possible number of wrinkles and "fishmouths".
   1. Where more than five "fishmouth" per 500 linear feet of seam occur, replace the seam and:
      a. retrain the operator, or
      b. repair seaming equipment.

3.7 SEAMING EQUIPMENT AND PRODUCTS

A. General:
   1. Approved processes for field seaming are extrusion welding and fusion welding.
   2. Use only apparatus which have been specifically approved by make and model.
   3. Welding equipment and accessories shall meet the following requirements:
      a. Gauges showing temperatures in extrusion welder or fusion welder shall be present.
      b. An adequate number of welding apparati shall be available to avoid delaying work.
      c. Power source must be capable of providing constant voltage under combined line load.
   4. Notify ENGINEER if discrepancies exist between specified requirements and manufacturer’s recommendations.

B. Extrusion Process:
   1. Welding apparatus shall be equipped with gauges giving the temperature in the apparatus and at the nozzle. CONTRACTOR shall provide documentation regarding the PE extrudate to the ENGINEER and shall record and certify that the extrudate temperatures, ambient temperatures, and geomembrane surface temperatures as specified at appropriate intervals.
   2. CONTRACTOR shall comply with the following:
      a. spare operable seaming apparatus is available on-site;
      b. equipment used for seaming is not likely to damage the geomembrane;

c. the extruder is purged prior to beginning a seam until all heat degraded extrudate has been removed from the barrel;
d. the electric generator is placed on a smooth base such that no damage occurs to the geomembrane;
e. splash protection is provided beneath equipment;
f. fuel cans are stored off the geomembrane;
g. a smooth insulating plate or fabric is placed beneath the welding apparatus after usage;
h. the geomembrane is protected from damage in heavily trafficked areas; and
i. Any comers of panels or areas where two or more seams meet shall be capped with a minimum 1 foot diameter patch.

C. Fusion Process:

1. Fusion-welding apparatus must be automated vehicular-mounted devices which produce a double seam with an enclosed space. The seaming apparatus shall be equipped with gauges giving the applicable temperatures and pressures. The CONTRACTOR shall log ambient, seaming apparatus, and geomembrane surface temperatures as well as seaming apparatus pressures.
2. CONTRACTOR shall comply with the following:
a. spare operable seaming apparatus is available on-site;
b. equipment used for seaming is not likely to damage the geomembrane;
c. for cross seams, the edge of the cross seams is ground to a smooth incline (top and bottom) prior to welding;
d. the electric generator is placed on a smooth base such that no damage occurs to the geomembrane;
e. a smooth insulating plate or fabric is placed beneath the hot welding apparatus after usage; and
f. the geomembrane is protected from damage in heavily trafficked areas.

D. Weather Conditions for Seaming:

1. Field seaming is prohibited during precipitation, in presence of moisture, or when winds are in excess of 20 miles per hour.
2. Unless authorized in writing by the ENGINEER, no seaming shall be attempted below 5°C (41 °F) nor above 40°C (104°F).
a. Refer to Section 06647.
3. Between 5°C (41°F) and 10°C (50°F), seaming is possible if the geomembrane is preheated by either sun or hot air device, and if there is not excessive cooling resulting from wind (as determined by the ENGINEER).
4. Above 10°C (50°F), no preheating is required.
5. In all cases, the geomembrane shall be dry and protected from wind damage.

E. Test Seams:

1. Test seams shall be made on fragment pieces of geomembrane liner to verify that seaming conditions are adequate. Make test seams:
   a. Each day prior to commencing field seaming, a test weld 3 feet long shall be run from each welding machine under the same conditions as exist for the liner welding.
   b. During field seaming, one 1-inch seam test sample shall be prepared and field peeled for every 500 feet of field seam.
   c. Each seamer shall make at least one (1) test seam each day and one test seam at least once every four hours, or at any time equipment is shut down and cooled.
2. Test seam sample shall be at least three (3) feet long by one (1) foot wide with the seam centered lengthwise. Cut five (5) adjoining specimens one (1) inch wide each from each end of the test seam sample. Test specimens in peel and shear by ASTM D 6392, and the specimens shall not fail in the seam. If test seam fails, repeat the entire seam test operation. If the additional test seam fails, the seaming apparatus or seamer shall not be accepted and shall not be used for seaming until the deficiencies are corrected and two (2) consecutive, successful, full test seams are achieved.
   a. The break, when peel testing, occurs in the liner material itself, not through peel separation (FTB).

Minimum Weld Values for LLDPE Geomembrane

Property	Test Method	40 mil
Peel Strength (extrusion), ppi Peel Strength (fusion), ppi	ASTM D 6392 ASTM D 6392	48 50
Shear Strength (fusion & ext.), ppi	ASTM D 6392	60

3. ENGINEER shall observe all test seam procedures. The remainder of the successful test seam sample shall be assigned a number and marked accordingly by the CONTRACTOR, who shall also log the date, hour, ambient temperature, number of seaming unit, welding temperatures, equipment speed, name of seamer, and pass or fail description. The sample itself shall be labeled and submitted to the ENGINEER.
4. All test seam apparatuses shall be as close to the operations as possible to permit continuous observation of construction activities by the ENGINEER.

F. General Seaming Procedure:
1. Extend seaming to the outside edge of panels to be placed in the anchor trench.
2. As required, a firm substrate shall be provided by using a flat board, a conveyor belt, or similar hard surface directly under the seam overlap to achieve proper support.
3. Fishmouths or wrinkles at the seam overlaps shall be cut along the ridge of the wrinkle in order to achieve a flat overlap. The cut fishmouths or wrinkles shall be seamed and patched with an oval or round patch of the same

geomembrane extending a minimum of six (6) inches beyond the fishmouth or wrinkle in all directions.

4. All seams shall be marked by the seamer with the seamer name, date, equipment number, and starting time. The liner installer shall mark each seam with a number to identity the seam. This number will be used by the installer to record all QA/QC data associated with the seam.
5. All tee seams or intersections where 3 or more panels are joined shall be capped with a patch 6 inches beyond the intersection in all directions.
6. CONTRACTOR shall take samples from the start and stop of each seam welded. Samples shall be one inch wide and shall be tested in peel and shear. Any seam failed shall be reconstructed.
7. Areas of seams which show evidence of overheating or degradation of liner properties due to seaming shall be patched or replaced by the CONTRACTOR at no expense to the OWNER.

3.8 NON-DESTRUCTIVE SEAM TESTING

A. General:

1. Non-destructive testing may be carried out as the seaming progresses or at completion of all field seaming.
2. CONTRACTOR shall test all field seams non-destructively using a vacuum test unit or air pressure to verify seam continuity.
3. CONTRACTOR shall cap-strip with same geomembrane all locations where seams cannot be non-destructivity tested.
4. CONTRACTOR shall correct all inadequate seams or portions thereof in accordance with approved method.
5. CONTRACTOR shall provide copies of the non-destructive test results to the ENGINEER.

B. Vacuum Box Testing: Shall be performed in accordance with ASTM D 5641, standard practice for Geomembrane seam Evaluation by Vacuum Chamber.

C. Air Pressure Testing: Shall be performed in accordance with ASTM D 5820, Standard practice for pressurized Air channel Evaluation of Dual seamed Geomembranes.

3.9 DESTRUCTIVE SEAM TESTING

A. Location and Frequency of Samples:

1. ENGINEER shall determine locations where seam samples shall be cut out for laboratory testing. Samples shall be taken at a minimum frequency of one test location per 500 feet of seam length and a maximum frequency shall be agreed upon by the ENGINEER and CONTRACTOR.
2. Additional test locations shall be determined during seaming at the ENGINEER'S discretion. Selection of such locations may be prompted by suspicion of excess crystallinity, contamination, offset welds, or any other potential cause of imperfect welding. The CONTRACTOR shall not be

informed in advance of the additional locations where the seam samples will be taken.

3. Cut samples as the seaming progresses in order to have laboratory test results before completion of geomembrane installation. Assign a number to each sample, mark it accordingly, record sample location on layout drawing, and record reason for taking the sample at this location.
4. ENGINEER shall witness all field tests and mark all samples and portions with their number. CONTRACTOR shall log the date and time, ambient temperature, number of seaming unit, name of seamer, welding apparatus temperatures and pressures, and pass or fail description, and attach a copy to each sample portion.
5. Samples shall be eighteen (18) inches wide by forty-seven (47) inches long with the seam centered lengthwise. Cut one 1-inch wide strip from each end of the sample and test in the field, by ASTM D 6392, at a separation rate of 2 inches per minute for peel and shear. The remaining sample shall be cut into three (3) parts and distributed as follows:
   a. One portion to the testing laboratory, 18 inches x 15 inches;
   b. One portion to the ENGINEER for archive storage, 18 inches x 15 inches; and
   c. One portion to the installer, 18 inches x 15 inches.
6. INSTALLER shall repair all holes in the geomembrane resulting from destructive sampling.
7. Repair and test the continuity of the repair in accordance with these Specifications.

B. Laboratory Testing:
   1. CONTRACTOR will forward test samples to an independent laboratory selected by the ENGINEER. The minimum acceptable values shall be as specified in Section 3.7E. Copies of all laboratory test results shall be submitted by the laboratory to the ENGINEER as soon as they become available. CONTRACTOR shall account for a minimum turnaround time for tests to be 3 business days.

C. Procedures for Destructive Test Failure:
   1. The following procedures shall apply whenever a sample fails the field destructive test:
      a. Reconstruct the seam between the failed location and any passed test location, at ten (10) feet, minimum, from the location of the failed test.
      b. Take a sample for an additional field test:
         1) If this additional sample passes the test, reconstruct seam between that location and the original failed location.
         2) If this sample fails, then the process is repeated.
      c. In any case, all acceptable seams must be bounded by two passed test locations (e.g., the above procedure shall be followed in both directions from the original failed location), and
      d. One (1) test must be taken within the reconstructed area.

2. With samples that fail a laboratory destructive test, follow the above procedures, considering laboratory tests exclusively. Since the final seam must be bounded by two (2) passed test locations, it may then be necessary to take one or more new samples for laboratory testing in addition to the one required in the reconstructed seam area.
3. CONTRACTOR may perform additional testing for his purposes, subject to the following restrictions at a minimum:
   a. OWNER will not pay for tests.
   b. Test results will be nonbinding for all purposes upon the OWNER, ENGINEER and laboratory.
   c. PE installation shall proceed in the absence of results of CONTRACTOR'S additional testing; untimely results from CONTRACTOR'S additional testing shall not be cause for delay claim.
   d. CONTRACTOR may only test the installer's sample, obtained and distributed per Article 3.9.A.4.C.

3.10 DEFECTS AND REPAIRS

A. Sweep and wash the geomembrane surface prior to inspection. Inspect all seams and non-seam areas of the geomembrane for defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter. Non-destructively test each suspect location, both in seam and non-seam areas, using the methods specified herein. Mark and repair each location which fails the non-destructive testing.

B. Repair procedures should be agreed upon between ENGINEER and CONTRACTOR. Unless otherwise agreed, the procedures shall be as follows:
   1. Defective seams shall be repaired by reconstruction as described below.
   2. Tears or pinholes shall be repaired by seaming or patching.
   3. Blisters, larger holes, undispersed raw materials, and contamination by foreign matter shall be repaired by patches.
   4. Surfaces of PE geomembrane which are to be patched shall be abraded no more than one (1) hour prior to the repair.
   5. All seams used in repairing procedures must be approved extrusion welded seams and shall be subjected to the same non-destructive test procedures as outlined for all other seams.
   6. Each patch shall be numbered and logged. Patches shall be round or oval in shape, and made of the same geomembrane, and extend a minimum of six (6) inches beyond the edge of defects in each direction.
   7. Patches shall be applied using approved methods only.
   8. Where excessive extrudate surface occurs, the affected seam length shall be cap-stripped.
   9. Any cold rudded areas shall be patched.

C. Seam reconstruction for the extrusion welding process shall be achieved by grinding the existing seam and rewelding a new seam or patching as determined

by ENGINEER. Seam reconstruction for the fusion process shall be achieved by cutting out the existing seam and welding in a replacement strip.

D. Each repair shall be non-destructively tested using the methods specified herein, as appropriate. Repairs which pass the non-destructive test shall be taken as an indication of an adequate repair. Failed tests indicate that the repair shall be redone and retested until a passing test results. The ENGINEER shall observe all non-destructive testing of repairs and the CONTRACTOR shall record the number of each patch, date, name of patcher, and test outcome. The CONTRACTOR will identify each patch and repair on the as-built drawing.

3.11 GEOMEMBRANE ACCEPTANCE

A. At the conclusion of placement of the PE geomembrane, prepare and submit six (6) copies of a written report of the work which includes the following:

1. Complete identification of PE geomembrane liner, including, but not limited to, resin type, physical properties and other pertinent data.
2. Complete description of failed seaming system used including material, method, temperatures, seam overlap width and cure or aging time.
3. Complete description of field sampling and testing including test equipment used, location of field tests, copy of all field laboratory test results, conditioning procedure prior to destructive seam testing, method of recording loading and determining average load for destructive test methods, and type of failure in tests (i.e., within the seam, within the sheet material, clamp edge, seam edge).
4. "As-built" drawings showing actual layout of liner sheets, pipe penetration details, patches, repairs, destructive samples and anchor trench details. "As-built" drawings shall also provide invert and spot elevations for each sump, pipe penetration and at 100-foot intervals along each anchor trench.
5. An affidavit of compliance from the liner manufacturer, containing the following wording:
   "I (name and title), as the duly authorized representative of (Company name), hereby certify that the installation of the textured LLDPE geomembrane has been completed in accordance with the terms and conditions of the Contract Documents.
6. Completed warranty for the installed items in accordance with paragraph 1.5 of this section.

By:

_____

(signature)

(Corporate Seal) Witness:

_____

(signature)

Date: _____

END OF SECTION
SECTION 06644

GEOSYNTHETICS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope: CONTRACTOR shall provide all labor, materials, tools, equipment, testing, and services necessary for the placement of geotextile as liner protection cushion, and a geocomposite drainage layer within the cap system as shown on the Drawings and specified, or as otherwise directed by the ENGINEER. This section also contains product specifications for gravel construction entrances and access roads.

B. Related Sections:
1. Section 02227, Vegetative Support Soil Material
2. Section 06643, Geomembranes.

1.2 QUALITY ASSURANCE

A. Manufacturer's Qualifications:
1. Geosynthetic manufacturer shall be a specialist in the manufacture of the particular geosynthetic.

B. Submittals:
1. Shop Drawings:
   a. CONTRACTOR shall submit six (6) copies of manufacturer's data, specifications, quality control plan, installation instructions and dimensions.
   b. CONTRACTOR shall submit six (6) copies of an affidavit certifying that each geosynthetic furnished complies with all requirements specified herein. No geosynthetic shall be shipped until the affidavit is submitted to ENGINEER.
   c. Samples of proposed geosynthetic materials (10 days prior to delivery).
   d. Associated submittals required under related sections.
   e. Geocomposite panel layout (10 days prior to planned placement).

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Each roll of geosynthetic delivered to the site shall be labeled by the manufacturer identifying the manufacturer's name, product identification, lot number, roll number and roll dimensions.

B. All geosynthetics shall be protected from ultraviolet light exposure, precipitation or other inundation, mud, dirt, dust, puncture, cutting or any other damaging or deleterious conditions. Geosynthetic rolls shall be shipped and stored in relatively opaque and watertight wrappings.

C. CONTRACTOR shall check all materials upon delivery to assure that the proper type, grade, color, and certification has been received. CONTRACTOR shall also provide all labor and equipment required to assist ENGINEER in inspection of materials upon delivery to the site.

1.4 WARRANTY

A. Material shall be warranted, on a pro-rata basis against defects for a period of 1-year from the date of the geocomposite installation.

B. Installation shall be warranted against defects in workmanship for a period of 1-year from the date of geocomposite completion.

PART 2 - PRODUCTS

2.1 GEOTEXTILE FOR CAP CONSTRUCTION

A. Geotextile for cap construction shall be a needle punched, nonwoven fabric composed of filaments which are formed into a stable network such that the filaments retain their relative position. Filter fabric shall be inert to biological degradation and naturally encountered chemicals, alkalis, and acids. The geotextile shall conform, as a minimum, to the following:

Fabric Property	Unit	Typical Test Method	Value(1)
AASHTO M288 Class	--	--	>>1
Unit Weight (mass per unit area)	oz/yd^2	ASTM D 5261	12
Thickness	mils	ASTM D 5199	110
Grab Tensile Strength	lb	ASTM D 4632	320
Grab Tensile/Elongation	%	ASTM D 4632	50
Puncture Strength	lb	ASTM D 4833	190
Trapezoid Tear Strength (MD)	lb	ASTM D 4533	125
Apparent Opening Size	mm	ASTM D 4751	0.150
Permittivity	Sec^{-1}	ASTM D 4491	0.80
Water Flow Rate	Gpm/ft^2	ASTM D 4491	60
UV Resistance (500 hrs)	%	ASTM D 4355	70

NOTES:

1. Values listed represent minimum values each roll delivered to the site shall meet when tested in accordance with the specified ASTM test method.

B. Geotextile filter fabric shall be:
   1. NW12 produced by GSE Environmental. Color shall be black unless approved otherwise.
   2. Or equal.

2.2 COMPOSITE DRAINAGE GEONET

A. The Geonet Drainage Layer (GDL) shall be:
   1. Tenflow 350-6-6 (double sided and customized for specified area-specific ply adhesion) manufactured by GSE Environmental. Color shall be black unless approved otherwise.
   2. Or equal.

B. Resin
   1. Resin shall be new prime quality virgin, compounded polyethylene resin.
   2. Natural resin (without carbon black) shall meet the following additional minimum requirements:

Table 1: Raw Material Properties

Property	Test Method[(1)]	Value
Density (g/cm^3)	ASTM D 1505	>0.94
Melt Flow Index (g/10 min)	ASTM D 1238	$\leq$ 1.0

NOTES:

1 Test equipment and procedures that enable effective and economical confirmation that the product will conform to specifications based on the noted procedures. Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

C. Geotextile
   1. The geotextile forming the friction surface shall be a 6 oz./yd² nonwoven needle punched geotextile. The non-woven needle punched geotextile specified herein shall be made from staple fiber.
   2. The geotextile shall be made from prime quality virgin polymer.
   3. The geotextile shall be able to withstand direct exposure to ultraviolent radiation from the sun for up to 30 days without any noticeable effect on index or performance properties.
   4. Along the edges, a maximum of 6 inches of the geotextile shall not be heat bonded to allow adjacent geonet panel connection in the field, except where otherwise approved by the ENGINEER.
   5. Maximum allowable blister size (unbonded defect area) of 9 square yards/roll.

D. Geocomposite Properties

1. The geonet shall be a T-shaped tri-axial structure manufactured by extruding three high-density polyethylene strands to form a three dimensional drainage net structure. A non-woven geotextile shall be bonded to the bottom and the top sides.
2. The geocomposite shall be chemically inert when immersed in a leachate representative of that from a typical landfill. The geonet shall contain a maximum of one percent by weight of additives, fillers, or extenders (not including carbon black) and shall not contain foaming agents or voids within the ribs of the geonet.
3. The geocomposite shall have properties that meet or exceed the values listed in the following table.

Table 2: Required Geocomposite Drainage Layer Properties

Property	Test Methods	Units	Value	Qualifier	Frequency
TRI-AXIAL GEONET[1]					
Thickness	ASTM D 5199	mil (mm)	350 (8.9)	MAV	1/100,000 sf
Density	ASTM D 792	g/cm^3	0.94–0.96	Range	1/100,000 sf
Melt Flow Index	ASTM D 1238	g/10 min	1.0	MAX	1/100,000 sf
Carbon Black	ASTM D 4218	%	2-3	Range	1/100,000 sf
Creep Reduction Factor From 10,000 hour creep test under 2,000 psf, and 20^oC temperature	GRI-GC8	-	1.05	-	-
GEOTEXTILE[1]					
U.V. Resistance (500 hrs)	ASTM D 4355	%	70	MARV	Per formula
Grab Tensile	ASTM D 4632	lbs	160	MARV	1/100,000 sf
Grab Elongation	ASTM D 4632	%	50	MARV	1/100,000 sf
Tear Strength	ASTM D 4533	lbs	65	MARV	1/100,000 sf
CBR Puncture	ASTM D 6241	lbs	400	MARV	1/100,000 sf
AOS	ASTM D 4751	US Std Sieve(mm)	70(0.212)	MaxARV	1/540,000 sf
Permittivity	ASTM D 4491	Sec^{-1}	1.5	MARV	1/540,000 sf
Water Flow Rate	ASTM D 4491	gpm/ft^2 ($l/min/m^2$)	110 (4481)	MARV	1/540,000 sf
GEOCOMPOSITE					
Roll Sizes	12.5 ft x 200 ft (3.81 m x 61 m)				
Peel Adhesion – MD (for slopes $\leq$ 5:1)	ASTM D 7005	lbs/in	0.5	MAV	1/100,000 sf

Peel Adhesion – MD (for slopes > 5:1)	ASTM D 7005	lbs./in	1.0	MAV	1/100,000 sf
Transmissivity[2] – MD					
Plate/Ottawa Sand/ Geocomposite/Geomembrane/Plate, Gradient = 0.1 @ 1,000 psf 1 hour seating period	ASTM D 4716	m^2/sec	$6.5*10^{-3}$ **(see note 3)**	MAV	1/540,000 sf
Plate/Ottawa Sand/ Geocomposite/Geomembrane/Plate, Gradient = 0.33 @ 1,000 psf 1 hour seating period			$3.5*10^{-3}$ **(see note 3)**		

NOTES:

MARV=Minimum Average Roll Value (MARV),
MAV=Minimum Average Value,
MAX=Maximum Value,
MaxARV=Maximum average roll value,
MD= Machine Direction.

1. Geotextile and geonet properties listed are prior to lamination.
2. The Tenflow geonet has a circular aperture side and a cuspated side, the side with circular apertures shall be placed against the soil while the cuspated side shall be placed against the geomembrane as indicated with "Top"/"Bottom" labels on the rolls.
3. **For rolls having 1 ppi ply adhesion on slopes > 5:1 (H:V), minimum transmissivity shall be 5.85 x 10^{-3} m^2/s at a gradient of 0.1, and 3.15 x 10^{-3} m^2/s at a gradient of 0.33.**

E MANUFACTURING QUALITY CONTROL

1. The geocomposite shall be manufactured in accordance with the Manufacturer's Quality Control Plan submitted to and approved by the ENGINEER.
2. The geocomposite shall be tested in accordance with the test methods and frequencies listed in Table 2.
3. Geocomposite material in non-conformance with these specifications shall be subject to rejection.

2.3 GEOTEXTILE FOR GRAVEL CONSTRUCTION ENTRANCES AND ACCESS ROADS

A. Geotextile for gravel construction entrances and access roads shall be a heavy duty fabric suitable for the traffic loading at the indicated location. Provide AASHTO M288 Class 1 woven geotextile or better.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

A. All geosynthetics shall be weighted with sandbags or the equivalent when required. Such sandbags shall be installed during placement and shall remain until replaced with Vegetative Support material or geomembrane.

B. If white or light colored geotextile is used, precautions shall be taken against "snowblindness" of personnel.

C. CONTRACTOR shall take any necessary precautions to prevent damage to underlying layers during placement of each geosynthetic.

D. During placement of geosynthetics, care shall be taken not to entrap in the geosynthetics stone, excessive dust, or moisture that could damage the geomembrane, generate clogging, or hamper subsequent seaming.

E. Geosynthetics shall not be exposed to precipitation prior to being installed, and shall not be exposed to direct sunlight for more than 15 days. Any materials not complying with this requirement shall be removed and replaced at no cost to the OWNER.

F. CONTRACTOR shall not operate equipment on geosynthetics without the specified depth of cover.

G. Excavation of fill material over geosynthetics shall be completed by hand with plastic shovels.

3.2 GEOTEXTILE

A. Geotextile fabrics shall be deployed in the direction of the slope unless otherwise directed by ENGINEER.

B. Geotextile fabrics shall be overlapped 3 inches and sewn as detailed on Contract Drawings unless otherwise approved by ENGINEER. Overlaps shall be oriented in the direction of filling.

C. Any bum mark, material defect or tear in the fabric shall be repaired as follows:
   1. A fabric patch shall be sewn into place using a double sewn lock stitch (1/4 inch to 3/4 inch apart and no closer than 1 inch from any edge).
   2. On slopes with a grade less than 8%, the CONTRACTOR may use a fabric patch heat welded in place with a minimum of 24 inches overlap in all directions.

3. Should any damaged area exceed 10 percent of the width of the roll, the roll shall be cut, overlapped and sewn to form a new seam.

3.3 GEOCOMPOSITE

A. Handling and Placement of GDL

1. Prior to implementing the work within this Section, the INSTALLER shall carefully inspect the installed work of all other Sections and verify that all work is complete to the point where the installation of this Section may properly commence without adverse impact.
2. If the INSTALLER has any concerns regarding the installed work of other Sections, he shall notify the Project ENGINEER.
3. After the substratum/geomembrane has been installed/ constructed, tested and approved by the ENGINEER, the surface shall be cleaned and free of excess dirt and debris.
4. The CONTRACTOR and the INSTALLER shall handle all geocomposite in such a manner as to ensure it is not damaged in any way. Precautions shall also been taken to prevent damage to underlying layers during placement of the geocomposite.
5. The geocomposite roll should be installed in the direction of the slope, and in the intended direction or flow following the labeled instructions as provided by the manufacturer with respect to the top/bottom sides.
6. If the project contains long, steep slopes, special care shall be taken so that only full-length rolls are used at the top of the slope.
7. In the presence of wind, all geocomposite shall be weighted with sandbags or the equivalent. Such sandbags shall be installed during placement and shall remain until replaced with cover material.
8. If necessary, the geocomposite shall be positioned by hand after being unrolled to minimize wrinkles.
9. The geocomposite shall be properly anchored to resist sliding. Anchor trench compacting equipment shall not come into direct contact with the geocomposite.
10. If there are any obstructions (such as outlet pipes or monitoring wells) while deploying the geocomposite, the geocomposite shall be cut to fit around the obstruction. Care shall be taken as to make sure there is no gap between the obstruction and the geocomposite. The geocomposite shall be cut in a way that the lower geotextile and geonet core is in contact with the obstruction and the upper geotextile has an excess overhang. There must be enough of the upper geotextile to be able to tuck the upper geotextile back under the geocomposite to protect the exposed geonet core, and prevent soil particles from migrating into the geonet core flow channels.

B. Seams and Overlaps

1. Each component of the geocomposite will be secured or seamed to the like component at overlaps.
   a. Geonet Component

1) Adjacent edges of geonet along the length of the geocomposite, shall be overlapped 3 inches, see Figure 1(a), or if approved by the ENGINEER based on the site specific conditions, placed with the edges of each geonet butted against each other, see Figure 1(b). These overlaps shall be joined by tying the geonet cores together with white or yellow cable ties or plastic fasteners (minimum tensile strength of 50 lbs). These ties shall be spaced at a maximum of every 5 feet along the roll length, or a maximum of 2 feet if the geocomposite is installed vertically.

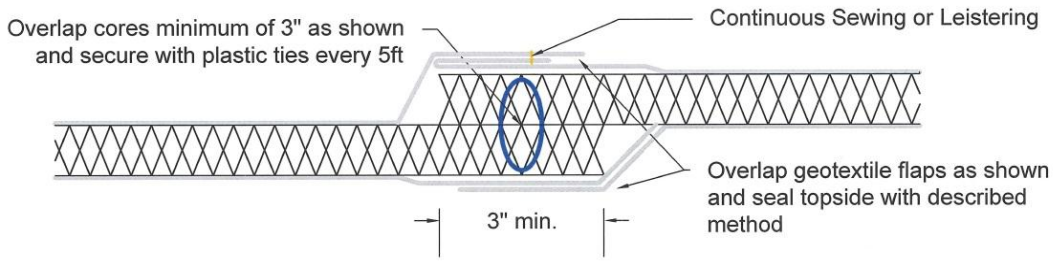

Figure 1(a). Overlap along roll length (side to side)

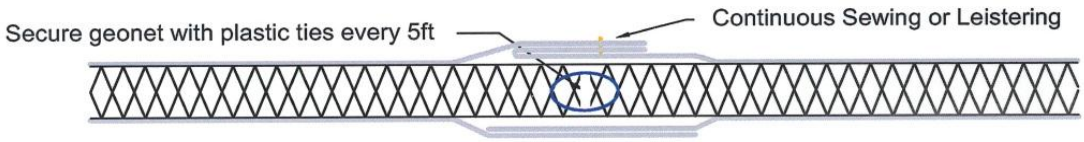

Figure 1(b). Butted along roll length (side to side)

2) Adjoining geocomposite rolls (end to end) along the roll width shall be shingled down in the direction of the slope, with the geonet portion of the top geocomposite overlapping the geonet portion of the bottom geocomposite a minimum of 8 inches across the roll width, see Figure 2. Geonet shall be tied every 12 inches across the roll width and every 6 inches in the anchor trench or as specified by the ENGINEER.

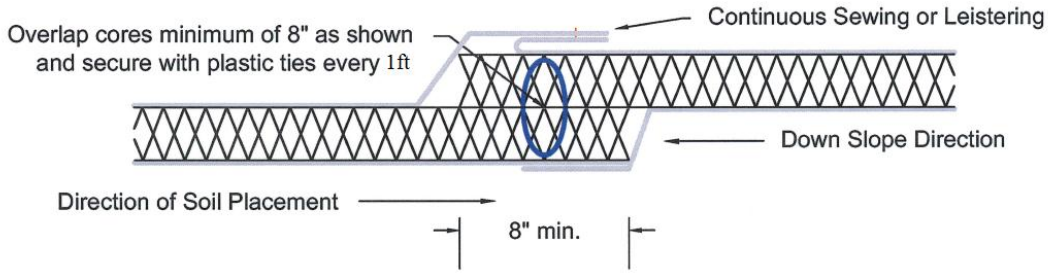

Figure 2. Overlap along roll width (end to end)

b. Geotextile Component of Geocomposite

1) The bottom layer of geotextile (if any) shall be overlapped.
2) The top layers of geotextile shall be sewn together, or at the discretion of the ENGINEER may be heat bonded or wedge welded. Geotextiles shall be overlapped a minimum of 4 inches prior to seaming or heat bonding. Geotextile sewing seams to be used are Prayer, "J" or Butterfly, as shown on the Contract Drawings. The seam shall be a two-thread, double-lock stitch, or a double row of single-thread, chain stitch. If heat bonding is to be used, care must be taken to avoid burn through of the geotextile. It is important that the geotextiles be joined continuously along to the roll as to prevent any fugitive particle migration into the geonet core flow channels.

c. Slope Corner

1) In the slope corners, the direction of the slope changes at the corner diagonal line. It's recommended to first place an additional panel along the corner diagonal line of the adjacent slope. The panels from the opposite slope should be placed to extend on top of the additional panel. Then the panel for the slope which contains the additional panel should be placed to meet (butted) the opposite slope panels.

C. Repair

1. Any small holes or tears in the top geotextile shall be patched with an 8" x 8" geotextile piece. The patching geotextile shall be the same as the original one. Apply the spray adhesive (*3M Super 77 adhesive is the recommended)* to one side of the 8" x 8"textile patch. Center and apply the 8" x 8" textile patch over the blemish, hole, tear or thin spot in the geotextile. Firmly press 8" x 8" textile patch over the repair area. If the damaged area of the geotextile is greater than this standard patch size, a bigger size patch is recommended using a multitude of 8" x 8" patches. If the geotextile is damaged beyond 50 percent of the width of the roll, a continuous piece of fabric the same width as the geocomposite may be cap-stripped directly to the adjacent seams by sewing a portion of the new geotextile in place.
2. Any rips, tears or damaged areas on the deployed geocomposite shall be removed and patched. The patch shall be secured to the original geonet by tying every 6 inches with the approved tying devices. If the area to be repaired is more than 50 percent of the width of the panel, the damaged area shall be cut out and the two portions of the geonet shall be joined in accordance with Section 3.3B.

3.4 PLACEMENT OF VEGETATIVE SUPPORT SOIL MATERIALS

A. Unless approved otherwise, placement of the vegetative support soil shall proceed immediately following placement and inspection of the geocomposite.

B. When applying Vegetative Support Soil Material, no equipment generally speaking shall drive directly across geocomposite. If a vehicle has to be driven on top of the geocomposite, the vehicle shall be driven in a fashion not to damage the geotextile, geonet or geocomposite. Acceleration or deceleration shall be in a smooth and gentle manner. Operator shall not make any sudden turns or stops when driving on the geonet or geocomposite. If any tear or local damage occurs to the geotextile, geonet or geocomposite, patching technique as described in the above section shall be used.

C. The specified fill material shall be placed and spread utilizing vehicles with a low ground pressure (LGP). The Vegetative Support soil shall be placed on the geocomposite from the bottom of the slope proceeding upwards and in a manner, which prevents instability of the Vegetative Support soil or damage to the geocomposite. Unless otherwise specified by the ENGINEER, all equipment for spreading fill material overlying the geocomposite shall comply with the following:

Maximum Equipment Ground Pressure (psi)	Minimum Separation Thickness (inches)
< 5	12
5 - 10	18
>10	24

D. Compaction of the initial lift placed over the geocomposite shall be performed in a manner that does not damage the geocomposite.

3.5 FAILING CQA TESTS:

A. In case of any failing CQA tests, “blocking” test on before and after the failing roll(s) shall be conducted to identify the affected rolls in the lot. The rejected rolls shall be excluded from the lot in consideration. The product manufacturer shall be responsible for any cost associated with blocking testing.

END OF SECTION 06644

SECTION 06647

COLD WEATHER INSTALLATION - GEOMEMBRANE

PART I - GENERAL

1.1 DESCRIPTION

A. Scope:

1. The Work covered by this section consists of cold weather installation requirements and supplements Section 06643. The CONTRACTOR may be required to work through cold weather months. If cold weather conditions prevail, the CONTRACTOR shall adjust the storage, handling, and installation procedures and conduct all necessary Work to ensure the integrity of the installed bottom and top liners. All of the provisions of Section 06643 will be strictly adhered to, except as modified herein.
2. All necessary Work required for snow and ice removal is included herein.
3. No direct or separate payment will be made for cold weather storage and installation of liners, snow or ice removal and for providing all other labor, materials, tools, equipment and services necessary to meet the requirements specified in this Section.
4. CONTRACTOR shall supply an outdoor thermometer for each welding enclosure.

B. Related Sections:

1. Section 02220, Excavation and Backfill
2. Section 06643, Geomembrane.

1.2 SUBMITTALS

A. The CONTRACTOR may be required to work through cold weather months. Therefore, six (6) copies of the proposed methods of cold weather installation construction shall be submitted in sufficient detail for the OWNER and ENGINEER to evaluate the proposed cold weather methods and techniques, such as preheating materials, the use of portable, heated enclosure shacks for field seaming, and other special equipment.

B. The CONTRACTOR shall pre-submit acceptable evidence (to be approved by the OWNER and ENGINEER) that his performance standards will be maintained at lower temperatures.

C. Submittals for Cold Weather Installation:

1. Seaming shall be suspended when temperatures are below 41°F or above 104°F. At his option, the CONTRACTOR shall submit a cold weather installation plan for the review and approval of the ENGINEER.
2. The CONTRACTOR shall submit to the ENGINEER the following additional cold weather construction items and information for approval, not later than 5 days after the notice to proceed from the OWNER:
   a. Field seaming and fabrication details during cold weather when temperatures are below 41°F.
   b. Work plan for liner installation during cold weather including manpower and equipment requirements.
   c. Shop Drawings and installation diagrams for liner panel sections layout and penetration details.
3. The ENGINEER will return all submittals to the CONTRACTOR within 10 working days of receipt.
4. The CONTRACTOR shall also specify any additional proposed method of testing the field seams. This testing is to be performed by the Liner Installer who will be required to provide a written report in accordance with Section 06643.
5. The CONTRACTOR shall present a schedule of cold weather operations to the ENGINEER and obtain the ENGINEER'S approval in writing of the same. This schedule shall be submitted sufficiently in advance of the proposed work as to afford a reasonable amount of time for the ENGINEER to review and approve the schedule.
6. The CONTRACTOR shall submit shop drawings for the welding enclosures.
7. The CONTRACTOR shall not install liner at ambient temperatures less than 41°F without an approved cold weather installation plan.

PART 2 - PRODUCTS

(Refer to Section 06643)

PART 3 - EXECUTION

3.1 COLD WEATHER STORAGE OF LLDPE GEOMEMBRANE MATERIALS

A. CONTRACTOR shall store and protect materials in accordance with manufacturer's recommendations and requirements of the Specifications. Additionally, all liner materials shall be stored inside heated areas, if the site temperature is, or is expected to drop, below 41 °F at any time during the storage period. The CONTRACTOR shall make his own provisions for heated storage.

3.2 SUBBASE

A. Geomembrane (and underlying geotextile) shall not be placed over water, ice, snow or frozen precipitation of any kind. Geomembrane (and underlying

geotextile) shall not be placed over frozen subbase which in the opinion of the ENGINEER may be detrimental to the integrity of the installation. Unacceptable subbase shall be reworked and replaced as necessary by the CONTRACTOR to provide adequate support.

3.3 COLD WEATHER INSTALLATION REQUIREMENTS FOR LLDPE FLEXIBLE MEMBRANE

A. The CONTRACTOR shall be required to implement the previously approved cold weather installation methods when the air temperature reaches 41°F or below. As a minimum the cold weather construction methods to be implemented shall include:

1. Providing additional labor, seaming crews, materials and equipment as required to pursue the work.
2. Adjustment of field seaming pre-heat to control heat loss prior to field welding to accommodate temperature, wind and humidity conditions.
3. Adjustment of the rate of field welding to accommodate temperature, wind and humidity conditions.
4. Exercising extra care in preparing panel edges prior to seaming to insure that edges to be seamed are dry, clean and free of all dirt, snow, ice, slush or water.

B. When the outside ambient temperature drops below 41°F, the CONTRACTOR shall conduct field seaming in heated, portable shelters to minimize geomembrane heat loss and to maintain dry, clean panel edges during seaming.

C. In addition to the quality assurance sampling and testing specified in Section 06643, the CONTRACTOR shall provide and operate a portable pull test machine at the site during field seaming operations. The CONTRACTOR shall sample the liner seam and conduct pull tests during the seaming to insure that acceptable weld seams are being fabricated and to gauge the effectiveness of the cold weather construction methods. Field tested seams must achieve 100 percent of the strength of the base liner material. CONTRACTOR shall sample and perform pull tests a minimum of 4 times per shift and as ordered by the ENGINEER. CONTRACTOR shall adjust the seaming and construction methods to achieve acceptable field seams.

D. CONTRACTOR shall place Geosynthetics and Cover Soil Materials over geomembrane as soon as field seams have cured, been tested and accepted.

E. No Geosynthetics and Cover Soil Materials shall be placed over ice, snow or frozen precipitation. CONTRACTOR will be responsible for ensuring that surfaces are clean and dry prior to placement.

END OF SECTION

S-6442 BID PRICE FORM

Bidder shall complete the Work as specified in the Contract Documents for the following lump sum and unit price items (please use itemized table below) including alternates (if approved):

Base Bid – Scofield Yard & Park Landfill Capping Project

Show amount in both words and figures.
In case of discrepancy, the amount shown in words will govern.
Also see Section 01205 Payment Items for a description of each payment item.

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
1	**Mobilization/Demobilization and Incidental Construction** for the Lump Sum Price of _____dollars and _____cents ($_____)	LS	1	$_____	$_____
2	**Street Sweeping and Dust Control** at the per month price of _____dollars and _____cents ($_____).	Month	12	$_____	$_____
3	**Clearing and Grubbing** for the Lump Sum Price of: _____dollars and _____cents ($_____)	LS	1	$_____	$_____

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
4	**Construction Entrances / Anti-Tracking Pads** for the Lump Sum Price of: _____dollars and _____cents ($_____)	LS	1	$_____	$_____
5	**Subgrade Preparation** for the Lump Sum Price of: _____dollars and _____cents ($_____)	LS	1	$_____	$_____
6	**Silt Fence with Hay Bales** for the Linear Foot Price of: _____dollars and _____cents ($_____)	LF	2,000	$_____	$_____
7	**Silt Fence** for the Linear Foot Price of: _____dollars and _____cents ($_____)	LF	3,500	$_____	$_____
8	**Demolition and Abandonment** for the Lump Sum Price of: _____dollars and _____cents ($_____)	LS	1	$_____	$_____

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
9	**Landfill Cap Subbase Material Import** for the Cubic Yard Price of: _____dollars and _____cents ($_____)	CY	2,500	$_____	$_____
10	**Landfill Cap Subbase Installation** for the Lump Sum Price of: _____dollars and _____cents ($_____)	LS	1	$_____	$_____
11	**Cap Geosynthetics - Installed** for the Lump Sum Price of: _____dollars and _____cents ($_____)	LS	1	$_____	$_____
12	**Interceptor Piping and Materials - Installed** for the Lump Sum Price of: _____dollars and _____cents ($_____)	LS	1	$_____	$_____
13	**15" HDPE Drainage Pipe - Installed** for the Linear Foot Price of: _____dollars and _____cents ($_____)	LF	500	$_____	$_____

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
14	**18" HDPE Drainage Pipe - Installed** for the Linear Foot Price of: _____dollars and _____cents ($_____)	LF	260	$_____	$_____
15	**24" HDPE Drainage Pipe - Installed** for the Linear Foot Price of: _____dollars and _____cents ($_____)	LF	200	$_____	$_____
16	**30" HDPE Drainage Pipe - Installed** for the Linear Foot Price of: _____dollars and _____cents ($_____)	LF	300	$_____	$_____
17	**36" HDPE Drainage Pipe - Installed** for the Linear Foot Price of: _____dollars and _____cents ($_____)	LF	200	$_____	$_____
18	**48" HDPE Drainage Pipe - Installed** for the Linear Foot Price of: _____dollars and _____cents ($_____)	LF	1,000	$_____	$_____

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
19	**30” HDPE Flared End Section - Installed** for the per Each Price of: _____do llars and _____cents ($_____)	EA	2	$_____ _	$_____ __
20	**36” HDPE Flared End Section - Installed** for the per Each Price of: _____do llars and _____cents ($_____)	EA	2	$_____ _	$_____ __
21	**36” RCP Wing Type Endwall - Installed** for the per Each Price of: _____do llars and _____cents ($_____)	EA	1	$_____ _	$_____ __
22	**48” RCP Wing Type Endwall - Installed** for the per Each Price of: _____do llars and _____cents ($_____)	EA	1	$_____ _	$_____ __
23	**Gabion Mattress Splash Pads and Flow Diffusers - Installed** for the Lump Sum Price of: _____do llars and _____cents ($_____)	LS	1	$_____ _	$_____ __

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
24	**Vegetative Support Soil – Soil Material Import** for the Cubic Yard Price of: _____dollars and _____cents ($_____)	CY	35,450	$_____	$_____
25	**Vegetative Support Soil – Installation / Placement** for the Lump Sum Price of: _____dollars and _____cents ($_____)	LS	1	$_____	$_____
26	**Material Screening - Cap Subbase Material and Vegetative Support Soil - On-Site Sources** - for the Lump Sum Price of: _____dollars and _____cents ($_____)	LS	1	$_____	$_____
27	**Crushed Stone Access Road – Purchase / Deliver / Installation** for the Lump Sum Price of: _____dollars and _____cents ($_____)	LS	1	$_____	$_____

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
28	**Asphalt Area – Processed Aggregate Pavement Base – Purchase / Deliver** for the Cubic Yard Price of: _____do llars and _____cents ($_____)	CY	5,100	$_____ –	$_____ __
29	**Asphalt Area – Processed Aggregate Pavement Base – Installation / Placement** for the Cubic Yard Price of: _____do llars and _____cents ($_____)	CY	5,100	$_____ –	$_____ __
30	**Asphalt Area – CT DOT Subbase Material – Purchase / Deliver** for the Cubic Yard Price of: _____do llars and _____cents ($_____)	CY	5,100	$_____ –	$_____ __
31	**Asphalt Area – CT DOT Subbase Material – Installation / Placement** for the Cubic Yard Price of: _____do llars and _____cents ($_____)	CY	5,100	$_____ –	$_____ __

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
32	**Asphalt Paving – 3" Bituminous Concrete - Installed** for the Square Foot Price of: _____do llars and _____cents ($_____)	SF	137,700	$_____ _	$_____ __
33	**Asphalt Curbing – Bituminous Concrete Curbing - Installed** for the Linear Foot Price of: _____do llars and _____cents ($_____)	LF	1,550	$_____ _	$_____ __
34	**Pipe Abandonment (Existing Pond Drain Line)** for the Lump Sum Price of: _____do llars and _____cents ($_____)	LS	1	$_____ _	$_____ __
35	**Pre-Cast Concrete Manholes – 4' Diameter - Installed** for the per Each Price of: _____do llars and _____cents ($_____)	EA	4	$_____ _	$_____ __
36	**Pre-Cast Concrete Manholes – 5' Diameter - Installed** for the per Each Price of: _____do llars and _____cents ($_____)	EA	1	$_____ _	$_____ __

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
37	**Pre-Cast Concrete Manholes – 6' Diameter - Installed** for the per Each Price of: _____do llars and _____cents ($_____)	EA	6	$_____ _	$_____ __
38	**Pre-Cast Concrete Manholes – 7' Diameter - Installed** for the per Each Price of: _____do llars and _____cents ($_____)	EA	1	$_____ _	$_____ __
39	**Pre-Cast Concrete Catch Basins – Single Type C and Type C-L - Installed** for the per Each Price of: _____do llars and _____cents ($_____)	EA	6	$_____ _	$_____ __
40	**Pre-Cast Concrete Catch Basins – Double Type C-L - Installed** for the per Each Price of: _____do llars and _____cents ($_____)	EA	4	$_____ _	$_____ __
41	**Hydrodynamic Separators Furnished and Installed** for the Lump Sum Price of: _____do llars and _____cents ($_____)	LS	1	$_____ _	$_____ __

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
42	**Green Armor System - Installed** for the Square Yard Price of: _____dollars and _____cents ($_____)	SY	7,500	$_____	$_____
43	**Fiber Filtration Tubes – Furnished and Installed** for the Linear Foot Price of: _____dollars and _____cents ($_____)	LF	1,500	$_____	$_____
44	**Hydroseeding with Flexible Growth Media - Installed** for the Square Yard Price of: _____dollars and _____cents ($_____)	SY	58,200	$_____	$_____
45	**Modified Riprap – Installation / Placement** for the Cubic Yard Price of: _____dollars and _____cents ($_____)	CY	1,000	$_____	$_____
46	**Soil Filled Modified Riprap – Installation / Placement** for the Cubic Yard Price of: _____dollars and _____cents ($_____)	CY	400	$_____	$_____

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
47	**Bioretention Basin Outlet Structures and Basin Construction - Installed** for the Lump Sum Price of: _____do llars and _____cents ($_____)	LS	1	$_____ _	$_____ __
48	**Landfill Gas Passive Vent Wells - Installed** for the per Each Price of: _____do llars and _____cents ($_____)	EA	5	$_____ _	$_____ __
49	**Overburden Groundwater Monitoring Wells - Installed** for the per Each Price of: _____do llars and _____cents ($_____)	EA	3	$_____ _	$_____ __
50	**Bedrock Groundwater Monitoring Wells - Installed** for the Price of: _____do llars and _____cents ($_____)	EA	3	$_____ _	$_____ __

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
51	**Maintenance of Temporary Sedimentation Basin During Construction -** for the Lump Sum Price of: _____dollars and _____cents ($_____)	LS	1	$_____	$_____
52	**Site Improvements -** for the Lump Sum Price of: _____dollars and _____cents ($_____)	LS	1	$_____	$_____
53	**Potential Hazardous / Regulated Waste Contingency - Allowance**	T & M	1	NA	$__10,000_____
LA-1	**New Utility Services**	LS	NA	$_____	$_____
LA-2	**New Concrete Three-Rail Fence**	LF	1,700	$_____	$_____
LA-3	**Steel Vehicle Gate**	EA	1	$_____	$_____

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
LA-4	**16' Light Duty Gate**	EA	3	$_____	$_____
LA-5	**Light Pole Foundation**	EA	7	$_____	$_____
LA-6	**Soil Mixture** **ADD Alternate No.1a**	LS	N/A	$_____	$_____
LA-7	**Planting Plan** **ADD Alternate No. 1b**	LS	N/A	$_____	$_____
LA-8	**Three-Rail Timber Fence** **Deduct Alternate No. 1**	LF	1,700	$_____	$_____
LA-9	**Temporary Irrigation System** **ADD Alternate No. 3**	LS	N/A	$_____	$_____
LA-10a	**5' Wide Asphalt Path – Rock Rimmon Road** **ADD Alternate No. 4**	LF	950	$_____	$_____

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total in Figures
LA-1b	**5' Wide Asphalt Path – Scofieldtown Road ADD Alternate No. 5**	LF	900	$_____	$_____
LA-10c	**5' Wide Asphalt Path – Access Road ADD Alternate No. 6**	LF	1,400	$_____	$_____
LA-11	**Improvements to Scofieldtown Park Entryway – ADD Alternate No.7**	LS	NA	$_____	$_____
SB1	**Demo Existing Salt Dome, Erect New Salt Barn Foundation & Superstructure ADD Alternate No.2**	LS	NA	$_____	$_____

Total Bid $_____

Total Bid (in words)_____

Company Name:_____

Address:_____

Telephone:_____

By Signature:_____

Title (Printed Name):_____

Project: Scofieldtown Yard And Park Landfill Closure

Minimum Rates and Classifications
for Heavy/Highway Construction

ID#: **H** 19411

Connecticut Department of Labor
Wage and Workplace Standards Division

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number:

Project Town: Stamford

FAP Number:

State Number:

Project: Scofieldtown Yard And Park Landfill Closure

CLASSIFICATION	Hourly Rate	Benefits
01) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters. **See Laborers Group 5 and 7**		
1) Boilermaker	33.79	34% + 8.96
1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	32.50	27.06
2) Carpenters, Piledrivermen	31.00	22.50

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2a) Diver Tenders	31.00	22.50
3) Divers	39.46	22.50
4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	44.25	17.75
4a) Painters: Brush and Roller	30.62	17.75
4b) Painters: Spray Only	33.62	17.75
4c) Painters: Steel Only	32.62	17.75
4d) Painters: Blast and Spray	33.62	17.75

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4e) Painters: Tanks, Tower and Swing	32.62	17.75
5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	50.75	39.65
6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete Erection	33.50	28.98
7) Plumbers (Trade License required: (P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) and Pipefitters (Including HVAC Work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4 G-1, G-2, G-8, G-9)	39.31	26.27
----LABORERS---- -		
8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	27.05	17.80
9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen, air tool operator	27.30	17.80

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10) Group 3: Pipelayers	27.55	17.80
11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block pavers and curb setters	27.55	17.80
12) Group 5: Toxic waste removal (non-mechanical systems)	29.05	17.80
13) Group 6: Blasters	28.80	17.80
Group 7: Asbestos Removal, non-mechanical systems (does not include leaded joint pipe)	28.05	17.80
Group 8: Traffic control signalmen	16.00	17.80

----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.----

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13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	31.28	17.80 + a
13b) Brakemen, Trackmen	30.37	17.80 + a
----CLEANING, CONCRETE AND CAULKING TUNNEL----		
14) Concrete Workers, Form Movers, and Strippers	30.37	17.80 + a
15) Form Erectors	30.68	17.80 + a
----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----		
16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers	30.37	17.80 + a

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17) Laborers Topside, Cage Tenders, Bellman	30.26	17.80 + a
18) Miners	31.28	17.80 + a
----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: ----		
18a) Blaster	37.41	17.80 + a
19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	37.22	17.80 + a
20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	35.35	17.80 + a
21) Mucking Machine Operator	37.97	17.80 + a

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----TRUCK DRIVERS----(*see note below)

Two axle trucks	28.33	19.14 + a
Three axle trucks; two axle ready mix	28.43	19.14 + a
Three axle ready mix	28.48	19.14 + a
Four axle trucks, heavy duty trailer (up to 40 tons)	28.53	19.14 + a
Four axle ready-mix	28.58	19.14 + a
Heavy duty trailer (40 tons and over)	28.78	19.14 + a

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Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids)	28.58	19.14 + a
----POWER EQUIPMENT OPERATORS----		
Group 1: Crane handling or erecting structural steel or stone, hoisting engineer (2 drums or over), front end loader (7 cubic yards or over), Work Boat 26 ft. & Over. (Trade License Required)	36.80	22.30 + a
Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 cubic yards; Piledriver ($3.00 premium when operator controls hammer); Bauer Drill/Caisson. (Trade License Required)	36.48	22.30 + a
Group 3: Excavator/Backhoe under 2 cubic yards; Cranes (under 100 ton rated capacity), Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar);Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.). (Trade License Required)	35.74	22.30 + a
Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper)	35.35	22.30 + a
Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" Mandrell)	34.76	22.30 + a

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Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	34.76	22.30 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	34.45	22.30 + a
Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and Under Mandrel).	34.11	22.30 + a
Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	33.71	22.30 + a
Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder).	33.28	22.30 + a
Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.	31.24	22.30 + a
Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment.	31.24	22.30 + a

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Group 12: Wellpoint Operator.	31.18	22.30 + a
Group 13: Compressor Battery Operator.	30.60	22.30 + a
Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	29.46	22.30 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	29.05	22.30 + a
Group 16: Maintenance Engineer/Oiler	28.40	22.30 + a
Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	32.71	22.30 + a
Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	30.29	22.30 + a

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**NOTE: SEE BELOW

----LINE CONSTRUCTION----(Railroad Construction and Maintenance)----

20) Lineman, Cable Splicer, Technician	44.30	6.5%+17.70
21) Heavy Equipment Operator	39.87	6.5%+15.83
22) Equipment Operator, Tractor Trailer Driver, Material Men	37.66	6.5%+15.40
23) Driver Groundmen	24.37	6.5%+10.04
23a) Truck Driver	33.23	6.5%+14.28

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----LINE CONSTRUCTION----

24) Driver Groundmen	30.92	6.5% + 9.70
25) Groundmen	22.67	6.5% + 6.20
26) Heavy Equipment Operators	37.10	6.5% + 10.70
27) Linemen, Cable Splicers, Dynamite Men	41.22	6.5% + 12.20
28) Material Men, Tractor Trailer Drivers, Equipment Operators	35.04	6.5% + 10.45

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Welders: Rate for craft to which welding is incidental.

**Note: Hazardous waste removal work receives additional $1.25 per hour for truck drivers.*

***Note: Hazardous waste premium $3.00 per hour over classified rate*

ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra $1.00 premium in addition to the hourly wage rate and benefit contributions:

1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)

2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson

3) Cranes (under 100 ton rated capacity)

Crane with 150 ft. boom (including jib) - $1.50 extra
Crane with 200 ft. boom (including jib) - $2.50 extra
Crane with 250 ft. boom (including jib) - $5.00 extra
Crane with 300 ft. boom (including jib) - $7.00 extra
Crane with 400 ft. boom (including jib) - $10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyperson instructing and supervising the work of each apprentice in a specific trade.

~~Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing state work ~~

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

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Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

As of: Tuesday, June 24, 2014

CITY OF STAMFORD
PROVISION FOR REQUIRED INSURANCE
Scofieldtown Yard & Park Landfill Capping Project

The Contractor shall affect and maintain commercial general liability, automobile liability, and workers' compensation and employer's liability insurance, which will protect the Contractor and the City of Stamford and their employees, agents and officers from claims arising out of personal injury, including death, and property damage as a result of the Contractor's operations, completed operations, and products liability. The Contractor will be required to submit certificates of insurance, which contain the minimum insurance coverages described below:

1. Standard workers' compensation, which complies with all Connecticut workers' compensation statutes and regulations.

2. Employer's liability insurance, which contains limits of liability of not less than $500,000 each accident, $500,000 disease policy limit and $500,000 disease – each employee.

3. Commercial general liability insurance, with a minimum limit of liability of $1,000,000 combined single limit per occurrence for bodily injury and property damage. Such coverage shall include the following:

   (a) Products liability and completed operations, which shall be maintained for a period of not less than three (3) years following completion of the services under this contract or termination of the contract, whichever is later.
   (b) Contractual liability insurance, which insures any indemnities contained in the contract between the Contractor and the City of Stamford.
   (c) Broad form property damage coverage;
   (d) X, C, U coverage;
   (e) An aggregate of not less than $2,000,000, which applies solely to this project;
   (f) City of Stamford and its employees, agents and officers designated as additional insureds;
   (g) Policy shall be underwritten on an occurrence basis, as opposed to claims made basis.

4. Comprehensive automobile liability insurance, which contains minimum limits of liability of $1,000,000 per accident, and contains, at a minimum, the following coverage provisions:

   (a) Coverage for all owned, non-owned and hired vehicles;
   (b) City of Stamford and its employees, agents and officers designated as additional insureds.

5. Umbrella (excess) liability insurance, which provides an additional $5,000,000 of liability insurance in excess of the commercial general liability, employer's liability and commercial automobile liability insurance. The umbrella (excess) liability insurance shall be at least as broad as the primary liability insurance.

6. Professional liability insurance, which contains a minimum limit of liability of $2,000,000 per claim and in the aggregate, and insures the services to be provided under the contract between the Contractor and the City of Stamford. This insurance shall contain the following:

    (a) If the insurance is underwritten on a claims made, as opposed to an occurrence basis, the retroactive date in the policy shall be the earlier of the effective date of the contract between the successful bidder and the City of Stamford or the date the successful Bidder begins services for the City. The policy shall also contain an extended reporting date of not less than three years following termination of the contract between the Contractor and the City of Stamford or conclusion of the services rendered by the contractor, whichever is later.

7. Builder's Risk Property Coverage – Builder's Risk – Special all-risk form including soft costs, delay in construction, coverage for new construction. Completed value, open perils including but not limited to perils of fire and extended coverage; vandalism and malicious mischief. City of Stamford cannot accept "reporting form" coverage. Limit of insurance must be equal to full value of the completed project. General Contractor will indemnify and hold the City of Stamford, and its employees, agents and officers harmless for any claims or losses they might otherwise incur as a result of damage during this construction project.

8. All insurance required hereunder shall contain waivers of subrogation in favor of the City of Stamford and its employees, agents and officers.

9. The Contractor shall provide certificates of insurance to the Risk Manager of the City of Stamford, which evidence the insurance required herein, including the endorsement form number for additional insured on products and completed operations.

10. Contractor shall include all subcontractors as insureds under its policies or shall furnish separate certificates and endorsements for each subcontractor. All coverages for subcontractors shall be subject to all of the requirements stated herein.

BID FORM

DATE: **BID No: S-6442**

TAX I.D. NO: _____

BIDDER: _____

ADDRESS: _____

_____

_____

PHONE NO: _____ FAX NO: _____

NOTE

THIS DOCUMENT, IN ORDER TO BE CONSIDERED A VALID BID, MUST BE SIGNED BY A PRINCIPAL, OFFICER OR OWNER OF THE BIDDING FIRM. SUCH SIGNATURE WILL ATTEST TO THE FACT THAT THE TERMS, CONDITIONS AND SPECIFICATIONS OF THIS BID HAVE BEEN READ, UNDERSTOOD AND ACCEPTED BY THE BIDDER.

BY: _____
(SIGNATURE)

_____
(PRINTED NAME)

TITLE: : _____

DATE: _____

BID DEPOSIT (IF APPLICABLE): _____