

**TOWN OF GUILFORD
 INVITATION TO BID
 BID #1-1819
 CALVIN LEETE ELEMENTARY SCHOOL
 SUBSURFACE SEWAGE DISPOSAL SYSTEM REPLACEMENT**

- I. Invitation to Bid (Legal Notice)**
- II. General Conditions & Instructions to Bidder**
- III. General Specifications**
- IV. Form Contract**
- V. Non-Collusion/Non-Conflict Affidavit (submit with bid)**
- VI. Affirmative Action Affidavit (submit with bid)**
- VII. Bid Proposal Form (submit with bid)**

REQUIREMENTS

- | | | |
|----|---|--|
| 1) | Certificate of Insurance | <u>X</u>
Yes, upon bid award |
| 2) | Bid Bond/Cashier's Check
(10% of base bid) | <u>X</u>
Yes (submit w/ bid) |
| 3) | Vendor References | <u>X</u>
Yes (submit w/ bid) |
| 4) | Required Submissions
Above | <u>X</u>
Yes (submit w/ bid) |

I.

**LEGAL NOTICE
TOWN OF GUILFORD
INVITATION TO BID #1-1819
CALVIN LEETE ELEMENTARY SCHOOL
SUBSURFACE SEWAGE DISPOSAL SYSTEM REPLACEMENT**

The Town of Guilford is seeking competitive bids for the Calvin Leete Elementary School Subsurface Sewage Disposal System Replacement. Sealed Bids are due on Wednesday, August 1, 2018 at 2:00 p.m. at the office of the First Selectman, on the second floor of Town Hall, 31 Park Street, Guilford, CT 06437 at which time they will be opened publicly. Bids received after this date and time will be rejected. Sealed Bid proposals should be labeled with bid number and bid title. Bid specifications may be obtained at the Office of the First Selectman or may accessed from the Town of Guilford's website at www.ci.guilford.ct.us and the Department of Administrative Services procurement website.

Any questions regarding the specifications may be directed, in writing only, to Mr. Clifford Gurnham, Director of Operations at gurnhamc@guilfordschools.org, with a copy to the Purchasing Department at millmanp@ci.guilford.ct.us.

A pre-bid conference will be held at the location of the Project at the Calvin Leete Elementary School, 280 South Union Street, Guilford, CT on Wednesday, July 25, 2018 at 10:00 a.m.

Each bidder will be required to submit to the Office of the First Selectman, their original proposal with one (1) copy, one (1) electronic copy, and a bid bond or cashier's check in the amount of ten percent (10%) of the base bid. Each bidder shall honor the bid price for ninety (90) business days from the date of the bid opening, without modification. Upon award of the bid, the winning bidder shall be bound by the bid proposal price throughout the contract period.

The Town of Guilford reserves the right to reject any or all bids; or to waive defects in same, if it deems such to be in the best interest of the Town. The Town of Guilford is an affirmative action, equal opportunity employer.

Matthew T. Hoey III
First Selectman

Publish one time only in the New Haven Register under LEGAL NOTICES on Monday July 16, 2018.

II.

GENERAL CONDITIONS AND INSTRUCTIONS TO BIDDERS

The general rules and conditions outlined below apply to all purchases authorized by the Town of Guilford. The conditions outlined become a formal part of each Invitation to Bid unless otherwise specified. All Bidders are expected to fully inform themselves as to the conditions, requirements and specifications before submitting bids. Failure to do so will be at the Bidder's own risk.

The terms and conditions outlined in the Invitation to Bid become part of the formal contract following award, unless specified otherwise.

1. BIDDING PROCEDURE

- 1.1 Bidder shall submit two (2) complete sets of the bid documents and all supporting material, unless otherwise stated in the Invitation to Bid. All appropriate blanks shall be completed. The signer of the bid shall initial any interlineations, alteration or erasure on the specification document. Bidders shall not change the Proposal Form nor make additional stipulations on the specifications document.
- 1.2 Bid prices shall be submitted on the Proposal Form included in the bid document.
- 1.3 The Base Bid is the sum stated in the bid for which the Bidder offers to perform the work or provide merchandise or equipment described in the bid package as the base, to which work or materials may be added or from which work or materials may be deleted from sums stated in alternate bids.
- 1.4 Conditional bids are subject to rejection in whole or in part. A conditional bid is defined as one which limits or modifies any of the terms and conditions and/or specifications of the Invitation to Bid.
- 1.5 Alternate bids will not be considered unless specifically requested in the original bid package. An alternate bid is defined as one which is submitted in addition to the Bidder's Base Bid set forth in the Invitation to Bid. Town shall have the right to accept alternates in any order or combination, unless otherwise specifically provided in the bid documents, and to determine the low Bidder on the basis of the sum of the Base Bid and alternates accepted.
- 1.6 Unit prices will not be considered unless specifically requested in the original bid package. Unit price is defined as an amount proposed by Bidders, stated on the Proposal Form, as a price per unit of measurement for material or services added to or deducted from the base bid by appropriate modification, if estimated quantities of work required by the contract documents are increased or decreased.
- 1.7 Each bid must be legible (no pencil), include the full name, business and e-mail address, and telephone number of the Bidder and be signed in ink by the Bidder.
- 1.8 A bid by a firm or organization other than a corporation must include the name and address of each member.
- 1.9 A duly authorized representative of a Bidder entity must sign the bid and any applicable bond(s) in the name of such entity. Such representative must attest that he/she is duly authorized to bind such entity or submit a corporate resolution or limited liability/partnership consent evidencing such authority.

- 1.10 Bids received after the time and date established for receiving bids will be rejected.
- 1.11 At bid opening all bids are publicly opened and received. The bids will be considered unverified and subject to further review for acceptance/disqualification. The Town shall prepare a bid summary by the Town of Guilford, which summary shall be available to all Bidders upon the request.
- 1.12 Estimated quantities may be listed as part of a bid package in order to assist Bidders, but Bidders are reminded that actual quantities ordered may vary from figures listed and the Town will not be held liable for any difference. On “as required” bids, acceptance of this bid will bind the Town to pay for, at unit price only, quantities ordered and delivered. The Town will not be required to accept delivery of any balances unordered as of the contract expiration date.
- 1.13 Bidders shall submit catalogues, descriptive literature and detailed drawings, fully detailing features, designs and construction necessary to fully describe the material or work proposed in the bid.

2. BIDDER’S SECURITY

- 2.1 Bid Security, as a guarantee of good faith, in the amount of ten percent (10%) of the base bid and in the form of a certified check, cashier’s check, or Bidder’s bond, shall be required to be submitted with the bid package for all bids.
- 2.2 Such bid security will be returned to the unsuccessful Bidders when the award of bid is made.
- 2.3 Bid security will be returned to the successful Bidder as follows:
 - 2.3.1 For bids with specified quantities for which the awarded bid package and delivery of award notice constitute the contract; upon the delivery of all equipment or merchandise (and/or performance of services, if applicable), and upon final acceptance by the Town.
 - 2.3.2 For all other contracts; upon receipt by the Town of the executed contract and applicable bonds, if any.
- 2.4 Town shall have the right to retain the bid security of Bidders to whom an award is being considered until either:
 - 2.4.1 A contract has been executed and bonds have been furnished.
 - 2.4.2 The specified time has elapsed so that the bids may be withdrawn.
 - 2.4.3 All bids have been rejected.
- 2.5 Bid security will be forfeited to the Town as full liquidated damages, but not as a penalty, for any of the following reasons:
 - 2.5.1 If the Bidder fails to deliver the equipment or merchandise in full compliance with the accepted proposal and specifications.
 - 2.5.2 If the Bidder fails or refuses to enter into a contract on forms provided by the Town, and/or if the Bidder fails to provide sufficient bonds or insurance within applicable time periods set forth in the bid package.
- 2.6 The surety company executing the bond must be licensed to do business in the state, or the bond must be countersigned by a company so licensed. The bond must be signed by an official of the surety company and corporate seal must be affixed over his/her signature. Signatures of two witnesses for both the principal and surety must appear on the bond, as required by law. A power of attorney for the official signing the bond for the surety company must be submitted with the bond.

3. CLARIFICATION OF SPECIFICATIONS/ADDENDA

- 3.1 Bidders shall promptly notify the Purchasing Manager of any ambiguity, inconsistency or error, which they may discover upon examination of the specification documents.
- 3.2 Bidders desiring clarification or interpretation of the specification documents shall make a written request which must reach the Purchasing Department by **Friday July 27, 2018 at noon**. Failure to request a clarification or interpretation within said time frame shall be deemed a waiver of the right to assert these issues and claims in the future.
- 3.3 Interpretations, corrections and changes made to the specification documents will be made by written addenda.
- 3.4 Oral interpretations or changes to the specifications documents made in any other manner, will not be binding on the Town and Bidders will not rely upon such interpretations or changes.
- 3.5 Addenda are written instruments issued by the Town prior to the bid opening date, which modify or interpret the specification document by addition, deletion, clarification or correction.
- 3.6 It is the Bidder's responsibility to check for addenda prior to submitting proposals.
- 3.7 Copies of addenda will be made available for inspection at the office of the Purchasing Department, which is located in the First Selectman's office.
- 3.8 No addenda will be issued later than forty-eight (48) hours prior to the bid opening date, except addenda withdrawing the Invitation to bid or addenda which includes postponement of the bid.
- 3.9 Bidders shall ascertain prior to submitting their bid that they have received all addenda issued, and they shall acknowledge receipt of addenda on the Proposal Form. It is the sole responsibility of the Bidders to monitor the Town website and DAS, if applicable to determine if addendums have issued.

4. BIDDER REPRESENTATION

- 4.1 Each Bidder by signing and submitting a bid, represents that the Bidder has read and understands the specifications documents and all addendums, and the bid has been made in accordance therewith.
- 4.2 Each Bidder for services further represents that the Bidder has visited the site and has become familiar with and is satisfied as to the general, local and site conditions that may affect cost, progress, performance, furnishing and completion of the services. Bidder acknowledges that it is solely responsible for investigating and satisfying itself as to all actual and existing site conditions.
- 4.3 Bidder recognizes and agrees that the Town is subject to the Freedom of Information Act of the Connecticut General Statutes and, as such, any information contained in or submitted with or in connection with Bidder's bid is subject to disclosure if required by law or otherwise. Bidder expressly waives any claims that Bidder or any of its successors and/or assigns has or may have against the Town or any of its directors, officers, employees or authorized agents as a result of any such disclosure.
- 4.4 Bidder recognizes and agrees that the Town shall have the right to inspect and audit the records of the Contractor as they pertain to this bid.

5. SUBSTITUTIONS

- 5.1 Wherever in the specifications or Bid Proposal form brand names, manufacturer, trade name, or catalog numbers are specified, it is for the purpose of establishing standard of required function, dimension, appearance and quality to be met by any proposed substitution.
- 5.2 No substitution will be considered prior to receipt of bids unless written request for approval has been received by Town at least by the date and time set forth in Section 3.2. It is the Bidder's responsibility to identify any alternate items offered in the bid, and prove to the satisfaction of the Town that said item is equal to, or better than, the product specified. Bidder shall identify the manufacturer and brand name of each proposed alternate, plus a complete description of the alternate items including illustrations, performance test data and any other information necessary for an evaluation. The Bidder must indicate any variances by item number from the specification document. Bidder must fully explain the variances from the specification document, since brochure information may not be sufficient. Town reserves the right to approve as an equal or to reject as not being equal any article the Bidder proposes to furnish which contains major or minor variations from the specifications requirements. Any deviation from the Town's specifications not previously submitted as required by the above will be grounds for rejection of the material and/or equipment.

6. SAMPLES

- 6.1 When samples are required from Bidders, the samples may be retained by the Town of Guilford until the delivery of contracted items by the awarded Bidder and with respect to the rejected Bidders, upon notification of such rejection. Bidders shall be responsible for delivery and removal of samples, at Bidders' sole cost. All samples are to be marked samples and delivered to Guilford. The package must indicate the name of the Bidder, item enclosed and bid number. Failure to adequately identify samples as indicated may be considered sufficient grounds for rejection of the bid.

7. BID AWARD

- 7.1 The signed bid proposal shall be considered an offer on the part of the Bidder. Such offer shall be deemed accepted upon receipt of proper Town authorization from the Board of Selectmen, and delivery by the Town of a notice of award letter to the winning bidder, or if applicable, execution by the Town and Bidder of a separate contract, in the form included in the bid package, or if not included in the bid package, in a form mutually acceptable to both parties. In either case, the terms and provisions of the Town's Invitation to Bid shall be deemed incorporated into the contract. *Notwithstanding anything to the contrary stated herein, the contract shall be deemed executory only to the extent of appropriation available to each agency for the purchase of such articles/services. The Town's extended obligation on those contracts which envision extended funding, through successive fiscal periods shall be contingent upon actual appropriations for the following year. In the event that funding is not available at the time of award and/or execution of the contract and/or if the Town budget is approved for the*

fiscal year in which the contract is to be performed after contract execution or time of award but prior to the performance of the contract, the Town reserves the right to cancel the contract.

- 7.2 Contracts shall be executed by the Bidder and delivered to the Town for counter-execution within five (5) business days of Town's delivery of final contracts for execution. By submitting a bid, bidder expressly agrees that it will execute the final contract provided by the Town within five (5) business days of notice of award. If Bidder fails to execute the contract provided by the Town within the aforementioned time period, the Town may reject the bid and award to the next most responsible responsive bidder.
- 7.3 No bid shall be modified or withdrawn for a period of ninety (90) calendar days after the time and date established for receiving bids, and each Bidder so agrees in submitting the bid. Upon award of the bid, the winning bidder shall be bound by the bid proposal price throughout the contract period.
- 7.4 If two or more Bidders submit identical bids and are equally qualified, the decision of the Town to make award to one or more of such Bidders shall be final. Selection shall be made by drawing lots in public, unless one of the bidders is a resident bidder, in which case preference shall be given to the resident bidder.
- 7.5 The contract will be awarded to the lowest responsive, qualified and responsible Bidder complying with all the provisions of the invitation, provided the bid price is reasonable and in the best interest of the Town of Guilford to accept it. The Town reserves the right to reject any or all bids. The Town specifically reserves the right to reject the low Bidder.

In determining responsibility the following qualifications in addition to price will be considered.

- a. Compliance to the specifications, and the terms, conditions and instructions of the bid documents/quote request.
- b. The ability and capacity of the Bidder to perform the work or provide the services required.
- c. The character, integrity, reputation and experience of the Bidder
- d. The quality and satisfaction of any previous work or services performed for the Town.
- e. The financial resources available to provide the insurance and bond requirements of the bid.
- f. The number and scope of any conditions or exceptions included in the bid or quote.
- g. The quality, availability and adaptability of the supplies or contractual services to the particular use required.

h. The ability of the Bidder to provide future maintenance and service for the use of the subject of the contract, if applicable.

7.6 The Town reserves the right to reject all bids or any part of a bid or to waive defects in bids if to do so is deemed to be in the best interest of the Town. The Town reserves the right to waive irregularities and technicalities in bids, such as shall best service the requirement and interest of the Town.

8. TERMS OF PAYMENT

8.1 Prepayment discounts for early payment are preferred. All others to be Net 30 days unless otherwise specified.

8.2 The Town is exempt from state and local taxes.

8.3 A contract shall be deemed executory only to the extent of appropriation available to each agency for the purchase of such articles. The Town's extended obligation on these contracts which envision extended funding, through successive fiscal periods shall be contingent upon actual appropriations for the following year

9. PERFORMANCE/LABOR AND MATERIALS PAYMENT BOND

9.1 The successful Bidder shall supply an original performance bond and labor and materials payment bond in the amount of 100% of the total awarded bid amount within five (5) business days of the award notification. The provisions of Section 2.6 above shall apply to the bonds required by this Section 9.1. The bonds shall remain in effect for one year from the date of delivery of the bonds to the Town. Should the Town elect to renew the terms of the accepted proposal, if applicable, then the bonds shall be extended for the period of such renewal period and the performance bond shall be increased to the full amount of the revised contract price, if applicable.

10. INSURANCE REQUIREMENTS

10.1 The successful Bidder shall, at its own expense and cost, obtain and keep in force during the duration of the work/project the insurance set forth below covering the Bidder and its agents, employees and subcontractors and other providers of services and shall name the Town of Guilford and Guilford Board of Education and its employees and agents as "Additional Insureds" on a primary and non-contributory basis to the Bidder's Commercial General Liability and Automobile Liability Certificate of Insurance.

10.2 Insurance shall be written with Carriers approved in the State of Connecticut and with a minimum Best's Rating of A-. In addition, all Carriers are subject to approval by the Town of Guilford.

10.3 The Town reserves the right to require additional coverages than those listed below, including, without limitation, Builder's Risk insurance for construction projects and Owner's Protective Liability, if desirable.

10.4 The required coverages are as follows:

- a. **Worker's Compensation Insurance:** (i) statutory coverage, (ii) employer's liability; (iii) \$500,000 each accident/ \$500,000 disease-policy limit/\$500,000 disease each employee (Coverage is to be extended for USL&H benefits and include coverage for Jones Act where work is adjacent to or on the water); and (iv) waiver of subrogation shall be provided.
- b. **Commercial General Liability:** (on an occurrence basis): (i) including premises & operations, products and completed operations, personal and advertising injury, contractual liability and independent contractors, (ii) limits of liability for bodily injury and property damage each occurrence \$2,000,000, aggregate \$3,000,000 (to be applied separately to each job), and (iii) waiver of subrogation shall be provided.
- c. **Automobile Insurance:** (i) including all owned, hired, borrowed and non-owned vehicles; (ii) limit of liability for bodily injury and property damage per accident \$1,000,000; and (iii) waiver of subrogation shall be provided.
- d. **Excess Liability Coverage (Umbrella):** With respect to the coverage provided by firm for this Project, excess liability insurance will be provided in an amount not less than Two Million Dollars (\$2,000,000.00) per occurrence and annual aggregate basis.

The Bidder shall provide a Certificate of Insurance to the Town within five (5) business days after receipt of notice of award. The Certificate shall specify that the Town of Guilford and Board of Education shall receive thirty (30) days advance written notice of cancellation or non-renewal. The Certificate shall evidence all required coverage including the *Additional Insured and Waiver of Subrogation*. Notwithstanding the forgoing, in the event that any State laws or regulations require additional coverage and/or higher coverage amounts, State laws and regulations shall control.

11. WARRANTIES AND MAINTENANCE

- 11.1 Copies of manufacturer's warranties and maintenance policies and associated costs shall accompany the bid proposal for items being bid.
- 11.2 At a minimum the Bidder shall warrant that any defective components discovered within a one year period after the date of installation/delivery shall be replaced at no expense to the Town, unless otherwise specified. Bidder shall pay the cost of all shipping with regard to such defective parts (both return and purchase of replacement parts.)

12. INDEMNIFICATION

- 12.1 The Bidder shall indemnify, defend and hold harmless the Town, its agents and employees from and against all claims, damages, losses and expenses, including attorney's fees arising out of, in whole or in part, the performance of the contract, or any negligent or willful act or omission of the Bidder, its subcontractors, employees or agents, including, without limitation, claims, damages, loss and expense attributable to

bodily injury, sickness, disease or death or injury to or destruction of tangible property, including the loss of use resulting there from or attributable to any type of pollution and/or environmental impairment or release into or upon land, the atmosphere, or any course or body of water that is above or below ground. The indemnification obligation under 12.1 shall not be limited in anyway by any limitation of the amount or type of damages, compensation or benefits payable by or for the Bidder, its subcontractors, agents or employees under worker's compensation, disability benefit acts or other employee benefit acts. This indemnity shall survive the expiration or early termination of the contract.

13. MISCELLANEOUS CONTRACT TERMS

- 13.1 **Delivery.** TIME IS OF THE ESSENCE with regard to the performance of the Work and the Contract. Strict compliance with and adherence to the schedule for the Work and the Contract. All bids shall be based upon inside delivery of the equipment or merchandise F.O.B. at the location specified by the Town. The Town reserves the right to cancel orders or any part thereof, without obligation, if delivery is not made within the time(s) specified on the proposal form. Such failure to deliver shall authorize the Town to purchase replacement articles of comparable grade from third party supplier(s). On all such purchases, Bidder shall reimburse the Town, within a reasonable time as specified by the Town, for any expenses incurred in excess of contract prices or the Town may deduct such amount from amounts owed the defaulting contractor. Such substitute purchases shall be deducted from contract quantities. If in the best interest of the Town, the Town reserves the right to use or consume articles delivered which are substandard in quality, subject to an adjustment in price to be determined by the Town.
- 13.2 **Termination of Contract.** Contracts shall remain in force for the period within which the Bidder must perform as set forth in the proposal, unless (i) there have been satisfactory deliveries prior to expiration; or (ii) an extension has been agreed upon as evidenced by a contract extension executed by Bidder and the Town.
- 13.3 **Assignment.** Bidder shall not assign, transfer or subcontract this contract or its obligations hereunder without the prior written consent of the Town, which consent may be withheld in the Town's sole discretion.
- 13.4 **Default.** The contract may be terminated by the Town by written notice of default to the contractor upon non-performance or breach of the contract terms. The awarded Bidder shall be obligated to pay the Town for all losses, damages, costs and expenses, including the cost of re-procurement, and attorney's fees incurred defending claims arising from such default and in seeking recovery of all such costs and expenses from Bidder and/or its surety. Upon a termination for cause, the Town shall have no further obligation to issue payments to the Contractor until resolution of the dispute.
- 13.5 **Conflict.** To the extent any of the contract terms set forth in sections 13.1 through 13.4 conflict with the terms of the form Contract entered into by the parties, the Contract terms shall control.

14. COMPLIANCE WITH LAWS

14.1 The Bidder shall comply with all federal, state and local laws and regulation and shall procure all necessary license and permits, pay all charges and fees and give all notice necessary and incident to the due and lawful performance of the contract and bid process. Such laws shall include, without limitation, the following:

- a. **Non-Discrimination and Affirmative Action.** Contractor, in performing under this contract, shall not discriminate against any worker, employee or applicant, or any member of the public, because of race, creed, color, age, marital status, sexual orientation, national origin, ancestry, sex, mental retardation or physical disability, including but not limited to blindness, unless it is shown by the contractor that such disability prevents performance of the work involved in any manner prohibited by the laws of the United States or the State of Connecticut, nor otherwise commit an unfair employment practice. Contractor further agrees that this article, (and any additional provisions required by law), will be incorporated by contractor in all contracts entered into with suppliers of materials or services contractors and sub-contractors and all labor organizations, furnishing skilled, unskilled and craft union skilled labor or who may perform any such labor or services in connection with this contract. The following principles and requirements of Equal Opportunity and Affirmative Action, as incorporated herein, will be incorporated into "Equal Opportunity - Non-Discrimination Clause" are hereby deemed to be included in all Town bid documents, purchase orders, lease and contracts entered into with the Town. The principles of Affirmative Action are addressed in the 13th, 14th and 15th Amendments of the United States Constitution, Civil Rights Act of 1964, Equal Pay Act of 1963, Title VI and VII of the 1964 United States Civil Rights Act, Presidential Executive Orders 11246, 11375, 11478 (nondiscrimination under federal contracts), Act 1, Section 1 and 20 of the Connecticut Constitution, Governor Grasso's Executive Order Number 11, Governor O'Neill's Executive Order Number 9, the Connecticut Fair Employment Practices Law (Sec. 46a-60-69) of the Connecticut General Statutes (CGS), Connecticut Code of Fair Practices (46a-70-81), Deprivation of Civil Rights (46a-58 (a)(d)), Public Accommodations Law (46a-63-64), Discrimination against Criminal Offenders (46a-80), definition of blind (46a-51(1)), definition of Physically Disabled (46a-51 (15)), definition of Mentally Retarded (46a-51-13), cooperation with the Commission on Human Rights and Opportunities (46a-77), Sexual Harassment (46a-60 (a)-8), Connecticut Credit Discrimination Law (360436 through 439), Title 1 of the State and the Local Fiscal Assistance Act 1 1972.

If a project is funded in whole or in part by State funds, CGS Sections 46a-68c through 46a-68k apply to contractors. These Sections trigger affirmative action plan requirements for contractors and the filing of compliance reports with the State by contractors.

- b. **Executive Orders.** The contract may be subject to the provisions of Executive Order No. Three of Governor Thomas J. Meskill, promulgate June 16, 1971, concerning labor employment practices, Executive Order No. Seventeen of

Governor Thomas J. Meskill, promulgate February 15, 1973, concerning the listing of employment opening and Executive Order No. Sixteen of Governor John G. Rowland promulgated August 4, 1999, concerning violence in the workplace, all of which are incorporated into and are made a part of the contract as if they had been fully set forth in it. The contract may also be subject to Executive Order No. 7C of Governor M. Jodi Rell, promulgated July 13, 2006, concerning contracting reforms and Executive Order No. 14 of Governor M. Jodi Rell, promulgate April 17, 2006, concerning procurement of cleaning products and services, in accordance with their respective terms and conditions.

- c. **Connecticut's Prevailing Wage Law Provision.** If applicable, the contractor must be in full compliance with CGS Section 31-53 and 31-53(a) which applies to each contract for the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration, or repair of any public works project by the state or its agents, or by any political subdivision of the State, CGS Section 31-53 (g) provides monetary thresholds which must be met before the law is applicable. In accordance with CGS Section 31-53, projects are subject to the payment of minimum prevailing wages where the total cost of all work to be performed by all contractors and subcontractors in connection with new construction of any public works project is **\$1,000,000** or more and where the total cost of all work to be performed by all contractors and subcontractors in connection with any remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project is **\$100,000** or more. For qualifying projects, all contractors and subcontractors shall submit to the Finance Department certified weekly payrolls for all contracts meeting the stated monetary limits. The certified payrolls shall be submitted to the Finance Department with the contractor's monthly certificate for payment. The contractor should familiarize themselves with all aspects of the provisions under state law in order to ensure full compliance.
- d. **Occupational Safety and Health Administration Requirements.** According to CGS, Section 31-53b (a) each contract entered into on or after July 1, 2007, for the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public building project by the state or any of its agents, or by a political subdivision of the state or any of its agents, where the total cost of all work to be performed by all contractors and subcontractors in connection with the contract is at least **\$100,000** shall contain a provision requiring that, not later than thirty days after the date such contract is awarded, each contractor furnish proof to the Labor Commissioner that all employees performing manual labor on or in such public building , pursuant to such contract, have completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, in the case of telecommunications employees, have completed at least ten hours of training in accordance with 29 CFR 1910.268. The aforesaid provisions shall be deemed to be incorporated into the Contract with the Town. The contractors should familiarize themselves with all aspects of state law and any applicable regulations pertaining to these requirements in order to ensure full compliance.

- e. **Payment Bond/Performance Bond State Law Requirements.** CGS Section 49-41, known as the Little Miller Act, requires that the Town ensure that payment bonds a/k/a labor and materials bond in the amount of the contract are provided for public works projects over **\$100,000**. When a contract for construction, alteration, remodeling, repair or demolition of any public building is estimated to cost more than **\$500,000** additional laws/requirements apply. The contractors should familiarize themselves with all aspects of state law and any applicable regulations pertaining to these requirements in order to ensure full compliance.
- f. **State of Connecticut Contractor Prequalification Program.** CGS Section 4b-91 requires all bidders for the construction, alteration, remodeling, repair or demolition of any public building or any other public work by a public agency (includes a municipality) that is paid for, in whole or in part, with state funds and that is estimated to cost more than **\$500,000**, except a public highway or bridge project or any other construction project administered by DOT, shall be prequalified with the State pursuant to CGS Section 4a-100. Once a contractor is prequalified, it is issued a prequalification certificate by DAS, which certificate is in effect for one year. Subcontractors' work, the cost of which may exceed **\$500,000**, are also required to be prequalified. Any bid for a project that requires prequalification must include a copy of the bidder's Prequalification Certificate showing the aggregate work capacity rating required under the contract and the Update (Bid) Statement showing renewal of certificate and/or change in aggregate work capacity. Bids which do not include a copy of the Prequalification Certificate and the Update (Bid) Statement are invalid. Contractors should contact the State Department of Administrative Services to familiarize themselves with these requirements.
- g. **Non-Resident Contractor 5% Tax For Contracts.** CGS Section 12-430(7) requires non-resident contractors who perform services or furnish materials, or both, for the construction, alteration or improvement of any project in which the contract price is at least **\$250,000**, to furnish the Department of Revenue Services (DRS) a Guarantee Bond for 5% of the total cost of the work, issued under a contract using Form AU-766, Guarantee Bond. This form is available on the State DRS website. Form AU-766 must be submitted for each additional change order or supplement issued against the contract. Non-resident contractors must have completed and submitted to the DRS Form REG-1, Business Tax Registration Application, to register with the DRS and have been issued a Connecticut Tax Registration Number. This form is available on the DRS website. Non-resident contractors have 120 days from the commencement of the contract to file the Guarantee Bond with the State. Commencement of the contract, as defined by law, "means the time when the non-resident contractor signs the contract, but, in any event, occurs no later than when the work under the contract actually starts." As soon as the guarantee bond is filed with the DRS, the non-resident contractor shall submit the copy of such Guarantee Bond together with the non-resident contractor's Connecticut Tax Registration Number to the Town department for whom the project is required. After the non-resident

contractor receives its Certificate of Compliance from the DRS confirming that the Guarantee Bond requirement has been met, the non-resident contractor shall submit a copy of the same to the department, for whom the work is being performed, with a copy to the Purchasing Department.

h. **Equal Employment Opportunity (EEO); Minority Business Enterprises (MBE)**

If a project is funded in whole or in part by state or federal funds, there may be a requirement that the contractor comply with CGS Section 4a-60 and applicable State regulations. On these projects it will depend upon which set-aside requirements are imposed by the funding agency. If no set-aside requirement is imposed, a statement that the contractor is required to undertake good faith efforts to include subcontractors and suppliers who are minority business enterprises will suffice and shall be deemed to be incorporated into the Contract with the Town. If there is a set-aside goal, the Town and contractor shall comply with the Small Contractors Set-Aside Program and the hiring goals identified by the State Commission on Human Rights and Opportunities (CHRO.)

III.

GENERAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS

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- 33 34 51 Subsurface Sewage Disposal System

SECTION 01 00 00 – SPECIFICATION FORMAT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The purpose of this section is to describe the format in which the Specifications are presented.

1.02 GENERAL FORMAT

- A. The Specifications are presented generally in accordance with the Construction Specifications Institute MasterFormat® publication.
- B. Most technical and construction related requirements are specified in the technical sections which are grouped by the Construction Specifications Institute into major divisions according to trade or type of Work. All major divisions may not be used in this Contract.
- C. Technical sections are arranged in numerical order. Page numbering is subordinate to each Section.
- D. Most sections are generally presented in three parts:

PART 1 – GENERAL

PART 2 – PRODUCTS

PART 3 – EXECUTION

All three parts may not be used in all sections and in some cases the title of some parts is other than the three standard titles given above.

- E. Paragraph designations are subordinate to each part.

1.03 EXPLANATIONS

- A. Descriptions: Many technical sections begin with a paragraph entitled “SCOPE OF WORK” or similar wording. In such paragraphs, a brief description of the Work generally specified in that section is presented.
- B. Related Work Specified Elsewhere: Some technical sections include a paragraph which lists some of the related work specified elsewhere in the Contract Documents. Such listings are presented as an aid to the Contractor in locating some of the other Specification sections wherein Work is specified that has a close relationship to the Work specified in that section.

SECTION 01 00 00 – SPECIFICATION FORMAT

1.04 STANDARD SPECIFICATIONS

- A. The Contractor’s attention is directed to the use of the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges, Facilities and Incidental Construction Form 817, 2016, latest revision, and all supplements thereto in the Specifications for this Project.
- B. Only the Division II Construction Details and Division III Materials Section shall apply to the Specifications for this Project.

Within the above referenced portions of the Standard Specifications, wherein the following terms are used, they shall mean respectively:

Owner: The Town of Guilford, Connecticut

Engineer: Design Earth Technology

Inspector: Inspector designated by the Owner

Laboratory: Laboratory designated by the Owner

PART 2 - PRODUCTS

NONE

PART 3 - EXECUTION

NONE

END OF SECTION

SECTION 01 11 00 – SUMMARY OF WORK

PART 1 - GENERAL

1.01 DESCRIPTION

A. The purpose of the section is to generally describe the Work included in the Contract.

1.02 PROJECT SCOPE

A. Project Description: The construction of the Calvin Leete Elementary School Subsurface Sewage Disposal System Replacement Project including:

1. Installation of erosion and sediment controls including temporary construction entrance.
2. Installation of construction safety fencing.
3. Removal of turfgrass sod layer.
4. Removal and stockpiling of topsoil.
5. Removal of existing distribution chamber and effluent sewer.
6. Installation of septic tank and distribution box vault.
7. Installation of sanitary piping.
8. Installation of leaching field.
9. Backfilling and grading.
10. Pavement removal and pavement installation.
11. Installation of topsoil.
12. Seeding and turfgrass establishment.
13. Removal of temporary erosion and sediment controls.

B. In addition, the Work under the Contract includes:

1. Work outside the Site as described in the Contract Documents and as required for the performance of the Work.
2. The provision and removal of temporary facilities.

SECTION 01 11 00 – SUMMARY OF WORK

- 3. Restoration of existing conditions as required.

1.03 PERMITS AND FEES

- A. The Contractor shall obtain, secure, and schedule all permits and inspections necessary for the proper execution of the Work. Permit fees shall be waived by the Town of Guilford.
- B. The Contractor shall comply with the conditions, if any, of the Permit to Construct and the Permit to Discharge issued by the Town of Guilford Health Department.

1.04 TIME OF COMPLETION

- A. In accordance with the General Conditions, the Work shall be commenced at the time stated in the Notice to Proceed and shall be substantially complete and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

PART 2 - PRODUCTS

NONE

PART 3 - EXECUTION

NONE

END OF SECTION

SECTION 01 31 19 – PROJECT MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. The purpose of the section is to describe the requirements for Project meetings.

1.02 PROJECT MEETINGS

A. Preconstruction Conferences: Conduct a preconstruction conference prior to beginning Work on the Site. Require all major Subcontractors and suppliers to attend. In general, the meeting shall cover the following subjects:

1. Creation of project team directory listing contact person for each organization.
2. Issuance of Contract Documents.
3. Review of project constraints and work hours.
4. Unloading policies, storage locations, temporary office locations, and temporary facilities.
5. First aid, safety, and security procedures.
6. Cleaning, housekeeping, and waste removal.
7. Change Order requirements.
8. Progress payment requirements.
9. Submittal requirements, schedules, and procedures.
10. Record document requirements and procedures.
11. Other subjects as determined by the Contractor, Owner, and Engineer.

B. Regular Progress Meetings: Conduct progress meetings to aid in coordination and planning of the Work and to create a forum to resolve coordination and scheduling problems and conflicts. Progress meetings shall be held as required at the Site. Special progress meetings may be called at any time by the Owner or Engineer and shall be attended by the Contractor and any required Subcontractors.

C. Chairperson and Minutes: The Engineer will chair the meetings and will prepare written meeting minutes.

SECTION 01 31 19 – PROJECT MEETINGS

- D. The Contractor shall require representatives of all major Subcontractors and suppliers to attend each progress meeting as required.
- E. Progress Meeting Agenda: Progress meetings shall have at least the following agenda:
1. Review and approval of minutes and record of previous meeting.
 2. Review progress of the Work, schedule, and status of submittals.
 3. Identify problems that impede planned progress.
 4. Develop corrective measures and procedures to maintain planned schedule.
 5. Review apparent conflicts and other problems and develop corrective measures.
 6. Review of payment applications.
 7. Pre-installation discussions regarding specific project items.
 8. Other current business.

PART 2 - PRODUCTS

NONE

PART 3 - EXECUTION

NONE

END OF SECTION

SECTION 01 33 00 – SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Consult the individual sections of the Specifications for the specific submittals required under those sections and for further details and descriptions of the requirements.

1.02 GENERAL PROCEDURES FOR SUBMITTALS

- A. It is anticipated that the submittal process shall begin immediately following the award of the Contract.
- B. **Timeliness:** The Contractor shall transmit each submittal to the Engineer at least five (5) days in advance of performing related Work or other applicable activities so that the installation will not be delayed by processing times, including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery, and similar sequenced activities. No extension of time will be authorized because of the Contractors failure to transmit submittals to the Engineer in advance of Work.
- C. **Sequence:** The Contractor shall transmit each submittal in a sequence which will not result in approval having to be later modified or rescinded by reason of subsequent submittals which should have been processed earlier or concurrently for coordination.
- D. **Contractors Review and Approval:** Only submittals received from and bearing the stamp of approval of the Contractor will be considered for review by the Engineer. Submittals shall be accompanied by a transmittal notice stating the name of the Project, date of submittal, To or From, Specification Section or Drawing number to which the submittal refers, purpose (first submittal, re-submittal), description, remarks, distribution record, and signature of transmitter.
- E. Any reference to a specific type or manufacturer in these Specifications is for identification purposes only. Equivalent products will be considered. In the event that samples or Specifications on equivalent products are required, it will be at the Contractors expense.
- F. **Or-Equivalents:** On the transmittal, or on a separate sheet attached to the transmittal, the Contractor shall direct attention to any deviations including minor limitations and variations from the Contract Documents.
- G. The Contractor and Subcontractors shall submit to the Engineer for consideration of any or-equivalent substitution, a written point by point comparison containing the name and full particulars of the proposed product or product named or described in the Contract Documents.

SECTION 01 33 00 – SUBMITTAL PROCEDURES

- H. Such submittal shall in no event be made later than five (5) calendar days prior to the incorporation of the item into the Work. In any case in which the time period specified in the Contract Documents from the Notice to Proceed to Substantial Completion is less than five (5) days, the Engineer can waive this requirement.
- I. Upon receipt of a written request for approval of an or-equivalent substitution, the Engineer shall investigate whether the proposed item shall be considered equivalent to the item named or described in the Contract Documents. Upon conclusion of the investigation, the Engineer shall promptly advise that the item is, or is not, acceptable as an or-equivalent substitution. Such written notice must have the concurrence of the Owner.
- J. In no case may an item be furnished on the Work other than the item named or described, unless the Engineer, with the Owners concurrence, shall consider the item equivalent to the item so named or described.
- K. The equivalency of items offered as equivalent to items named or described shall be proved to the satisfaction of the Engineer at the expense of the Contractor or Subcontractor submitting the substitution.
- L. The Engineer and the Owner may require that full size samples of both the specified and proposed products be submitted for review and evaluation. The Contractor and Subcontractor, as the case may be, shall bear the full cost for providing, delivering, and removal and disposal of all such samples.
- M. The Contractor or Subcontractor, as the case may be, shall assume full responsibility for the performance of any item submitted as an or-equivalent and assume the costs of any changes in any Work that may be due to such substitution.
- N. All costs for printing, preparing, packaging, submitting, resubmitting, and mailing, or delivering submittals required by the Contract shall be included in the lump sum base bid Contract Price.

1.03 ENGINEERS ACTION

- A. The Engineer will review the Contractors submittals and return them with one of the following actions recorded thereon by appropriate markings:
 - 1. Final Unrestricted Release: Where marked “Reviewed”, the Work covered by the submittal may proceed provided it complies with the requirements of the Contract Documents.

SECTION 01 33 00 – SUBMITTAL PROCEDURES

2. Final but Restricted Release: Where marked “Reviewed as Modified”, the Work may proceed provided it complies with the Engineers notations or corrections on the submittal and complies with the requirements of the Contract Documents.
3. Returned for Resubmittal: When marked “Revise and Resubmit”, or “Not Reviewed”, the Work covered by the submittal (purchasing, fabrication, delivery, or other activity) should not proceed. The submittal should be revised or a new submittal resubmitted without delay, in accordance with the Engineers notations stating the reasons for returning the submittal.

1.04 SUBMISSION OF SHOP DRAWINGS AND PRODUCT DATA

- A. Shop Drawings shall be complete and give all information necessary or requested in the individual sections of the Specifications. They shall also show adjoining Work and details of connection thereto.
- B. Shop Drawings shall be for whole systems. Partial submissions will not be accepted.
- C. The Engineer reserves the right to review and approve Shop Drawings only after approval of related product data and samples.
- D. Shop Drawings shall be properly identified and contain the name of the Project, name of the firm submitting the Shop Drawings, Shop Drawing number, date of Shop Drawing and revisions, Contractors stamp of approval, and sufficient spaces near the title block for the Engineers stamp.
- E. The Contractor shall submit Shop Drawings as indicated below. The Shop Drawing must be legible in both formats. A transmittal notice shall accompany each submittal.
 1. To the Owner: One (1) hard copy.
 2. To the Engineer: One (1) copy via email or hard copy.
- F. The Engineer will process the submittal as outlined below and send the submittal back via email. Hard copies will not be sent.
 1. When the Shop Drawing is returned by the Engineer with the stamp “Revise and Resubmit” or “Not Reviewed”, the Contractor shall correct the original drawing or prepare a new drawing and resubmit a transparency and two (2) prints thereof to the Engineer for approval. The procedure shall be repeated until the Engineers approval is obtained.

SECTION 01 33 00 – SUBMITTAL PROCEDURES

2. When the transparency is returned by the Engineer with the stamp “Reviewed” or “Reviewed as Modified”, the Contractor shall provide and distribute the prints for all Contractors and Subcontractors use, and in addition submit, within ten (10) calendar days after approval, five (5) prints to the Engineer.
- G. The Contractor shall maintain one (1) full set of approved Shop Drawings at the Site.

1.05 SUBMISSION OF SAMPLES

- A. Unless otherwise specified in the individual sections of the Specifications, the Contractor shall submit two (2) specimens of each sample.
- B. Samples shall be of adequate size to permit proper evaluation of materials. Where variations in color or in other characteristics are to be expected, samples shall show the maximum range of variation. Materials exceeding the variation of approved samples will not be approved.
- C. Samples that can be conveniently mailed shall be sent directly to the Engineer, accompanied by a transmittal notice. All transmittals shall be stamped with the Contractors approval stamp of the material submitted.
- D. All other samples shall be delivered at the field office of the Engineer with sample identification tag attached and properly filled in. Transmittal notice of samples so delivered with the Contractors stamp of approval shall be mailed to the Engineer.
- E. If a sample is rejected by the Engineer, a new sample shall be submitted in a manner specified herein above. This procedure shall be repeated until the Engineer approves the sample.
- F. Samples will not be returned unless return is requested at the time of submission. The right is reserved to require submission of samples whether or not particular mention is made in the Specifications.

PART 2 - PRODUCTS

NONE

SECTION 01 33 00 – SUBMITTAL PROCEDURES

PART 3 - EXECUTION

NONE

END OF SECTION

SECTION 01 43 00 – QUALITY ASSURANCE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Consult the individual sections of the Specifications for the specific submittals required under those sections and for further details and descriptions of the requirements.

1.02 TESTING AND SPECIAL TESTING

- A. Unless otherwise provided in the Specifications, the Contractor or assigned Subcontractor shall provide all materials, samples, mock-ups, or assemblies for all tests specified in various sections of the Specifications, or as directed by the Engineer, and pay shipping costs for such samples to laboratory or other testing location and facility. Unless specified otherwise, all tests shall be made by an approved independent testing laboratory and reports provided to the Engineer.
- B. Tests shall be provided and accomplished in accordance with the standard used as the reference for the particular material or product, unless other test methods or criteria are specified. In the absence of a referenced standard, tests shall be accomplished in accordance with applicable ASTM Standards or Test Methods, current at the date of the Contract Documents.
- C. The Owner will employ and pay for any special inspector to provide the inspections during construction as may be required by applicable codes. The Contractor shall coordinate his operations with the inspector and cooperate with the inspector in the required inspections.

1.03 QUALIFICATIONS OF TESTING AGENCY

- A. Approved Independent Testing Laboratory: Shall mean an independent testing agency acceptable to the Owner and the Engineer and possessing the professional qualifications and equipment to perform the specified tests and to evaluate the report results.

1.04 QUALITY ASSURANCE

- A. Comply with the requirements of ASTM E29 and ASTM D3740.
- B. Laboratories shall maintain a full-time licensed Engineer on staff to review services.
- C. Laboratory authorized to operate in State in which Project is located.
- D. Testing equipment shall be calibrated at reasonable intervals with devices of accuracy traceable to either NBS Standards or accepted values of natural physical constraints.

SECTION 01 43 00 – QUALITY ASSURANCE

E. 1.05 REFERENCES

- A. ASTM D3740 – Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as used in Engineering Design and Construction.
- B. ASTM E29 – Standard Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials used in Construction.

1.06 PAYMENT FOR TESTS

- A. Tests to be paid for by the Owner will be paid directly to the testing laboratory by the Owner.
- B. The Owner will not pay for tests to determine if a proposed material will initially meet the specified requirements, which will include but not be limited to concrete aggregate analysis, concrete design mixes, concrete block for initial approval, precast concrete in-plant tests, brick being considered for selection, analysis of paving aggregate, paving mix designs, and similar tests. The Owner will not pay for testing of irrigation, mechanical, or electrical systems.
- C. The Contractor shall pay for the following tests:
 - 1. Soil material testing.
 - 2. Soil compaction testing.
 - 3. Concrete compressive strength testing.
 - 4. Mortar testing.
- D. The following is the list of the type of tests the Owner will pay for, where tests are specified or later determined necessary:
 - 1. Review of mix designs.
 - 2. Concrete air entrainment.
 - 3. Paving samples.
- E. The Contractor or assigned Subcontractor shall be responsible for, and shall pay for, all off-site and on-site tests except those listed in Paragraph 1.06.D.

SECTION 01 43 00 – QUALITY ASSURANCE

- F. The Engineer shall have the right to witness all off-site and on-site tests performed by the Contractor or assigned Subcontractor and the Contractor shall furnish adequate notice of when tests will be made.
- G. When in the opinion of the Engineer, additional tests or inspections are required because of the manner in which the Contractor executes its Work, such tests and inspections shall be paid for by the Owner but will be deducted from the Contract Price. Examples of such tests and inspections are tests of previously accepted materials, or substitutes for specified materials, retests made necessary by failure of materials to comply with the requirements of the Specifications, load test made necessary because of portions of the structure not fully meeting Specifications or plan requirements, etc.

1.07 TESTS TO DEMONSTRATE QUALIFICATION

- A. In addition to tests specified, should the Contractor propose a product, material, or method of assembly that is of unknown or questionable quality to the Engineer, the Engineer may require and order suitable tests to establish a basis for acceptance or rejection. Such tests will be paid for by the Contractor, or by the Subcontractor requesting approval. Standard test reports or similar material will not be acceptable.
- B. The Owner and Engineer reserve the right to require certification or other proof that the material, assembly, equipment, system, or other product furnished or proposed to be furnished for the Project is in compliance with any test or standard called for. The certificate shall be signed by a representative of the independent testing laboratory.
- C. Any test required to qualify the Contractor or any of his workmen for any phase of the Work, and any test of a method, system, or equipment that may be required by Specification or law to qualify the item for use, shall be made or taken without additional reimbursement.
- D. If exploratory Work is required to determine the cause of defects, the cost of such Work shall be borne by the Contractor or assigned Subcontractor responsible for such Work if Work is found, in the judgement of the Engineer to be defective. If the Contractor or assigned Subcontractor responsible for the Work is adjudged by the Engineer to be not at fault, exploratory testing will be paid for by the Owner.

1.08 INSPECTIONS

- A. Should the Specifications, Engineers instructions, laws, ordinances, or any public authority require any Work to be inspected or approved, the Contractor shall give timely notice of its readiness for inspections and a reasonable date fixed for such inspection. If any Work requiring inspection should be covered up without approval or consent of the Engineer, it must be uncovered for examination at Contractors expense.

SECTION 01 43 00 – QUALITY ASSURANCE

B. 1.09 CERTIFICATES

- A. Except for test reports provided and signed by approved independent testing laboratories, all certificates required by the Specifications shall be signed by an authorized official of the firm providing the certificate, with the signature notarized, when such certificates by the producer are acceptable to the Engineer.

1.10 RETEST RESPONSIBILITY

- A. Where results of required inspections, tests, or similar prove unsatisfactory and do not indicate compliance of related Work with requirements of the Contract Documents, the retests are the responsibility of the Contractor or assigned Subcontractor, regardless of whether original test was the Contractors responsibility. Retesting of Work revised or replaced by Contractor is the Contractors responsibility, where required tests were performed on original Work.
- B. Owners decision on unsatisfactory testing resulting in retesting of Work based on consultation with Testing Laboratory and Engineer is final.

PART 2 - PRODUCTS

NONE

PART 3 - EXECUTION

NONE

END OF SECTION

SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. The Contractor shall be responsible for providing and maintaining all temporary facilities until Substantial Completion. Removal of such facilities prior to Substantial Completion must be with the concurrence of the Engineer.
- B. Removal of all temporary facilities shall be a condition precedent to Substantial Completion unless directed otherwise by the Engineer or specifically noted in the Specifications.

1.03 TEMPORARY FENCING

- A. The Contractor shall be responsible for providing and maintaining temporary fencing or barricades as may be necessary to assure the safety of all persons authorized or unauthorized. Such protective measures shall be located and installed as required by local, State, and Federal ordinances, laws, codes, or regulations at no additional costs to the Owner.

1.04 TEMPORARY STRUCTURES AND MATERIAL HANDLING

- A. Materials shall be handled, stored, installed, cleaned, and protected in accordance with the best practice, and except where otherwise specified in the Contract Documents, in accordance with manufacturers specifications and directions.

1.05 TEMPORARY ELECTRICITY

- A. The Contractor may make use of the available electricity at the Site for construction purposes, provided the Contractor shall supply proper adapters and extension cords. Where electrical equipment drawing current in excess of 15 amps is involved, the Contractor shall provide a temporary electrical service to supply the electricity.
- B. Temporary electrical work shall be performed under the direct supervision of a licensed electrician who will be present on the Site at all times when such Work is being performed.
- C. Temporary electrical work shall be in accordance with all applicable laws, regulations, and codes.
- D. The Contractor shall remove from the Site all temporary electrical facilities.

SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS

1.06 TEMPORARY WATER

- A. The Contractor may make use of the available water supply at the Site for construction purposes, provided the permission of the Owner is obtained beforehand and only as long as the water is not used wastefully.
- B. The Contractor shall provide all necessary connections, piping, and hoses to utilize the water source.
- C. In the event that the water source is unavailable, the Contractor shall be responsible for providing water from off-site sources.

PART 2 - PRODUCTS

NONE

PART 3 - EXECUTION

NONE

END OF SECTION

SECTION 01 57 26 – DUST CONTROL

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work required by this section of the Specifications shall consist of furnishing all labor, plant, equipment, tools, materials, and incidentals, and performing all operations in connection with providing calcium chloride and/or water for dust control purposes over the areas of the Work and at the times and at the rates of application in accordance with the Drawings and these Specifications, or as directed by the Engineer.

1.02 RELATED WORK SPECIFIED ELSEWHERE

NONE

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Calcium chloride shall meet the requirements of the Standard Specifications, Section 9.42.
- B. Water shall be fresh water obtained from a source approved by the Engineer.

PART 3 - EXECUTION

3.01 GENERAL

- A. The Contractor shall exercise every precaution and means to prevent and control dust created as a result of all construction operations from becoming a nuisance to abutting properties, surrounding neighborhoods, and/or the traveling public.
- B. Pavement areas adjoining the work that are open to vehicular traffic shall be kept clean of excess earth materials as directed by the Engineer.
- C. When in the opinion of the Engineer, conditions require additional dust control measures to supplement those required to be provided by the Contractor in Paragraphs A and B above, the Engineer may direct the Contractor to furnish and spread calcium chloride and/or water over certain areas of the site, at certain times, and at certain rates of application.

SECTION 01 57 26 – DUST CONTROL

3.02 EQUIPMENT

- A. Calcium chloride shall be spread in a manner and by devices approved by the Engineer that will insure uniform application over the area on which it is to be placed.
- B. Watering equipment shall consist of pipelines, tanks, tank trucks, distributors, pumps, meters, hoses, or other devices, approved by the Engineer, which are capable of applying a uniform spread of water over the surface of the area on which it is to be placed. Suitable devices for positive shut-off and regulation of flow shall be provided to insure operator control.

END OF SECTION

SECTION 01 71 13 – MOBILIZATION AND DEMOBILIZATION

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work required by this section of the Specifications shall consist of all Work necessary for the movement of the Contractor's plant, equipment, material, and personnel to and from the Project Site within this Contract, and for the establishment, maintenance, and ultimate removal of any temporary field offices, buildings, storage areas, sanitary, and other facilities necessary to the performance of the Work.

1.02 RELATED WORK SPECIFIED ELSEWHERE

NONE

PART 2 - PRODUCTS

NONE

PART 3 - EXECUTION

NONE

END OF SECTION

SECTION 01 71 23 – FIELD ENGINEERING

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work required by this section of the Specifications shall consist of providing sufficient additional horizontal and vertical reference points in the project area, and all detailed layout, staking, and grade control necessary for the control of the accuracy of all lines, grades, and measurements used in the execution of all Work to be performed under this Contract.

1.02 RELATED WORK SPECIFIED ELSEWHERE

NONE

PART 2 - PRODUCTS

NONE

PART 3 - EXECUTION

3.01 GENERAL

- A. The Owner will furnish and establish permanent horizontal and vertical reference points in the Project area to enable the Contractor to proceed with the Work required under this section.
- B. The Contractor shall carefully protect and preserve all permanent reference points, monuments, stakes, benchmarks, and other survey markers furnished by the Owner. Where located in the line of Work, such points, monuments, markers and/or benchmarks shall be tied to fixed points and/or transferred and replaced upon completion of the Work unless otherwise specified by the Engineer.
- C. The Contractor shall record the tie-in or transfer of all points and/or benchmarks and shall submit copies of all notes, sketches or other records of the tie-in and/or transfer to the Engineer.
- D. The Contractor shall insure that adequate reference points, stakes, and/or benchmarks are in place at all times to allow the Engineer to check the Work in progress.

SECTION 01 71 23 – FIELD ENGINEERING

3.02 LINES AND GRADES

- A. The Contractor shall layout all Work and set all necessary grades as required to ensure that all Work is installed in conformance with the lines and grades shown on the Drawings or as directed by the Engineer.

END OF SECTION

SECTION 01 77 00 – CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 DESCRIPTION

A. The purpose of this section is to describe the closeout procedures for the Project.

1.02 RELATED DOCUMENTS

A. Consult the individual sections of the Specifications for specific items required under those sections.

1.03 SUBSTANTIAL COMPLETION

- A. Prior to requesting Substantial Completion as provided in the General Conditions, the Contractor shall make a thorough inspection of the Work. During this inspection the Contractor shall prepare a comprehensive list of all items remaining to be completed or corrected. This list shall include all remaining Contractor and Subcontractor items to be provided under the Contract Documents.
- B. Upon completion of the list, the Contractor shall notify the Engineer in writing, that the Work is Substantially Complete. The Engineer shall then conduct a similar thorough inspection. If the Engineer agrees that the Work is Substantially Complete, the Engineer will promptly make a thorough inspection and prepare a punch list, setting forth in accurate detail any items on the Contractors list and additional items that are not acceptable or incomplete. The Contractor shall coordinate all Subcontractors to achieve prompt completion of the punch list.
- C. The Contractor shall not be relieved of the responsibility to provide Contract items left off of the Engineers punch list.
- D. If the Engineer determines that the Work is not Substantially Complete, the Engineer shall inform the Contractor of those items that must be completed before the Engineer will prepare a punch list. Upon completion of those items, the Contractor shall again request the Engineer to prepare a punch list.
- E. When the punch list has been prepared, the Engineer will arrange a meeting with the Contractor and Subcontractors to identify and explain all punch list items and answer questions on Work which must be done before final acceptance.
- F. The Engineer may revise the punch list, from time to time, to ensure that all items of Work are properly completed.

SECTION 01 77 00 – CLOSEOUT PROCEDURES

- G. The Engineer shall prepare the Certificate of Substantial Completion in accordance with the General Conditions.

1.04 FINAL COMPLETION

- A. Within fifteen (15) days after Substantial Completion, if any of the items on the Engineers punch list are not complete or if the Contractor has not provided the appropriate Record Drawings, Operating Manual, Warranties, Guaranties, or spare parts, the Engineer may assign a monetary value for each incomplete item.
- B. The Contractor shall provide the Engineer with a notarized Contractors Certificate and Release and an appropriate Application for Payment. This application shall be for an amount equal to the remaining balance of the Contract.
- C. The Contractor shall complete all remaining Work in accordance with the provisions of the General Conditions.
- D. Upon completion of all remaining items, and after receipt of all appropriate Shop Drawings, Record Drawings, Operating Manuals, Warranties, Guaranties, and spare parts required by the Contract Documents, the Contractor shall provide a notarized Contractors Certificate and Release and a final Application for Payment to complete the closeout process.

PART 2 - PRODUCTS

NONE

PART 3 - EXECUTION

NONE

END OF SECTION

SECTION 01 78 36 – WARRANTIES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The purpose of this Section is to describe warranty requirements for all Work included in the Contract.

1.02 WARRANTY REQUIREMENTS

- A. **Warranties Required:** All materials, equipment and Work of the Project shall be covered by comprehensive written warranties. Refer to individual Specification sections for additional specific warranty requirements. For Work not specified to have additional specific warranty requirements or warranties longer than one (1) year, provide a comprehensive one (1) year warranty signed by the Contractor and Subcontractor.
- B. **Warranty Limitations:** Warranties required under the Contract are in addition to and not in lieu of any remedy or warranty to which the Owner is entitled under law. Warranties required under the Contract shall not be interpreted as a waiver of any of the Owners rights.
- C. **Warranty Procurement:** Do not purchase or subcontract for materials, equipment, or Work until it has been verified that parties required to provide and sign warranties are willing to do so and that warranty language, content, and form are approved by the Owner. Special warranty terms, conditions, and requirements are often specified.
- D. **Warranties are Irrevocable:** After a specific warranty language, content, and form has been approved by the Owner and after the Work covered by a specific warranty is subcontracted or purchase order given to a manufacturer, the warrantor shall not revoke or withhold the warranty for any reason including without limitation, non-payment or incomplete payment by any party other than the Owner, except that if Work has not been installed in compliance with the warrantor installation requirements, then the warranty may be temporarily withheld until corrections are made and the warrantors installation requirements have been met.
- E. **Warranty Forms:** Submit written warranty forms to Owner through the Engineer for approval prior to award of Subcontract, submission of purchase order, and execution of warranty. The manufacturers standard warranty forms may not comply with the requirements of the Contract Documents. Special warranty terms, conditions, and requirements are often specified and required.
- F. **Standard Warranty Form:** In the absence of specific written permission by the Owner, provide all warranties including the Contractors comprehensive one (1) year warranty on fully executed standard warranty. Furnish original or certified copies of each executed warranty to Owner for warranty and maintenance manuals.

SECTION 01 78 36 – WARRANTIES

- G. Work Covered by Warranty: Contractor and warrantor shall remove and replace other Work damaged as a result of failure of warranted materials, equipment, or Work, and shall remove and replace other Work which must be removed and replaced to provide access to and replacement of materials, equipment, or Work covered under warranty. Warranties shall include full payment to the Owner for Work related to warranty repair or replacement including without limitation, painting.
- H. Pro-Rated Warranties: Unless otherwise specified or approved in writing by Owner, each warranty shall cover the full cost of replacement or repair and shall not be pro-rated on basis of useful service life or warranty period.
- I. Warranty Extensions: Work repaired or replaced under warranty shall be provided with a new warranty equal to the full length of the original warranty. The new warranty shall begin on the date of Owners acceptance and use of the replaced or repaired item.
- J. Warranty Effective Starting Date: All warranties shall begin on Date of Final Acceptance of the entire Project or Owners acceptance of the Work or item covered by the warranty, whichever is later, and the warranty coverage shall continue for the period specified. If no specific warranty period is specified, the warranty shall extend for one (1) year.
- K. Contractors Responsibilities for Warranties: The Contractor shall implement and invoke all guarantees and warranties provided by Subcontractors, manufacturers, material suppliers, and other parties, including warranties longer than one (1) year duration. The Contractor shall make every effort to facilitate, expedite, and aid the Owner in warranty claims the Owner may have throughout the warranty periods.

PART 2 - PRODUCTS

NONE

PART 3 - EXECUTION

NONE

END OF SECTION

SECTION 01 78 39 – PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. The purpose of this Section is to describe Project Record Document requirements.

1.02 RECORD DOCUMENTS

- A. From the set of Contract Drawings furnished by the Owner, the Contractor shall reserve one set for record purposes. From this set, the Contractor shall detach and furnish, the Drawings of their portion of the Work for the same purpose.
- B. The Contractor and Subcontractors shall keep their record set on the Site at all times and note on it in colored ink or pencil, neatly and accurately, at the end of each work day, the exact location of their Work as actually installed. This shall include the location, elevations, and dimensions of underground and concealed Work, and any variations from the Contract Drawings. All changes, including those issued by Addendum, Change Order, or Field Order shall be recorded. Record Drawings shall be prepared for the entire Project and include all Work.
- C. The Engineer may periodically inspect the Record Drawings at the Site. The proper and current maintenance of the information required on these drawings shall be a condition precedent to the monthly requisitions for periodic payment.
- D. At Substantial Completion, the Contractor shall submit the complete set of Record Drawings to the Engineer. The Engineer will review these drawings and return them to the Contractor with necessary comments.

NONE

PART 2 - PRODUCTS

NONE

PART 3 - EXECUTION

NONE

END OF SECTION

SECTION 02 41 00 – SITE PREPARATION

SECTION 02100 – SITE PREPARATION

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. The Work required by this section of the Specifications shall consist of furnishing all labor, plant, equipment, tools, materials, and incidentals, and performing all operations in connection with all Work necessary to prepare the Site for the proper completion of the Work to be performed under this Contract, in accordance with the Drawings and these Specifications, or as directed by the Engineer.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Dust Control - Section 01 57 26.
- B. Earthwork - Section 31 00 00.
- C. Clearing and Grubbing – Section 31 11 00.
- D. Trench Excavation and Backfill - Section 31 23 16.
- E. Dewatering, Control and Diversion of Water - Section 31 23 19.
- F. Soil Erosion and Sediment Control - Section 31 25 00.

1.03 SUBMITTALS

- A. Submit the following:
 - 1. Certificates of discontinuance of utility services, if required.

1.04 PROTECTION

- A. Protect wetlands and watercourses.
- B. Maintain and protect vehicular and pedestrian traffic.
- C. Take precautions to prevent damage to existing conditions to remain. Promptly repair any damage identified by the Engineer.
- D. Take precautions to properly support structures. Cease operations and notify the Engineer immediately if safety of adjacent structures appears to be endangered.

SECTION 02 41 00 – SITE PREPARATION

- E. Take measures to prevent windblown dust, dirt, and debris.

PART 2 – PRODUCTS

2.01 TEMPORARY FENCING

- A. Temporary fencing shall consist of four (4) foot height, high density polyethylene construction safety fencing, color-orange, with wood or metal stakes, spaced ten (10) feet on center.

2.02 STOCKPILE COVERS

- A. Reinforced polypropylene tarps, resistant to ultraviolet radiation, secured with anchors as required and approved by the Engineer.

PART 3 – EXECUTION

3.01 POLLUTION CONTROL

- A. Comply with the requirements of Section 01 57 26 – Dust Control to limit dust, dirt, and debris rising and scattering in air. Comply with governing regulations pertaining to environmental protection.
- B. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.
- C. Comply with the requirements of Section 31 25 00 - Soil Erosion and Sediment Control.
- D. Clean adjacent structures and improvements of dust, dirt, and debris caused by site preparation operations. Return adjacent areas to condition existing prior to start of Work.

3.03 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

- A. Existing structures and utilities shall be protected from damage, including but not limited to existing buildings, fencing, lighting, and utilities.
- B. Provide protections necessary to prevent damage to pipes, conduits, wires, cable or structures above or below ground, indicated on drawings to remain.

SECTION 02 41 00 – SITE PREPARATION

- C. No monuments, property markers, or benchmarks shall be damaged or removed until an authorized agent has witnessed or otherwise referenced their location and approved their removal.
- D. Provide protections necessary to prevent damage to adjoining properties.
- E. Repair any damaged utilities as acceptable to the Engineer, at no additional cost to the Owner.
- F. Restore damaged items to their original condition, at no additional cost to the Owner, and as acceptable to the Engineer.

3.04 REMOVAL, SALVAGE, AND RELOCATION

- A. Removal: Items and materials indicated on the Drawings or designated by the Engineer to be removed shall be either removed and stockpiled on the Site, or demolished, dismantled, removed, and disposed of properly off-site.
 - 1. Items and materials resulting from the preparation of the Site, which are not required for reuse in the Project, or which are unsuitable for reuse in the Project, and as determined by the Engineer should be salvaged, shall remain the property of the Owner and shall be stockpiled on the Site at a location identified by the Engineer.
 - 2. Items and materials resulting from the preparation of the Site, which are not required for reuse in the Project, or which are unsuitable for reuse in the Project and as determined by the Engineer should not be salvaged, shall be properly disposed of off-site. Such items or materials shall be removed from the Site and disposed of promptly and shall not be left until final cleanup of the Site.
- B. Salvage: Items and materials indicated on the Drawings or designated by the Engineer to be salvaged shall be dismantled, removed, protected, and delivered to the Owner at a location identified by the Engineer.
- C. Relocation: Items and materials indicated on the Drawings or designated by the Engineer to be relocated shall be dismantled, removed, protected, and relocated as indicated on the Drawings or as directed by the Engineer.

3.08 REMOVAL OF PAVEMENTS

- A. Where indicated on the Drawings and as directed by the Engineer, existing pavement and curbing shall be removed and properly disposed of.

SECTION 02 41 00 – SITE PREPARATION

- B. Unstable pavement shall be removed over cave-outs and over breaks and the subgrade shall be treated as the main trench.
- C. Where previous cuts have been made adjacent to the new trench or excavation extra care shall be taken to prevent the opening of existing joints and the settling of the pavements. Any and all damage to the existing pavement adjacent to the excavation including existing patches, shall be repaired by the Contractor.
- D. Pavement edges shall be trimmed to a vertical face and neatly aligned with the center line of the trench.
- E. The cutting of the bituminous surface ahead of excavation is required to confine pavement damage to the limits of the trench. Excavation shall not commence until the Contractor has marked out the proposed limits of excavation in white paint, the underground facilities marked in their respective color, and protection provided for users of the highway.
- F. The initial cutting of the pavement shall be restricted to the area directly over the sidewalls of the proposed trench to be excavated. The pavement surface shall be removed to the limits of excavation with all edges cut to a vertical line and neatly aligned with the center of the trench. Cut-out outside of the trench line must be normal or parallel to the trench.
- G. The trimming shall be accomplished with either a spaded pavement breaker or cut with a concrete saw. Under no circumstances shall pavement be subjected to blows from a hammer or dropped weight. The use of hydrohammers or heavy duty pavement breakers is prohibited.
- H. Sections of sidewalk within the excavation limits shall be saw cut and removed to the nearest score line or expansion joints.

END OF SECTION

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work required by this section of the Specifications shall consist of furnishing all labor, plant, equipment, tools, materials, and incidentals, and performing all operations in connection with all Work necessary to provide the complete installation of all reinforced and non-reinforced cast-in-place concrete Work, as shown on the Contract Drawings, in accordance with these Specifications, or as directed by the Engineer.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Earthwork - Section 31 00 00.
- B. Trench Excavation and Backfill - Section 31 23 16.

1.03 SUBMITTALS

- A. Submit Shop Drawings for reinforcement steel, including schedules and details, to the Engineer for approval.
- B. Submit certified test reports of the reinforcement steel to the Engineer for approval. Reports shall be furnished for each steel shipment and shall be identified with specific lots. The steel shall be tested as the Engineer may consider necessary to establish its quality and particularly to fulfill the requirements of bending and elongation.
- C. Certified manufacturer's test reports shall be provided for premolded expansion-joint filler strips, joint sealants, and waterstops to verify compliance with the applicable specification.
- D. A concrete design mix will be prepared by a testing laboratory selected and paid for by the Engineer.
- E. Submit samples of aggregate for laboratory testing and trial mixes. Samples shall be in the quantity (and volume) as ordered by the Owner and shall be delivered in watertight containers with contents fully identified. Testing will be paid by the Owner.

1.04 STANDARDS

- A. The following American Concrete Institute (ACI) publications, latest revisions, are hereby made part of this Section:
 - 1. Building Code Requirements for Reinforced Concrete ACI 318
 - 2. Concrete Sanitary Engineering Structures ACI 350

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

3. Specifications for Structural Concrete for Building	ACI 301
4. Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete	ACI 304
5. Recommended Practice for Concrete Formwork	ACI 347
6. Recommended Practice for Hot Weather Concreting	ACI 305
7. Recommended Practice for Cold Weather Concreting	ACI 306
8. Recommended Practice for Curing Concrete	ACI 308
9. Manual of Standard Practice for Detailing Reinforced Concrete Structures	ACI 315

1.05 TESTING

- A. Cylinders for testing will be taken by the Engineer. An average of four (4) cylinders shall be cast for each fifty (50) cubic yard of concrete placed.
- B. Slump tests shall be performed by the Engineer.
- C. The Contractor shall notify the designated testing laboratory at least forty-eight (48) hours before every pouring operation so that arrangements may be made for taking samples and inspection. Contractor take note: Placement of concrete will not be allowed if sufficient notice is not given to the Owner to make arrangements for the taking of samples and inspection.
- D. Where the twenty-eight (28) day compressive strength of concrete in any test cylinder is below the strength specified for the class of concrete tested, the proportion of water content or temperature conditions shall be changed to secure the required strength. The Contractor shall be held responsible for the additional tests and removal and replacement of unacceptable work at no additional cost to the Owner.
- E. If laboratory test of concrete from any part of the structure indicates understrength concrete, the Engineer may order load tests or other tests on the portion of the structure affected to determine its adequacy to sustain the loads for which it is designed. Tests, if required, shall be made at the Contractor's expense and shall conform to the requirements of ACI-318, Chapter 20. If the structure, or any part of the structure, cannot pass the load tests, it shall be removed and replaced at the Contractor's expense.

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, latest revision, Type I or II. Cement shall be the product of one manufacturer.
- B. Fine Aggregate: ASTM C 33, latest revision. Fineness modulus shall be two point eight (2.80), plus or minus zero point two zero (0.20), and shall not contain more than three (3%) percent, by weight, of material passing a number one hundred (100) sieve (2% when dry). Particles shall be free of alkali and other surface coatings determined by ASTM C 40, latest revision color test. Test aggregate for soundness by five alterations by the accelerated soundness test using magnesium sulphate in accordance with ASTM C 88, latest revision, except that loss of weight shall not exceed five (5%) percent.
- C. Coarse Aggregate: ASTM C 33, latest revision. No more than one (1%) percent, by weight, of the matter shall be removed by decantation. No more than five (5%) percent, by weight, shall consist of structurally weak particles. Materials shall be tested for soundness as given above for fine aggregate.
- D. Water: Clean and potable.

2.02 ADMIXTURES

- A. The following admixtures are approved for use in accordance with the recommendations of ACI Committee 350, Title No. R-83:
 - 1. Air Entraining Agent: ASTM C 260. For concrete with 1/2" aggregate, provide air content of 5%, +1/2%; for concrete with 3/4" aggregate, 6%, +1/2%. Air content to be determined in accordance with ASTM C 231 or C 173.
 - 2. Water-Reducing Agent: ASTM C 494, Type A.

2.03 REINFORCING

- A. Bars: ASTM A 615, grade 60.
- B. Welded Wire Fabric: ASTM A 185.
- C. Bar Supports: ACI 315. Supports for formed surfaces shall be plastic protected wire or stainless steel.
- D. Wire Ties: 16-gauge (min.) black, annealed wire.

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

2.04 FORMS

- A. The design and construction of forms shall be the responsibility of the Contractor. The formwork shall be designed in accordance with Chapter 1 of ACI Standard 347. Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of concrete and remain within required tolerances.
- B. Forms for other cast-in-place concrete shall be made of wood, metal, or other approved material. Wood forms shall be constructed of sound lumber or plywood of suitable dimensions, free from knotholes and loose knots; where used for exposed surfaces, boards shall be dressed and matched. Plywood shall be sanded smooth and fitted with tight joints between panels. Metal forms shall be an approved type for the class of work involved and of the thickness and design required for rigid construction.
- C. Form coating shall be a commercial formulation of satisfactory and proven performance that will not bond with, stain, or adversely affect concrete surfaces and will not impair bond or adhesion nor impede the wetting of surfaces to be cured with water or curing compounds.

2.05 JOINT MATERIALS

- A. Expansion Joint Filler Strips: ASTM D 1752, Type III; self-expanding cork.

PART 3 - EXECUTION

3.01 MIX DESIGN

- A. All concrete shall be normal weight and consist of a proportioned mixture of Portland Cement, fine and coarse aggregate, admixtures and water.
- B. All concrete mixes shall be proportioned on the basis of field experience and/or trial mixtures in accordance with ACI 318-89 to achieve the following properties:

Class	Comp. Strength @ 28 Days (psi)	Maximum Water/ Cement Ratio	Minimum Cement Content (lb/cy)
A	5,000	0.49	611
B	3,000	0.53	517
C	1,500	0.69	423

- C. Class A and B shall be proportioned for a slump range of 2” minimum to 4” maximum. Class C shall not exceed 6” maximum.

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

- D. Class A and B concrete shall be air entrained with an air content of 6% + 1%. Class C shall not be air entrained.
- E. A low range water reducing admixture shall be utilized in all concrete.
- F. Admixtures to retard or accelerate setting, plasticize or prevent freezing shall not be used without prior approval from the Engineer. No admixtures containing calcium chloride will be permitted.
- G. All admixtures shall be mixed at the batch plant.
- H. Utilize the following maximum aggregate sizes which shall not exceed the tolerance in oversize specified in ASTM C-33:

Class A	3/4"
Class B	1"
Class C	1-1/2"
- I. Aggregates shall be well graded from coarse to fine within limits established in ASTM C 33. Maximum size of aggregate in concrete for base mat slabs (mud slabs), walls and footing shall be 1 1/2"; for roof and intermediate slabs, thin wall and densely reinforced sections, 3/4". In no case shall aggregate size exceed 1/5th of the least dimension of the concrete between re-bars and forms. In columns, aggregate size shall be not greater than 2/3 the minimum clear distance between bars.

3.02 GENERAL CRITERIA

- A. Concrete measuring, mixing, and placing shall conform to ACI 304 requirements and as further required by this Section. Concrete batching shall be at all times under the control of competent and experienced workmen. The stiffest concrete mixes that can be handles will be required. In no case will concrete having a slump of less than 2" or more than 4" be permitted, except with the expressed permission of the Owner. Slump material shall enter the mixing drum until all of the preceding batch is discharged. No retempering will be allowed and concrete which has attained its initial set before placing shall be discarded at once.
- B. Concrete shall be of uniform consistency, free from segregation and lumps. If at any time segregation occurs, the Owner may require that the materials by satisfactorily remixed at the point of deposit. If concrete ingredients are dry batched at a point distant from the work, the batches shall be kept dry during transportation. Unless the cement is kept separate from the

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

aggregates, all batched concrete so transported shall be controlled by the provisions of ACI 304 Section 5.2.3. Admixtures shall be carefully measure and dispensed with the mixing water and uniformly mixed into the concrete mass.

3.03 TRANSIT-MIX CONCRETE

- A. Use truck mixers of approved revolving-drum type, equipped with calibrated tanks for measuring water and carrying the manufacturer's seal of the rated capacity of the truck. Trucks, before loading, shall reverse drums to discharge water and/or materials that may remain in the drum in full view of the Owner. Inspection slops shall be issued to each truck complying with the following requirements and no load will be accepted at the jobsite without such slip. The maximum size of batch shall not exceed the manufacturer's rated capacity. The charge in the mixer shall be reduced if, in the opinion of the Owner, such reduction is required to attain the specified quality and uniformity of concrete.
- B. Mixing shall begin within 30 minutes after the cement has been added to the batch and shall continue until there is uniform consistency. Mixing shall begin immediately after admixtures are added and shall continue for at least 30 revolutions to insure complete dispersion, followed by slow agitation during transport and final mixing at the jobsite for a suitable number of revolutions. Concrete shall be completely discharged from the mixer into its final location within two hours after cement has been added, except as otherwise directed or approved. In hot weather, reduce this initial time limit. However, all concrete that has attained its initial set or has exceeded the mixing limit before placing shall be discarded at once. Trucks shall conform to the latest edition of the Specification of the National Ready Mix Concrete Association.

3.04 FORMS

- A. Forms shall be mortar tight, properly aligned and adequately supported to produce concrete surfaces meeting allowable surface requirements. Forms shall not be reused if there are any defects. Surfaces of forms and embedded materials shall be cleaned of any mortar from pervious concreting and of all other foreign material before concrete is placed.
- B. Edges of form panels in contact with concrete shall be flush within 1/32 inch and forms for plane surfaces shall be such that the concrete will be plane within 1/16 inch in 4 ft. Forms shall prevent the passage of mortar, water and grout.
- C. Forms for walls have removable panels at the bottom for cleaning, inspection and scrubbing-in of bonding paste. Forms for walls of considerable height shall be fitted with tremies and hoppers for placing concrete to prevent segregation and accumulation of hardened concrete on forms or reinforcement above the pour line.
- D. Form ties shall be break-back type that will not leave any metal within 1 1/2" of finished surfaces after removal. Removable portions of such ties shall be 1/2" diameter, minimum or

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

shall be furnished with a wood or metal cone at least 1/2" in diameter by 1" long. Thru-bolts or wire ties will not be allowed.

- E. Exposed joints, edges and external corners shall be chamfered by molding placed in the forms unless shown or stated otherwise. Chamfered joints will not be permitted where earth or rock fill is placed in contact with concrete surfaces. Chamfered joints shall be terminated a sufficient distance above earth or rock fill so that the ends of the joints will be visible.
- F. Forms shall be coated with form oil or form-release agent before the form or reinforcement is placed in final position. The coating shall be used as recommended by the manufacturer. Forms for unexposed surfaces may be wet with water in lieu of coating immediately before placing concrete, except that in cold weather form oil is mandatory. Surplus coating of form surfaces, reinforcing steel construction points shall be removed before placing concrete.
- G. Directions as to the time of removing forms shall be strictly followed. This work shall be done with care so as to avoid injury to the concrete or damage to any details. In general removal of formwork shall be as specified in Section 3.6 of ACI 347 with the following exceptions:
 - 1. Forms shall not be removed until the concrete has attained sufficient strength to support its own weight plus construction live loads.
 - 2. Forms for the vertical faces of walls, beams and columns may be removed 3 days after concrete placement provided the concrete is sufficiently hard to not be damaged by the form removal and that curing, cold weather protection and other protective measures are maintained.
 - 3. Forms for the bottom of slabs, pan joints and beams shall not be removed until the concrete has gained a minimum of 75% of the required 28-day compressive strength, but in no case shall they be removed before 10 days after concrete placement.
 - 4. Forms for any portion of the structure shall not be removed until the concrete has gained adequate strength. Forms and form supports shall be removed such that the stresses due to the concrete's own weight can be absorbed by the concrete in a gradual and uniform manner.
 - 5. No superimposed load will be allowed on any structure until it has attained its 28-day strength.
- H. When reshoring is permitted or required, the work shall be planned in advance and will be subject to approval.

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- I. Reshoring for the purpose of early form removal shall be performed so that at no time will large areas of new construction be required to support its own weight. While reshoring is underway, no live loads shall be permitted on the new construction. Reshores shall be tightened to carry their required loads but shall not be overtightened so that the new construction is overstressed. Reshores shall remain in place until the concrete has reached 75% of its specified 28-day strength, unless otherwise specified or permitted.
- J. Floors supporting shores under wet concrete shall be reshored or shall have their original shores left in place. The reshores shall have at least one half the load capacity of the shores above and shall be distributed in approximately the same pattern as those above. These reshores shall remain in place until the freshly-placed concrete has reached 75 percent of its specified 28-day strength, unless otherwise specified or permitted.

3.05 REINFORCING

- A. Reinforcing shall be fabricated to the lengths, sizes and shapes as shown on the approved shop drawings, or as otherwise ordered. All bends shall be made cold and in such a manner that there shall be no damage to the bars, not shall bending exceed the limits given in ASTM A615.
- B. Identification of bars shall be in accordance with ASTM A615. Bundles bars shall be clearly identified by the numbers used on the approved Schedules.
- C. Reinforcement steel and accessories shall be installed or placed as specified and as shown on the Contract and approved shop drawings. Placement details of reinforcement and accessories not specified or shown on the Drawings shall be in accordance with ACI 315 or ACI 318. Reinforcement shall be fabricated to shapes and dimensions shown, placed where indicated within specified tolerances and adequately supported during concrete placement. At the time of concrete placement, all reinforcement shall be free from loose flaky rust, scale (except tight mill scale), mud, oil, grease, or any other coating that might reduce that bond with the concrete.
- D. Bars shall not be bent or straightened in the field unless approval is granted. Bars with bends or kinks not indicated on the approved shop drawings shall not be used. Welding of bars will only be permitted where shown on the drawings, or as permitted or directed by the Owner. Welding shall be in accordance with AWS D12.1 or as directed.
- E. Bars shall be spaced as indicated on the Drawings or as otherwise directed. The spacing between adjacent bars and the distance between layers may not vary from the indicated position by more than one bar diameter nor more than one (1") inch.
- F. Concrete coverage shall be as indicated on the drawings with tolerances as follows:

Minimum Cover _____ Variation

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

3"	+3/8"
2"	+1/4"
1 1/2"	+1/4"
1"	+1/8"
3/4"	+1/8"

- G. Splices in reinforcement steel shall be as specified, shown on the Drawings, or as directed by the owner. Bars may be spliced at alternate or additional locations at no additional cost to the Owner, subject to the approval of the Owner. Except as provided herein, all splicing shall be in accordance with approved splicing procedures and the requirements of ACI 318.
- H. Lapped spliced shall be used only for bars smaller than Size #14. Bar laps may be placed in contact and securely ties or may be spaced transversely apart to permit the embedment of the entire surface of each bar in concrete but shall not be spaced farther apart than one-fifth the required length of lap or 6 inches. Lengths of laps for bars or welded wire fabric shall conform to the requirements of ACI 318, except when otherwise shown on the Drawings.

3.06 CONCRETE PLACEMENT

- A. The method of placement of concrete shall be selected by the Contractor. The Owner shall be advised as to the method of placement, whether by chute, bucket, pumping or other means, in order that the design mix be compatible.
- B. Concrete shall be moved from the mixer to the place of final deposit as rapidly as possible by methods that will prevent separation or loss of ingredients. When concrete is conveyed by chuting, the chute shall be of such size and design as to insure a practically continuous flow. The slope of the chute shall be such that concrete flows without separation of ingredients. The chute shall be flushed with water before and after each run; the water discharged outside the forms. Chutes shall be U-shaped, designed for this function and in general, shall have slope varying from 25 to 45. The maximum drop shall be 5 feet and unless mechanical conveyors are used, the maximum horizontal distance shall be 5 feet. Do not use aluminum chutes or pipes for conveying concrete.
- C. In general, concrete placement shall produce compact, dense, homogeneous and impervious concrete, completely filing the space being concreted. Concrete adjacent to forms shall be continuously and sufficiently worked, spaded and vibrated. Acceptable types of high speed electrical or air-operated immersion-type vibrating equipment shall be used. Stones shall be spaced away from faces to be exposed. Concrete shall be spread in horizontal layers not to exceed 18" to 24" thick to the extent practicable. Consolidation shall be thorough for each layer and shall extend into the previously placed concrete to insure an integral mass.

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- D. The minimum number of vibrators shall be as follows: 1 per 10 CY per hour for walls; 2 per 20 CY per hour for slabs; 1 spare in proper working condition at all times. The rating capacities of the vibrators shall be 10,000 RPM minimum. The vibrators shall be inserted in the freshly placed concrete at approximately 18 to 30-inch intervals and shall operate in each insertion for a period of 5 to 15 seconds, or as otherwise ordered.
- E. No concrete shall be placed against the surface of sheet piling, rock or concrete until water entering the space to be filled has been cut off by caulking or has been diverted outside the space by means of pans, pipes, gravel drains, sumps or other suitable means.
- F. Methods and materials used for concreting in cold or freezing weather shall be subject to the prior approval of the Engineer. Cold weather shall mean any time that the air temperature in the shade and away from artificial heat may be expected to reach 50oF or lower at any time during the 24 hours following the placing of the concrete. Chill factor shall be taken into consideration in determining proper protection of the concreting operations.
- G. Remove ice and frost from foundations, previously placed concrete, forms and form materials. Heat the water, sand and aggregate. Concrete shall have a temperature of not less than 60F when placed in the forms and shall be maintained at a temperature of at least 50F for not less than 72 hours after placing. Salt, chemicals or other foreign materials shall not be mixed with the concrete to prevent freezing. Recommended methods for hot or cold weather concreting are set forth in ACI 305 and ACI 306.
- H. Where new concrete is to be placed against existing, the latter shall be thoroughly cleaned of all laitance, mortar and other substances which would prevent complete adhesion. The joint shall be clean and free of standing water but the surface shall be moist. A thick layer of mortar of the same consistency as the concrete shall be broomed into the surface, or the Contractor may use one of the specified bonding agents. Bonding agent shall be applied in accordance with the manufacturer's specification.
- I. Concrete fill shall be placed where shown. The coarse aggregate used in concrete fill shall be sized to permit forming to the details indicated or as directed. Concrete fill shall conform to the requirements specified herein for concrete.
- J. Building into forms, set or attach sleeves, castings, metal frames, ladders, ladder rungs, bolts, pipes, waterstops or other items shown or specified. Provide holes, recesses or projections as needed.

3.07 CURING

- A. Every precaution shall be taken to prevent concrete from drying out until thoroughly hardened. To this end, sprinkling may be required as early as three hours after placement. Thereafter it shall be kept continuously moist for fourteen days. Wooden forms shall be

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wetted immediately before concrete is placed and shall be kept wet until removed. Curing compounds shall not be used on surfaces receiving monolithic or epoxy finishes, resilient tile, ceramic tile, construction joints or surfaces to be bonded to future concrete. Curing methods shall, in general, be in accordance with ACI 308.

3.08 PATCHING AND REPAIR

- A. Immediately after forms are stripped, remove fins and projections from flat surfaces and fill recesses left by form ties and repair surface defects. Clean exposed concrete that has been stained by leakage.
- B. Wet holes and other recesses to be filled and apply a 1/16" thick brush coat of neat cement slurry mixed to the consistency of heavy paste. Immediately plug the hole with a 1:1.5 moisture of cement and sand mixed slightly damp to the touch (just short of "balling"). Hammer the grout into the hole until dense, and an excess of paste appears on the surface in the form of a spider web. Trowel smooth with heavy pressure. Avoid burnishing.
- C. When patching or repairing exposed surface use the same source of cement and sand as used in the parent concrete. Adjust color if necessary by additional of proper amounts of white cement. Rub slightly with a fine carborundum stone at an age of 1 to 5 days if necessary to bring the surface down to the parent concrete. Exercise care to avoid damaging or staining the virgin skin of the surrounding parent concrete. Wash thoroughly to remove subbed matter.
- D. Defective concrete and honeycombed areas shall be chipped down reasonably square and at least 1" deep to sound concrete with hand chiseled or pneumatic chipping hammers. Irregular voids or surface stones need not be removed if they are sound, free of laitance, and firmly embedded in the parent concrete. If honeycomb exists around reinforcement, chip to provide a clear space at least 3/8" wide all around the steel. For areas less than 1 1/2" deep, the patch may be made in the same manner as described above, care being exercised to use dry (non-trowelable) mixtures to avoid sagging. Thicker repairs will require build-up in successive 1 1/2" layers on successive days, each layer being applied (with slurry, etc.) as described above. To aid strength and bonding of multiple layers, use an approved metallic aggregate additive as follows:

<u>Material</u>	<u>Volumes</u>	<u>Weights</u>
Cement	1.0	1.0
Aggregate	0.15	0.25
Sand	1.5	1.5

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

E. For every heavy (generally formed) patches, add pea gravel to the mixture and proportion as follows:

<u>Material</u>	<u>Volumes</u>	<u>Weights</u>
Cement	1.0	1.0
Aggregate	0.2	0.33
Sand	1.0	1.0
Pea Gravel	1.5	1.5

- F. In cases where metallic aggregate is used in multiple patches and a rusty finish is not desired on the surface, the final layer (or at least the final 1/2") shall be composed of the 1:1.5 grout without the aggregate. After hardening, rub lightly as described above for form tie holes.
- G. Costs of patching and repairs shall be included in the Contract Sum and will not be considered as an addition to the Sum. If required, anchor bolts shall be set in drilled holes, and to these reinforcing steel, wire mesh, or other suitable devices embedded in the patch.

3.09 FINISHING

- A. Formed Surfaces: Grout finish the exposed face of the roof edge beam and parapet. Interior exposed concrete surfaces shall be similarly treated. Use 1:1.5 cement, sand grout mixed with sufficient water produce a consistency of thick paint. The surface of the concrete shall be wetted thoroughly and the grout shall be applied immediately to the wetted surfaces by brush or spray.
- B. Immediately after applying the grout, the surfaces shall be scoured vigorously with clean burlap or rubber sponge float to fill pits completely. While the grout in the pits is still plastic, a dry mix of the specified grout shall be rubbed over the surface with clean dry burlap until no materials remain on the surface except that within the pits. The operation for any area shall be completed the day it is started. After the work has been grouted, any remaining dark spots and streaks shall be rubbed lightly with a fine abrasive stone; rubbing shall not change the texture of the concrete.
- C. Unformed Surfaces: Floor slabs shall be true planes, including slabs pitched to drains, within a tolerance of 1/8" in 10 ft. Dusting with dry concrete or the addition of toppings will not be allowed.
1. Wood Float Finish: Exterior concrete platforms shall be finished by tamping to force coarse aggregate away from the surface and screening and floating to bring the surface to the required finish level. While the concrete is fresh to the required finish level. While the concrete is still green, but sufficiently hardened to bear a man's weight without deep imprint, it shall be wood-floated to a true even surface with no coarse aggregate visible.

SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

2. Broomed Finish: Concrete steps and walls, wet wells and slabs to receive fills shall be broom finished. The surfaces shall be first tamped to force aggregate away from the surface then screened and floated to required grade, or pitch, and finally, while still "green" broomed right angle to the normal line of travel.
3. Troweled Finish: Interior floor slabs not specified to have another finish shall be steel trowel finished. Surfaces shall be tamped, screened and floated as above and then wood floated. While concrete is still "green", steel trowel the surface to provide a smooth, uniform, impervious finish free of trowel marks.

3.10 MISCELLANEOUS

- A. Expansion Joint Filler: Spaces for premolded filler strips shall be formed with oiled wood strips accurately positioned and secured against displacement. The wood strips shall be tapered and of the size required for the filler strips. Material used to secure wood strips to concrete shall not harm the concrete. The wood strips shall not be removed until after the concrete curing period. The groove shall be thoroughly cleaned of laitance, curing compound, foreign materials, protrusions of hardened concrete and any dust which shall be blown out with oil-free, compressed air.

END OF SECTION

SECTION 31 00 00 - EARTHWORK

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work required by this section of the Specifications consists of furnishing all labor, plant, equipment, tools, materials, and incidentals, and performing all operations in connection with all Work necessary for all earthwork operations in accordance with the Drawings and these specifications, or as directed by the Engineer.
- B. The Work under this section of the Specifications shall include, but not necessarily be limited to:
 - 1. Stripping and stockpiling of topsoil.
 - 2. Mass earth and rock excavation.
 - 3. Earth and rock excavation for structures.
 - 5. Site grading.
 - 6. Processing on-site materials for use in the items of Work under this Contract.
 - 7. Providing, placing and compacting all general site fill, all structural fill and all bedding materials.
 - 8. Providing, placing and compacting all required borrow materials.
 - 9. Removal from the Site and disposal of all materials as directed by the Engineer.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Dust Control - Section 01 57 26.
- B. Trench Excavation and Backfill - Section 31 23 16.
- C. Dewatering, Control and Diversion of Water - Section 31 23 19.
- D. Soil Erosion and Sediment Control – Section 31 25 00.

1.03 DESCRIPTION

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- A. General Excavation: Shall be classified as Earth Excavation, Rock Excavation and Unclassified Excavation in accordance with the following definitions:
1. Earth excavation shall include the removal, relocation, spreading, and compaction of all suitable earth material so as to achieve the finished grades shown on the Drawings or as directed by the Engineer. Any unsuitable earth such as swamp muck, bog, pavement, peats, etc. shall be disposed of similar to the debris from Section 31 11 00 - Clearing and Grubbing. Earth excavation includes materials which are removable by normal earth excavation equipment and methods. All material which can be excavated by machinery of smaller size than the machine used to define Rock excavating equipment below shall be considered as earth excavation.
 2. Rock excavation shall include the removal and disposal of all rock material encountered so as to achieve the finished grades as shown on the Contract Drawings or as directed by the Engineer. Rock shall be defined as boulders one (1) cubic yard or more in volume, solid rock, rock in ledges and outcrops, and rock hard cementitious aggregate deposits. For the purposes of payment, rock shall be defined as material which cannot be dislodged and excavated with modern track mounted heavy duty excavating equipment without drilling, blasting or ripping. Rock excavation equipment is defined as Caterpillar Model No. D8N bulldozer or equivalent track mounted bulldozer, rated at not less than 285 HP flywheel power. Intermittent drilling, blasting, or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.
 3. Unclassified Excavation shall include all materials for which no classification is given above.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Common Fill: Shall be utilized under areas to be grassed and areas of general landscaping, and shall be clean, friable, non-plastic in-organic soil material containing no stone greater than two thirds (2/3) of the required loose lift thickness. The material shall be free from debris, ice, snow, frozen lumps, vegetation, stumps, roots or other organic materials.
- B. Sandy Fill: Shall be utilized as structure backfill and as trench backfill where indicated on the Contract Drawings, and shall be clean, friable, non-plastic in-organic soil material free from debris, ice, snow, frozen lumps, vegetation, stumps, roots or other organic materials and shall conform to the following gradation:

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<u>Sieve Size</u>	<u>Percent Passing By Weight</u>
6"	100
No. 10	30-95
No. 40	10-75
No. 100	5-30
No. 200	0-12

- C. Structural Fill: Shall be utilized under footings, foundations, slabs and structure bases where indicated on the Drawings or directed by the Engineer, and shall be clean, friable, non-plastic in-organic soil material free from debris, ice, snow, frozen lumps, vegetation, stumps, roots or other organic materials. The material shall consist of sound, tough, hard, durable particles of sand, gravel and crushed rock or a combination of these materials and shall conform to the following gradation:

<u>Sieve Size</u>	<u>Percent Passing By Weight</u>
6"	100
3/4"	50-100
1/4"	30-80
No. 40	10-50
No. 100	0-15
No. 200	0-10

- D. Granular Fill: Shall consist of sound, tough, hard, durable particles of crushed or uncrushed gravel, free from soft, thin, elongated or laminated pieces and vegetable or other deleterious substances. It shall conform to Section M.02, Article M.02.01 and Article M.02.06, Grading "B", of the Standard Specifications.

- E. Rolled Granular Base: Conform to Section M.02, Article M.02.03 of the Standard Specifications, for the stone sizes shown on the Drawings or required in the Specifications.

- F. Crushed Stone: Conform to Section M.02, Article M.01.01 of the Standard Specifications, for the stone sizes shown on the Drawings or required in the Specifications.

H. Bedding Material:

1. Crushed Stone Bedding: See Item F. above.
2. Sand Bedding: Shall be clean, friable, non-plastic in-organic soil material free from debris, ice, snow, frozen lumps, vegetation, stumps, roots or other organic materials and shall conform to the following gradation:

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<u>Sieve Size</u>	<u>Percent Passing By Weight</u>
1/2"	100
3/8"	80-106
No. 10	30-80
No. 40	10-50
No. 200	0-5

- I. Stone Screenings: That product from the crushing operations to produce crushed stone meeting the material specifications in Paragraph 2.01.F. above that completely passes a No. 4 sieve and not less than 40% passes a No. 8 sieve.

PART 3 - EXECUTION

3.01 LOCATIONS, GRADES AND ELEVATIONS

- A. The Drawings indicate the general location and alignment, and the invert and finished grade elevations of all proposed structures and utilities and other Work under this Contract. The Engineer reserves the right to make such adjustments in alignment and elevation as are found necessary in order to avoid interference with structures, facilities, or other obstacles and to adapt the proposed structures, utilities, and other work to other special conditions encountered.

3.02 UTILITIES

- A. The Contractor shall obtain information from the applicable utility companies concerning locations of all utilities within the areas of the Work. All rules and regulations of the respective utility companies shall be observed. The Contractor shall adequately protect from damage all existing active utilities. Inactive or abandoned utilities encountered in earthwork operations shall be plugged, capped, or removed as directed. The Contractor shall restore any utility damaged as a result of his operations without additional compensation.

3.03 TEMPORARY PROCESSING FACILITIES

- A. It is intended that the Contractor utilize, to the extent possible, on-site materials that have been generated in the earthwork operations under this Contract. The Work under this section of the Specifications shall include the processing of on-site materials, including obtaining any required permits and/or approvals for, and the set up and operation of any temporary processing facilities required. All processed materials shall meet the specifications for the various materials noted herein under Section 2.01, Paragraphs A through I.

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- B. The Contractor shall be responsible for obtaining all required permits and/or approvals from all regulatory authorities that may have jurisdiction in regulating the operation of any temporary materials processing facilities.
- C. The Contractor shall insure that the operation of any temporary processing facility shall be in strict conformance with the conditions of all permits and/or approvals for such facilities throughout the length of the project.
- D. The location of such facilities shall be in conformance with the conditions of all permits and/or approvals and shall be approved by the Engineer.

3.04 STRIPPING AND STOCKPILING TOPSOIL

- A. Prior to the commencement of any excavation and/or grading operations all topsoil shall be stripped to a depth equal to the top of the subsoil and from the area(s) to be disturbed and stockpiled in locations approved by the Engineer.
- B. Topsoil stockpiles shall be protected from erosion as specified in Section 31 25 00 – Soil Erosion and Sediment Control, of these Specifications.

3.05 STRUCTURE EXCAVATION

- A. Excavation shall be performed to the elevations and dimensions indicated plus adequate space to permit erection of forms, sheeting, shoring, bracing, drains, masonry, and other Work and the inspection of the Work.
- B. Immediately after excavations for the structure have been completed to the required grades, the exposed surface of the excavation shall be cleaned of all loose or disturbed materials. The surface of the excavation shall then be compacted with at least six (6) passes of an acceptable vibratory plate tamper.
- C. If suitable bearing for foundations is not encountered at the depth indicated on the Drawings, or in the excavation required in these Specifications, the Contractor shall immediately notify the Engineer. The Contractor shall remove any remaining unsuitable material as directed. Unsuitable materials as herein defined are organic material, frozen material, peat, organic silt, or combinations thereof, all having unsuitable in-situ bearing properties and all materials of whatever description which are too loose or saturated to provide satisfactory bearing.
- D. If rock is encountered at the required elevations, the rock shall be over-excavated and replaced with a minimum of twelve (12) inches of compacted gravel or crushed stone fill.
- E. The bottom of excavations shall be protected from frost from whatever source. Footings or slabs shall not be placed on frozen ground or on saturated materials. No excavation shall be

SECTION 31 00 00 - EARTHWORK

made to the full depth indicated when freezing temperatures may be expected, unless the footings or slabs can be placed immediately. The bottoms so excavated shall be protected from frost and water if placing of concrete is delayed.

- F. The Contractor shall sheet, shore, and brace all excavation if necessary to prevent cave-ins as required.
- G. Over excavation below or beyond the indicated or authorized limits shall be refilled with fill material approved by the Engineer compacted to ninety-five (95%) percent of the maximum dry density of the material as determined by ASTM D 1557 at no additional expense to the Owner.
- H. The Contractor shall control and pitch all grading to prevent water from running into the excavated areas of structures or to prevent damage to other Work already completed or in progress.
- I. The Contractor shall furnish all pumping and other dewatering equipment necessary to keep excavated areas dry during construction, as required. Refer to Section 02230 - Dewatering, Control and Diversion of Water, of these Specifications.
- J. Any damage resulting from the failure of the dewatering operations and any damage resulting from the failure to maintain the area of all structures and Work in a suitable dry condition shall be repaired as directed by the Engineer at no additional expense to the Owner.

3.06 SITE EXCAVATION, FILL AND BACKFILL

A. GENERAL

- 1. All fill materials shall be approved by the Engineer prior to being incorporated into any fill area.
- 2. The Contractor shall perform all site excavations, fills, re-fills, backfills, and compaction required for all site grading and for the various areas to be paved, and for utilities, structures, conduits and appurtenances.

B. BORROW

- 1. The amount of usable general fill material excavated within the limits of the Work contracted for may not be sufficient to accomplish the grading called for and other features of the Work. Borrow shall include the furnishing, removing, and satisfactory placing of additional material necessary to complete all features of the Work.

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2. Borrow shall be of satisfactory quality as determined by the Engineer for the purpose intended.
3. Borrow will be permitted only to the extent necessary to complete the Work as shown and only after all acceptable on-site material from excavation has been placed. With the approval of the Engineer, the Contractor may be permitted to place borrow before the excavation is completed; but he will be held responsible for the proper placing of all suitable excavated material.
4. The Contractor shall notify the Engineer at least fifteen (15) calendar days prior to obtaining material from any borrow pits so that an examination may be made of the fitness of the material. The limits of the proposed borrow pit shall be shown to the Engineer. The Contractor shall be required to clear the area of all unsuitable material.

C. OVER-EXCAVATION

1. Unauthorized excavation of suitable materials beyond the indicated or authorized limits shall be refilled, at no additional expense to the Owner, with gravel fill compacted to ninety-five (95%) percent of the maximum dry density of the material as determined by ASTM D 1557.

D. SHEETING AND SHORING

1. Excavations shall be adequately sheeted, shored and braced, as necessary, to permit proper execution of the Work and to protect all slopes and banks.
2. The Contractor shall be solely responsible for the adequacy of all temporary support systems.
3. The Contractor shall retain a Professional Engineer licensed in the State of Connecticut to design all temporary support systems required for the execution of the Work. The installation of sheeting, shoring, and bracing shall comply with the safety precautions as outlined in the Associated General Contractors of America "Manual of Accident Prevention in Construction," and all Local and State regulations.
4. Sheeting shall be installed as required to prevent cave-ins or settlement and to protect workmen, adjacent structures, and utilities. Shoring and sheeting may be removed as the backfilling progresses, but only when banks are safe against caving. The Engineer may direct that sheeting, shoring, and bracing be left in place at any time during the progress of the Work, and direct that the timber and/or steel be used for sheeting and bracing, authorized to be left in place, be cut-off at a specified elevation.

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5. Dewatering shall be performed as required, for all excavations below ground water level in conformance with Section 31 23 19 - Dewatering, Control and Diversion of Water, of these Specifications.

E. BACKFILLING

1. Backfilling shall comply with material, compaction and placing requirements specified elsewhere in this section. In addition, comply with the following requirements:
2. Backfilling at Buildings: Remove from spaces to be filled all excessively wet or otherwise unsuitable material, such as rubbish, organic materials, sheeting, bracing, forms and debris. Do not commence backfilling operations until conditions have been inspected and approved by the Engineer. Do not place fill material against foundation walls or structural members unless they are either shored and braced or of sufficient strength to withstand the pressures to be imposed by compaction. Similarly, do not place fill until subgrade dampproofing materials have been in place for at least 48-hours, have been inspected and approved by the Engineer, and are properly protected.
3. Backfilling at Utility Trenches: Do not commence backfilling operations until all piping, conduit, etc. has been installed, tested and approved by the Engineer and the locations of all pipe and appurtenances have been recorded. backfill carefully by hand around pipe to depth of 6" above top of pipe using bedding material and tamping firmly in layers not to exceed 6", compacting by hand rammers or mechanical tampers. When a manufacturer of a utility line material suggests specific backfill materials and methods other than those specified herein, such requirements shall govern, providing the finished work equals or exceeds the result obtained by the materials and methods specified herein as determined by the Engineer.
4. Backfilling at Retaining Structures: Compaction equipment weighing more than 2,000 pounds will not be used adjacent to retaining structures or building walls which function as retaining structures unless specifically authorized by the Engineer.

3.07 PLACING FILL

A. PREPARATION

1. Foundations for fills, refills and backfills shall be prepared in an approved manner by removing all excess and unsuitable materials. The base or other surfaces of fills, refills, or excavations which have been allowed to weather and which, in the opinion of the Engineer, are unsuitable, shall be removed and replaced with crushed stone or gravel fill or shall be dried, roughened or scarified, and then compacted with at least six (6) passes of a suitable vibratory compactor, as directed, before any additional fills or refills are placed on them.

SECTION 31 00 00 - EARTHWORK

B. PLACEMENT

1. Materials placed shall be specially compacted by depositing in approximately horizontal layers not exceeding twelve (12) inches in thickness before compaction, and unless sufficiently moist as spread, shall be wetted to near the optimum moisture content. Each layer shall be compacted by suitable vibratory compactors or tampers.
2. Materials used in refills and backfills shall be carefully placed to avoid damage to structures, conduits and/or pipes.

C. MOISTURE CONTROL

1. Fill material which does not contain sufficient moisture to be compacted to the specified densities shall be conditioned by adding water uniformly to the surface of each lift before compaction.
2. Fill material containing excess moisture shall be required to dry to optimum moisture content before it is placed and compacted. A tolerance of up to five (5%) percent above optimum may be permitted by the Engineer. However, if a lift of fill displays pronounced elasticity or deformation under the action of earthmoving and compaction equipment, the moisture content shall be reduced to secure stability.

3.08 COMPACTION

A. REQUIREMENTS

1. All fills, refills, and backfills shall be compacted in accordance with the following minimum percentage of the maximum dry density for the material as determined by ASTM D 1557:
 - a. All fills under building areas - 95%.
 - b. All bases under slabs on grade and footings - 97%.
 - c. All fills under areas to be paved:
 - (1) To within three (3) feet of finished pavement - 92%.
 - (2) Within three (3) feet of finished pavement - 95%.
 - d. All foundation and retaining wall backfill - 95%.

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- e. All pipe bedding - 95%.
- f. All trench backfill under areas to be paved:
 - (1) To within three (3') feet of finished pavement - 92%.
 - (2) Within three (3') feet of finished pavement - 95%.
- g. All trench backfill under unpaved areas - 90%.
- h. All fills under general landscaped areas - 90%.

B. TESTING

1. All percentages of compaction specified herein shall be related to the maximum dry density as established by Method D ASTM Designation D 1557, latest revision and verified in the field by ASTM Designation D 1556, latest revision, D 2167, latest revision or an approved Nuclear Density Testing Device. Prior to placing, at least one (1) laboratory test shall be made by the Engineer on a representative sample of each of the fill materials proposed to be furnished for the earthwork operations to determine gradation and moisture-density characteristics.
2. Field density tests to determine the actual in-place densities being attained shall be made at the Owner's expense and insufficient quantity to determine that the required compaction is being attained.

C. EQUIPMENT

1. Where vibratory compaction equipment is specified herein or is directed to be used by the Engineer, all such equipment, whether plate-type or roller-type, shall be furnished with a vibrating surface at least twenty-four (24") inches in width, and capable of operating at a minimum of two thousand (2,000) blows per minute. Equipment not specifically designed as vibrating compaction equipment shall not be permitted for compaction of either existing in-place materials or of fills, refills and backfills. Plate vibratory tampers specified for compaction of materials shall be commercially manufactured by Jackson Vibrators, Inc., Ludington, MI.; the Wacker Corp., Hartford, WI.; the Jay vibratory plate tamper as manufactured by the Jay Co., Columbus, OH.; or equal.
2. Vibrating rollers and vibrating tampers specified for compaction shall be similar and equal to the Vibrating Rollers as manufactured by Essick Manufacturing Company, Elizabeth, NJ; the Multiple Vibratory Compactor as manufactured by Jackson Vibrators, Inc., Ludington, MI; or equal. Jack hammers, rubber-tired vehicles, and similar

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equipment not specifically designed and manufactured for the compaction of granular materials will not be approved for use.

D. SURFACES TO BE COMPACTED

1. Surfaces to be compacted shall, unless otherwise specified, shall be compacted by a sufficient number of passes with approved vibratory compactors, in order to obtain the percentage of compaction specified in subsection 3.07 A. A complete pass shall consist of the entire coverage of the surface area to be compacted with one trip of the equipment. Each trip of the equipment shall overlap the previous trip by at least one (1) foot.
2. Dumping, spreading, preparing and compacting of several layers of fill materials across the area of work may be performed simultaneously, providing there is sufficient total area to permit these operations to proceed in a systematic manner.
3. No rolling equipment shall be used to compact fill, refill or backfill materials within four (4) feet of the vertical faces of any concrete walls or utility pipes. Plate vibratory tampers shall be used in these restricted areas and in other areas too confined to satisfactorily use rolling equipment.
4. It is the intent of these compaction requirements that the minimum in-place dry density of the compacted materials resulting from the specified minimum number of passes of the compaction equipment will be equal to or greater than the minimum percentages specified herein. Additional passes of the specified equipment shall be required if the minimum percentages of ASTM in-place dry densities as specified are not obtained with the minimum passes indicated.

3.09 RESTORATION OF EXISTING SURFACES

- A. Whenever streets, lawns or sidewalks within or outside the Contract Limit Lines have been excavated in fulfilling the work required under this Contract, the Contractor shall furnish and install all material necessary to bring finish surfaces level with the existing adjacent surfaces. All work shall be installed to match the existing conditions in accordance with the governing authority. The Contractor shall notify the proper authorities prior to restoring surfaces outside the Contract Limit Lines.

3.10 OVERLOAD OF STRUCTURES

- A. The Contractor shall be responsible for taking all necessary precautionary measures to assure that compaction equipment used will not overload structures during the compaction of fills and backfills.

SECTION 31 00 00 - EARTHWORK

END OF SECTION

SECTION 31 05 19 – GEOTEXTILES

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work required by this section of the Specifications consists of furnishing all labor, plant, equipment, tools, materials, and incidentals, and performing all operations in connection with all Work necessary for the installation of geotextiles in accordance with the Drawings and these Specifications, or as directed by the Engineer.

1.02 QUALITY ASSURANCE

- A. The latest edition of the following standards, as referenced herein, shall be applicable.

American Society for Testing and Materials (ASTM).

1.03 SUBMITTALS

- A. Product Data: Submit Manufacturer's material specifications, product literature, and installation instructions.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Delivery:

1. Deliver sufficient materials to the site to prevent interruption of the Work.
2. All materials shall be inspected by Contractor upon delivery. Products received at the Site torn, with holes, deteriorated, or otherwise damaged will not be approved and shall be returned and replaced at no expense to the Owner.

B. Storage:

1. All material shall be stored in strict accordance with the manufacturer's recommendations and as approved by the Engineer.
2. Do not store products directly on ground. Ship and store geotextile with suitable wrapping for protection against moisture and ultraviolet exposure. Store geotextile in way that protects it from elements, if stored outdoors, elevate and protect geotextile with waterproof cover.

C. Handling:

SECTION 31 05 19 – GEOTEXTILES

1. All material shall be handled in strict accordance with the manufacturer's recommendations and as approved by the Engineer.

PART 2 - PRODUCTS

2.01 NONWOVEN GEOTEXTILE

A. Separation/Filtration Fabric: To be used in drainage ditches, haybale installation, culvert outfall installations, rip-rap installations, stone bedding envelope installations, and cover material separation.

1. Pervious sheet of polyester, polypropylene, or polyethylene fabricated into stable network of fibers that retain their relative position with respect to each other. Nonwoven geotextile shall be composed of continuous or discontinuous (staple) fibers held together through needle-punching, spun-bonding, thermal-bonding, or resin-bonding.
2. Geotextile Edges: Selvaged or otherwise finished to prevent outer material from pulling away from geotextile.
3. Unseamed Sheet Width: Minimum 12 feet.
4. Physical Properties:

Property	Design Value	Test Method
Tensile Strength	120 lbs	ASTM D4632
Elongation	50%	ASTM D4632
Trapezoidal Tear	50 lbs	ASTM D4533
Mullen Burst Strength	225 psi	ASTM D3786
Puncture Strength	65 lbs	ASTM D4833
A.O.S.	70 (US Sieve)	ASTM D4751
Permittivity	1.8 sec-1	ASTM D4491

PART 3 - EXECUTION

3.01 GENERAL

A. The Contractor shall be responsible for the installation and seaming of geotextile fabric in accordance with the Specifications and the manufacturer's recommendations.

SECTION 31 05 19 – GEOTEXTILES

3.02 SUBGRADE PREPARATION

- A. Surfaces to be covered with geotextile fabric shall be smooth and free of rocks, sticks, roots, sharp objects, and debris that may damage the fabric. The surface to be covered shall be firm and unyielding, with no sudden changes or breaks in grade. There shall be no standing water or excessive moisture on the surface when the fabric is placed.
- B. The compacted subgrade shall be maintained in a smooth, uniform, and compacted condition during installation of the fabric.

3.03 GEOTEXTILE INSTALLATION

- A. The fabric shall be cleaned of all debris or other materials that may negatively affect the fabric's performance.
- B. Mechanical equipment shall not be permitted to operate directly on the fabric unless authorized to do so by the manufacturer and approved by the Engineer.

3.04 GEOTEXTILE PLACEMENT

- A. Fabric shall be placed as recommended by the manufacturer and approved by the Engineer on surfaces which have been prepared to conform with these Specifications and found acceptable for fabric installation.
- B. The fabric shall be placed as smooth and wrinkle-free as possible.
- C. When installing geotextile in trenches, swales, ditches, etc., overlap geotextile in the direction of flow.
- D. All areas of fabric damaged during installation as determined by the Engineer shall be repaired or replaced by the Contractor as specified at no additional cost to the Owner. Should the fabric be damaged during any step of the installation, the damaged section shall be repaired by covering it with a piece of fabric which extends at least twenty-four (24) inches in all directions beyond the damaged area. The fabric shall be secured by sewing or bonding as approved by the Engineer.
- E. At time of installation, fabric will be rejected if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, handling, or storage. Damaged materials shall be removed and replaced at no additional cost to the Owner.
- F. Fabric shall be placed with long dimension down slope.

SECTION 31 05 19 – GEOTEXTILES

- G. Fabric shall be protected at all times during construction from contamination by surface run-off and any fabric so contaminated shall be removed and replaced with uncontaminated fabric.

3.05 SEAMS AND OVERLAPS OF GEOTEXTILE

- A. All overlaps shall be a minimum of eighteen (18) inches.

3.06 COVER MATERIALS OVER GEOTEXTILES

- A. Granular materials shall be placed on geotextiles as shown on the Contract Drawings. During backdumping and spreading, a minimum depth of six (6) inches of granular material shall be maintained at all times between the fabric and wheels of trucks or spreading equipment. All equipment used in spreading or traveling on the cover layer for any reason shall exert low ground pressures and shall be approved by the manufacturer and Engineer. Dozer blades, etc. shall not make direct contact with the fabric, however, if tears occur in the fabric during the spreading operation, the granular material shall be cleared from the fabric and the damaged area repaired as previously described.
- B. The granular material shall be spread in the direction of fabric overlap. Large fabric wrinkles which may develop during the spreading operations shall be folded and flattened in the direction of the spreading. Occasionally, large folds may reduce the fabric overlap width. Special care shall be given to maintain proper overlap and fabric continuity.
- C. All equipment spreading cover material or traveling on the cover layer shall avoid making sharp turns, quick stops, or quick starts.
- D. Fabric shall be covered as soon as possible after placement to minimize exposure to sunlight. Fabric shall not be exposed for more than five (5) days.

END OF SECTION

SECTION 31 23 00 – TRENCH EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work required by this section of the Specifications consists of furnishing all labor, plant, equipment, tools, materials, and incidentals, and performing all operations in connection with trench excavation and subsequent earth backfilling necessary for the construction of all drainage pipe, utilities, conduits, and related Work in accordance with the Drawings and these Specifications, or as directed by the Engineer.
- B. The Work shall also include the temporary control and diversion of groundwater, the installation of trench support systems, and the removal and disposal of surplus excavated material, which in the opinion of the Engineer are considered unsuitable for reuse in any part of the Work.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Earthwork - Section 31 00 00.
- B. Dewatering, Control and Diversion of Water - Section 31 23 19.
- C. Soil Erosion and Sediment Control - Section 31 25 00.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Bedding and backfill materials shall conform to the requirements of Section 31 00 00 – Earthwork.

PART 3 - EXECUTION

3.01 CLASSIFICATION OF TRENCH EXCAVATION

- A. Trench Excavation: Shall be classified as either earth or rock as described below:
 - 1. Trench Excavation shall include the excavation and removal of all materials of whatever nature encountered in trench excavation operations, or as directed by the Engineer.

SECTION 31 23 00 – TRENCH EXCAVATION AND BACKFILL

2. Rock in trenches shall be excavated well in advance of the construction of pipelines, utilities, conduits and other Work to ensure that all necessary blasting is kept at a reasonable distance from the Work in progress.

3.02 BACKFILL

- A. Bedding Material: Shall be placed to the dimensions and compacted thicknesses as shown on the Drawings and shall conform to the requirements of these Specifications. Bedding material shall be deposited in layers and shall be compacted to not less than ninety (90%) percent of the maximum dry density of the material as determined by ASTM D 1557 for all areas not under traveled ways and to not less than ninety-five (95%) percent of the maximum dry density of the material as determined by ASTM D 1557 for all areas under traveled ways.
- B. Sandy Fill: Shall be suitable excavated material meeting the requirements of Section 31 00 00 - Earthwork of these Specifications and placed in accordance with the Drawings. If sufficient suitable materials are unavailable from excavations, additional acceptable backfill shall be obtained and compacted in the Work in sufficient quantities required for completion of the refilling to the limits directed.
- C. All Sandy Fill shall be placed in uniform layers which shall not exceed twelve (12) inches in depth and shall be thoroughly compacted by means of mechanical rammers or vibrators, or by pneumatic tampers. Hand tampers shall be used only upon written permission of the Engineer. All trench backfill shall be compacted to not less than ninety (90%) percent of the maximum dry density of the material as determined by ASTM D 1557 for all areas not under traveled ways and to not less than ninety-five (95%) percent of the maximum dry density of the material as determined by ASTM D 1557 for all areas under traveled ways.

3.03 GENERAL

- A. Unauthorized excavations made beyond neat lines or below subgrade lines shall be refilled with approved compacted gravel or other approved material as directed by the Engineer and at no additional expense to the Owner.
- B. No backfilling shall be allowed around manholes or other masonry structures until concrete or masonry has set sufficiently, as determined by the Engineer. The best of the excavated materials shall be used in backfilling within two (2) feet of the structure. Unequal soil pressures shall be avoided by depositing the material evenly around the structure.
- C. Frozen material shall not be placed in the backfill, nor shall backfill be placed upon frozen material. Previously frozen material shall be removed or shall otherwise be treated as required, before new backfill is placed.

SECTION 31 23 00 – TRENCH EXCAVATION AND BACKFILL

- D. If pipe is to be laid in embankments or other recently filled materials, the fill shall first be placed to the top of the embankment or to the height of at least one (1) foot above the top of the pipe, whichever is lesser. Particular care shall be taken to ensure maximum consolidation of fill under the pipe location. The pipe trench shall be excavated as though in undisturbed earth.
- E. All surfaces shall be graded evenly. Unless otherwise specifically required, all paving and walks damaged by work shall be built anew of same kind of material as that existing, and all loam, sods, shrubs, trees, and other surface material shall be replaced in good condition.

END OF SECTION

SECTION 31 23 19 – DEWATERING, CONTROL AND DIVERSION OF WATER

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work required by this section of the Specifications consists of furnishing all labor, plant, equipment, tools, materials, and incidentals, and performing all operations in connection with the dewatering, control, and diversion of water, and all other operations necessary to maintain "in the dry" conditions of all excavations and Work areas of this Contract, in accordance with the Drawings and these Specifications, or as directed by the Engineer.
- B. The Contractor shall be responsible for providing, operating, maintaining, and removing all dewatering and other facilities, including all pumping and appurtenant equipment required to maintain "in the dry" conditions.
- C. The Contractor shall exercise extreme caution in all dewatering operations and shall be responsible for performing all required dewatering in a manner to prevent injury to persons or public health and damage to existing structures, facilities, wells or the Work in progress.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- 1. Earthwork - Section 31 00 00.
- 2. Trench Excavation and Backfill - Section 31 23 16.
- 3. Soil Erosion and Sediment Control - Section 31 25 00.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. The Contractor shall provide all pumps, drains, well points, cofferdams or any facilities necessary for the control, collection, and disposal of all surface and subsurface water encountered in the performance of the Work.

PART 3 - EXECUTION

3.01 GENERAL

- A. The Contractor shall provide dewatering during construction suitable for the conditions encountered or as required by the Engineer to ensure that all Work is performed in the dry condition.

SECTION 31 23 19 – DEWATERING, CONTROL AND DIVERSION OF WATER

- B. Dewatering facilities shall be designed, installed, and operated in such a manner as to minimize the transport of fine soil particles from the excavation that could cause settlement of structures or of the Work in progress.
- C. Any damage to existing structures or the Work in progress resulting from the failure of the Contractor to perform the Work in the dry condition shall be repaired by the Contractor, as directed by the Engineer, at no additional expense to the Owner.

3.02 WORKMANSHIP

- A. All dewatering operations shall be carried out in such a manner that no loss of ground occurs. All pipes, structures and other facilities shall be thoroughly braced or otherwise protected against damage.
- B. All water and other materials removed from excavations and other Work areas by dewatering operations shall be disposed of in such a manner to prevent direct discharge into a waterbody. Sedimentation basins shall be provided for any water from dewatering operations that is to be discharged to a waterbody or storm drainage system. No water from dewatering operations shall be discharged to any sanitary sewer system.
- C. Upon completion of the Work in each area requiring dewatering, the Contractor shall remove all temporary dewatering equipment and shall perform all necessary Work including backfilling, compacting, and grading all areas disturbed for purposes of dewatering operations.

END OF SECTION

SECTION 31 25 00 – SOIL EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work required by this section of the Specifications consists of furnishing all labor, plant, equipment, tools, materials, and incidentals, and performing all operations in connection with all Work necessary for controlling soil erosion and water pollution and providing and maintaining the various erosion and sediment control devices including but not limited to berms, dikes, dams, sediment basins, geosynthetics, haybales, gravel, mulches, grasses, slope drains, ditches, channels, riprap, grading to surface runoff, and other erosion and sediment control devices in accordance with the Drawings and these Specifications, or as directed by the Engineer.
- B. The Contractor shall operate, maintain, and provide means and devices necessary to minimize to the greatest extent possible, erosion within the Work area of the Contract and to prevent entrance of any silt laden runoff from the work area into any drainage system, sewer or waterbody on or adjacent to the Work area. Waterbodies mentioned herein shall mean any Inland Wetland, swamp, stream, watercourse, lake, pond, or other area of water impoundment.
- C. The Contract Drawings and these Specifications set forth the minimum requirements for the control of soil erosion and sediment. The Contractor shall employ such additional methods and measures as may be necessary to fully comply with the intent of this section and the guidelines and recommendations set forth in the “Connecticut Guidelines for Soil Erosion and Sediment Control”, 2002, latest revision.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Earthwork - Section 31 00 00.
- B. Trench Excavation and Backfill - Section 31 23 16.
- C. Dewatering, Control and Diversion of Water - Section 31 23 19.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All materials to be used for the control of soil erosion and sediment shall be as indicated on the Drawings and shall be approved by the Engineer.

SECTION 31 25 00 – SOIL EROSION AND SEDIMENT CONTROL

PART 3 - EXECUTION

3.01 GENERAL

- A. All necessary soil erosion and sediment control devices shall be properly installed, as specified on the Drawings, and in a manner acceptable to the Engineer prior to the commencement of the Work.
- B. Soil erosion and sediment control devices shall be maintained by the Contractor as specified on the Contract Drawings and in a manner acceptable to the Engineer. Soil erosion and sediment control devices shall be replaced as required or as ordered by the Engineer.
- C. Soil erosion and sediment control devices shall be removed after all disturbed areas have been stabilized, as ordered by the Engineer.
- D. The Engineer has the authority to control the surface area of earth material exposed by construction operations and to direct the Contractor to immediately provide permanent or temporary erosion and sedimentation control devices.
- E. All slopes of temporarily stockpiled material shall be stabilized or otherwise protected by seeding, mulching, or any means necessary to comply with the intent of this section.

END OF SECTION

SECTION 32 12 16 – BITUMINOUS CONCRETE PAVEMENT

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work required by this Section of the Specifications consists of the furnishing of all labor, plant, equipment, tools, materials and incidentals, and the performing of all operations in connection with installing all pavement base and subbase courses, and temporary and permanent bituminous pavements, including providing all appurtenances and incidentals required, to the lines, grades, typical cross sections and compacted thicknesses in accordance with the Drawings and these Specifications, or as directed by the Engineer, or as necessary for the proper completion of the intended Work.
- B. The Work under this Section of the Specifications shall include, but not necessarily be limited to:
 - 1. Base and subbase courses.
 - 2. Bituminous concrete pavement.
 - 3. Temporary and permanent bituminous concrete pavement repair.
 - 5. Sawcut bituminous concrete pavement.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Soil Erosion and Sediment Control – Section 31 25 00.
- B. Earthwork - Section 31 00 00.
- C. Trench Excavation and Backfill - Section 31 23 16.
- D. Dewatering, Control and Diversion of Water - Section 31 23 19.

PART 2 - PRODUCTS

2.01 BASE MATERIALS

- A. Rolled Granular Base: shall conform to the requirements of the Standard Specifications, Section M.02, Article M.02.02-3.
- B. Processed Aggregate Base: shall conform to the requirements of the Standard Specifications, Section M.05, Article M.05.01.

SECTION 32 12 16 – BITUMINOUS CONCRETE PAVEMENT

- C. Bituminous Concrete: shall conform to the Standard Specifications, Section 4.06.
- D. Tack Coat: of emulsified asphalt shall conform to Standard Specifications, Section M.04, Article M.04.01.1(d) (5). Material Type shall be SS-1.

2.02 EQUIPMENT

- A. Sawcutting Equipment: shall be a gasoline engine driven self-contained unit with a turning blade.
- B. Compaction Equipment:
 - 1. All equipment used for compaction of subgrades shall be as specified in the Standard Specifications, Section 4.06.
 - 2. All equipment used in the compaction of subbases and base courses shall be power rollers weighing not less than ten (10) tons or an equivalent vibratory roller or compactor approved by the Engineer.
- C. Paving and Curbing Equipment:
 - 1. All equipment used for the spreading and compacting of bituminous concrete shall be as specified in the Standard Specifications, Section 4.06, Article 3.11 and 3.12.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. INSPECTION

- 1. Prior to commencing all work of this Section, carefully inspect the installed Work of all other trades and verify that all such work is complete to the point where the work of this Section may begin.
- 2. Verify that the bituminous concrete pavement may be installed in strict accordance with the Contract Drawings and these Specifications.
- 3. The Contractor shall notify the Engineer of any discrepancies and shall not proceed with the installation of any Work until all discrepancies have been resolved.

SECTION 32 12 16 – BITUMINOUS CONCRETE PAVEMENT

3.02 SAWCUTTING

- A. In all areas where pavement is to be removed or where new pavement is to match existing pavement, the existing pavement shall be sawcut uniformly along the lines shown on the Contract Drawings or as directed by the Engineer. The Contractor shall exercise reasonable care not to damage existing pavement that is to remain.

3.03 PLACEMENT OF SUBBASE AND BASE COURSE

- A. Rolled Granular Base shall be placed and compacted to the lines, grades, typical cross sections and compacted thicknesses shown on the Contract Drawings.

3.04 PLACEMENT OF BITUMINOUS CONCRETE PAVEMENT

- A. Bituminous Concrete Pavement shall be placed in accordance with the Standard Specifications, Section 4.06.

END OF SECTION

SECTION 32 92 19 – SEEDED LAWNS

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work required by this section of the Specifications consists of furnishing all labor, plant, equipment, tools, materials, and incidentals, and performing all operations in connection with all Work necessary to provide the establishment of general lawn area grass, in accordance with the Drawings and these Specifications, or as directed by the Engineer.

1.02 WORK INCLUDED

- A. The Work of this section consists of all seeding and related Work as shown on the Drawings or required herein and includes the following:
 - 1. Providing all topsoil from on-site sources required for the Work under this section.
 - 2. Providing all soil amendments, fertilizers, herbicide, and pesticide products as required.
 - 3. Preparation of subsoil in preparation for loaming.
 - 4. Spreading and fine grading topsoil for all lawn areas.
 - 5. Seeding.
 - 6. Establishment and maintenance of lawn area grass.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Site Preparation – Section 02 41 00.
- B. Earthwork – Section 31 00 00.
- C. Soil Erosion and Sediment Control – Section 31 25 00.

1.04 SUBMITTALS

- A. Materials List: Submit a complete list of all materials proposed for use in this Work, demonstrating complete conformance with the requirements specified.
- B. Grass Seed: For each grass seed mixture, stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

SECTION 32 92 19 – SEEDED LAWNS

- C. Fertilizers: Product certificate from manufacturer.
- D. Pesticides and Herbicides: Product label and manufacturer's instructions.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications:
- B. Herbicides shall be applied by a licensed commercial applicator in conformance with all applicable laws and regulations, and in conformance with the manufacturer's directions.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver manufactured products in manufacturers original, unopened, and undamaged containers with labels intact and legible.
- B. Store and handle manufactured products to prevent damage and deterioration. In the event of damage, make replacements necessary at no additional cost to Owner.
- C. Use all means necessary to protect seed from moisture and other contaminants which may adversely affect proper germination.
- D. Use all means necessary to protect amendments, fertilizers, and other materials from moisture and other contaminants that may adversely affect their efficacy.

PART 2 – PRODUCTS

2.01 TOPSOIL

- B. Topsoil shall be from on-site sources and amended as specified.

2.02 LIME

- A. Lime shall be an approved agricultural limestone containing no less than fifty (50) percent of total carbonates and twenty-five (25) percent total magnesium with a neutralizing value of at least one hundred (100) percent. The material shall be ground to such a fineness that forty (40) percent will pass through a Number 100 U.S. Standard sieve and ninety-eight (98) percent will pass through a Number 20 U.S. Standard sieve. Lime shall be of uniform composition, dry, and free flowing, and shall be delivered to the Site in original, unopened containers, each bearing the manufacturers guaranteed analysis.

SECTION 32 92 19 – SEEDED LAWNS

2.03 FERTILIZERS

- A. 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 formaldehyde, phosphorous, and potassium in the following composition:
1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from qualified testing laboratory.

2.04 WATER

- A. Water is available from the existing irrigation system. The Contractor shall not use water from other sources.

2.05 HERBICIDES, PESTICIDES, AND FUNGICIDES

- A. Herbicides, pesticides, and fungicides may be used if required. All materials shall be approved by the Owner prior to use and shall be applied by State licensed applicators in strict conformance with the manufacturer's instructions.

2.06 GRASS SEED

- A. Grass seed shall be fresh, clean, dry, new crop seed, complying with AOSA's "Rules for Testing Seeds" for purity and germination tolerances.
- B. Seed Species Mixture: Seed of grass species as follows, with not less than 80 percent germination, not less than 97 percent pure seed, and not more than 0.5 percent weed seed.
1. Proportioned by weight as follows:
 - a. 40 percent Kentucky bluegrass.
 - b. 40 percent improved creeping red fescue.
 - c. 20 percent perennial rye grass.

PART 3 - EXECUTION

3.01 PREPARATION OF SUBSOIL

- A. Prior to spreading topsoil, subsoil should be rough graded to correspond with finish grades as indicated on the Drawings. The subgrade shall slope to allow for subsurface drainage.

SECTION 32 92 19 – SEEDED LAWNS

Depressions shall be filled, and areas which are highly compacted shall be loosened to a depth which is adequate for gravitational water through the subsoil.

- B. After acceptance of subsoil grades, loosen and mix subgrade material two (2) to four (4) inches deep. Remove stones over two (2) inches, sticks, debris, and other deleterious materials which may impede the healthy and vigorous growth of grass. Move no heavy objects or equipment, except as necessary for the spreading of topsoil, over seed beds after preparation of the subgrade.

3.02 TOPSOIL PLACEMENT

- A. After approval of subgrade, spread stockpiled topsoil using tracked or low-pressure turf tired equipment as specified herein. Do not spread topsoil which is in a wet or frozen condition.
- B. Fine grade the topsoil surface to achieve the surface elevations indicated on the Drawings within a surface tolerance of one-half (1/2) inch in ten (10) feet.
- C. Roll topsoil surface with a tow behind turf roller to firm surface.

3.03 SEEDING

- A. Sow grass seed between August 15 and September 15, except as otherwise approved by the Engineer.
- B. If seeding out of season as described above, The Contractor is still obligated by all conditions and responsibilities described under Paragraph 3.06 Lawn Maintenance and Inspection, until final acceptance of all turfgrass areas.
- C. Prior to sowing seed, scarify soil and rake until surface is smooth, friable, and of uniformly fine texture. Seed evenly at suppliers recommended rates, lightly rake and water with fine spray.
- D. Mulch sloped area great than 3:1 with straw mulch at an application rate of 1 ½ - 2 tons per acre.

3.04 LAWN MAINTENANCE AND INSPECTION

- A. Maintenance of lawn areas grass shall begin immediately after seeding operations, and shall generally consist of watering, weeding, mowing, edging, fertilization, reseeding, disease and insect control, repair of erosion or settlement areas, and any other procedure consistent with good horticultural practices, necessary to insure normal, vigorous and healthy grass growth.

SECTION 32 92 19 – SEEDED LAWNS

- B. Maintenance shall also include filling, regrading, and reseeding as necessary to correct depressions caused by settling or other damage.
- C. Maintenance shall also include all temporary protection fencing, barriers, signs and all other work incidental to proper maintenance.
- D. The Contractor shall be responsible for maintenance to establish a uniform stand of grass until acceptance.
- E. At the time of first cutting, mow turf not less than two (2) inches high with reel type mowing equipment.

3.05 INSPECTION AND ACCEPTANCE

- A. The Engineer shall inspect the lawn areas for acceptance upon written request by the Contractor. The request shall be received at least ten (10) days before the anticipated date of inspection.
- B. Final acceptance will not be approved until all seeded areas are in satisfactory condition.
- C. If the grass is in satisfactory condition, the Contractors care and maintenance responsibilities will terminate. If the grass condition is not satisfactory, the Contractors maintenance responsibilities shall continue until an acceptable stand of turf grass is achieved.

END OF SECTION

SECTION 33 31 13 – SANITARY PIPING

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work required by this section of the Specifications consists of furnishing all labor, plant, equipment, tools, materials, and incidentals, and performing all operations in connection with all Work necessary to provide the complete installation of sanitary pipe, fittings, and appurtenances in accordance with the Drawings and these Specifications, or as directed by the Engineer.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- B. Trench Excavation and Backfill - Section 31 23 16.

1.03 QUALITY ASSURANCE

- A. Comply with other related sections.

1.04 SUBMITTALS

- A. Catalog cuts, manufacturers literature and technical data for all sanitary pipe, fittings, geotextiles, and appurtenances.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Delivery and Storage:

1. Pipe, fittings, and appurtenances shall be delivered to and stored within the Contractor's work limits as shown on the Drawings.
2. Special care shall be exercised during delivery and storage to avoid damage to the products.

B. Handling:

1. Pipe, fittings and appurtenances shall be handled carefully with approved handling devices in strict conformance with the manufacturer's recommendations.
2. Products shall not be dropped or rolled off trucks, nor shall products be otherwise dragged, rolled, or skidded.

SECTION 33 31 13 – SANITARY PIPING

PART 2 - PRODUCTS

2.01 MATERIALS

A. GENERAL

1. Pipe shall be of the sizes, type, and materials indicated in this section of the Specifications, or as directed by the Engineer.
2. The Contractor shall provide only new and unused pipe materials as more specifically defined below.

2.02 POLYVINYL CHLORIDE PIPE AND FITTINGS

- A. Pipe and fittings shall be manufactured from PVC plastic as defined in ASTM Specification D-1784, latest revision.
 - B. Schedule 40 Polyvinyl Chloride pipe conforming to the requirements of ASTM D1785.
 - C. Polyvinyl Chloride pipe conforming to the requirements of ASTM D3034 SDR-35 and ASTM F 679, latest revision SDR-35 with integral bell-and-spigot joints.
- B. PVC Pipe shall be supplied in standard twenty (20) foot and/or thirteen (13) foot lengths with a tolerance of plus or minus one (1) inch. PVC pipe shall meet the following dimensional criteria, with tolerances listed in inches:

Nominal Size	Outside Average Diameter	Tolerance	Min. Wall Thickness
4"	4.22"	0.009±	0.120
6"	6.28"	0.011±	0.180
8"	8.40"	0.012±	0.240
10"	10.50"	0.015±	0.300
12"	12.50"	0.018±	0.360
15"	15.30"	0.023±	0.437
18"	18.37"	0.028±	0.499

2.03 GEOTEXTILE

- A. Geotextile for use in trench excavation operations, shall be a non-woven polypropylene fabric, DuPont Typar, Mirafi-140, or approved equal.

SECTION 33 31 13 – SANITARY PIPING

2.04 UTILITY MARKING TAPE

- A. Utility marking tape shall be the non-detectable type containing the words "CAUTION - SEWER LINE BURIED BELOW" and shall be "TERRA-TAPE" as manufactured by Reef Industries, P.O. Box 33310, Houston, Texas 77233, (800) 231-2417, or equal.

PART 3 - EXECUTION

3.01 PRE-INSTALLATION INSPECTION

- A. All pipe, fittings, and appurtenances shall be completely and carefully inspected by the Contractor for defects and damage before lowering the pipe into the trench. The interior of the pipe and fittings shall be thoroughly cleaned of foreign matter before being lowered into the trench. All defective, unsound, and/or damaged materials shall not be used and shall be removed from the job site.
- B. The Engineer will make such additional inspections as he deems necessary. The Contractor shall fully cooperate and assist the Engineer in his inspections.
- C. No pipe or pipe joints shall be covered (backfilled) until inspected by the Engineer.
- D. The Engineer shall have the right to reject any material deemed by the Engineer to be defective, unsound, or damaged.

3.02 PREPARATION

- A. The Contractor shall use only the proper implements, tools, and other facilities, as recommended by the pipe manufacturer, in the receiving, storing, handling, and installation of pipe and appurtenances.
- B. The trench bottom and pipe bedding shall be properly shaped and compacted to provide uniform unyielding circumferential support to the pipe along the entire length of the pipe. Depressions in the bedding shall be provided or the bell of the pipe so that, after placement, only the barrel of the pipe rests and provides pressure on the bedding material.

3.03 INSTALLING PVC PIPE

- A. Polyvinyl Chloride Pipe shall be installed in strict conformance with ASTM Specification D 2321, latest revision.

SECTION 33 31 13 – SANITARY PIPING

- B. PVC pipe, shall be of the sizes, type, and materials, and placed at the locations indicated on the Drawings. Pipe laying shall proceed upgrade with the spigot ends of the bell-and-spigot pipe pointing in the direction of flow.
- C. All pipe, when in place, shall be precisely true to the line and grade indicated, and shall be placed soundly, well laid, jointed, and bedded, and free from defects. Any pipe found to have been laid other than true to the line and grade as shown on the Drawings shall be removed and reset by the Contractor at his expense.
- D. No blocking or supporting wedges or other method of supporting the pipe other than the laying of pipe bedding specified will be permitted. The Contractor shall furnish all slings, straps, and other approved devices to permit satisfactory support of all parts of the pipe when it is being handled. The Contractor shall take all precautions to prevent flotation of the pipe or movement of the pipe in the event of the trench flooding.
- E. Pipes, in general, shall be bedded in bedding material in accordance with the Drawings and as specified in Section 31 23 16 - Trench Excavation and Backfill.
- F. After pipe has been placed in the trench, joined to adjacent pipe lengths, set to the correct line and grade, inspected by the Contractor for complete conformance to these Specifications, and inspected by the Engineer, backfill shall be placed carefully on the sides and the top of pipe as described in Section 31 23 16 - Trench Excavation and Backfill.
 - 1. No walking on or working over the pipe will be permitted after the pipe is laid except as may be necessary in making joints, in placing cradles, or in tamping backfill material, until pipes are covered with earth to a depth of twelve (12) inches over the pipe. During construction, all openings to pipe lines shall be protected from entry of earth or other material. Open ends of branches and pipes when completed shall be sealed with stoppers or by equally effective methods. Where new pipes are to join existing ones, Contractor shall do such Work as necessary to make connections.
 - 2. Utility Marking Tape: Shall be installed continuously in all sewer trenches throughout the project. The utility line marking tape shall be as specified elsewhere in this section.

G. GEOTEXTILE

- 1. Geotextile Envelope: Comprised of material specified in Section 31 05 19 - Geotextiles, shall be used:
 - a. Where ground water is encountered in the trench.
 - b. Where soils containing large amounts of fines are encountered at the proposed pipe grade,

SECTION 33 31 13 – SANITARY PIPING

- c. or where directed by the Engineer.
- 2. It shall be placed around the bedding material only, forming an envelope as indicated on the Drawings, and shall have a minimum twelve (12) inch overlap at all seam/joints.

END OF SECTION

SECTION 33 34 13 – PRECAST CONCRETE STRUCTURES

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work under this Section of the Specifications consists of the furnishing of all labor, plant, equipment, tools, materials and incidentals and the performing of all operations necessary to provide the complete installation of precast concrete septic tanks, vaults, leaching chambers, castings, and appurtenances in accordance with the Drawings and these Specifications, or as directed by the Engineer, or as necessary for the proper completion of the intended Work.

1.02 SUMMARY

A. Section includes:

1. Precast concrete septic tanks.
2. Precast concrete vaults.
3. Precast concrete leaching chambers.
4. Frame and cover castings.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Earthwork – Section 31 00 00.
- B. Trench Excavation and Backfilling – Section 31 23 16.
- C. Dewatering, Control and Diversion of Water – Section 31 23 19.
- D. Cast-in-Place Concrete – Section 03 30 00.

1.04 QUALITY ASSURANCE

- A. Comply with ASTM C 857 Standard Practice for Minimum Structural Design Loading for Precast Concrete Utility Structures.
- B. Comply with ASTM C 890 Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
- C. Qualifications of Workers:

SECTION 33 34 13 – PRECAST CONCRETE STRUCTURES

1. The Contractor shall provide at least one person who is thoroughly trained and experienced in the skills required under this Section, who shall be completely familiar with the design and application of Work described for this Section, and who shall be present at all times during progress of the Work of this Section and shall direct all Work performed under this Section.
2. The installation of all precast concrete tanks, vaults, and leaching chambers shall be accomplished by skilled personnel who are thoroughly trained and experienced in the required Work.

D. Comply with other related Sections.

1.04 SUBMITTALS

- A. Catalog cuts, manufacturers literature and technical data for all precast concrete structures and appurtenances.
- B. Shop drawings showing design details for:
 1. Precast concrete septic tanks and vaults.
 2. Precast concrete leaching chambers.
 3. Frame and cover castings.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Storage:
 1. Precast concrete structures and appurtenances shall be delivered to and stored within the Contractor's work limits as shown on the Drawings.
 2. Special care shall be exercised during delivery and storage to avoid damage to the products.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Precast concrete structure dimension shown on the Drawings are based on typical precast manufacturer designs and may vary with different manufacturers.
- B. Design Loading: AASHTO H20-44 wheel loading. Minimum cover over top of structure as

SECTION 33 34 13 – PRECAST CONCRETE STRUCTURES

shown on the Drawings.

- C. Construct of 4,000 psi concrete at 28 days with reinforcement conforming to ASTM A615, Grade 60, air entrainment 5%-9%.
- D. Joint Seal: Seal concrete joints with a self-sealant butyl-based rubber gasket conforming to ASTM C443 and AASHTO M 198.
- E. Waterproof Non-shrink Mortar: Five Star or approved equal.
- F. Patching Material: Sika Plug by Sika Chemical Corporation, Waterplug by Standard Dry Wall Products, Inc. or Waterstop by Larsen products, or approved equal.

2.02 PRECAST CONCRETE TANKS, VAULTS AND LEACHING CHAMBERS

- A. Comply with ASTM C857 and C890 and meet the following additional requirements:
 - 1. The wall thicknesses shall be as shown on the Drawings. In all cases the wall thickness shall be no less than the minimum thickness necessary to sustain HS20-44 loading requirements as determined by a Licensed Professional Engineer.
 - 2. Sections shall have tongue and groove or ship-lap joints with a butyl mastic sealant conforming to ASTM C990.
 - 3. Cement shall be Type II Portland cement conforming to ASTM C150.
 - 4. All sections shall be cured by an approved method. Sections shall not be shipped until the concrete has attained a compressive strength of 4,000 psi or until five (5) days after fabrication and/or repair, whichever is the longer.
 - 5. Pipe openings shall be sized to accept pipes of the specified size(s) and material(s), and shall be sealed by the Contractor with a hydraulic cement conforming to ASTM C595M.
 - 6. Coating shall be one component waterproofing coal tar pitch coating.

2.03 MANHOLE FRAMES AND COVERS

- A. Heavy duty cast iron of the sizes, dimensions, and model numbers shown on the Drawings and conforming to ASTM A48, Class 30B. Label covers “SEWER” for all sanitary manhole covers.

2.04 INSPECTION PORT FRAMES AND COVERS

- A. Heavy duty, cast iron of the sizes, dimensions, and model numbers as shown on the

SECTION 33 34 13 – PRECAST CONCRETE STRUCTURES

Drawings.

2.05 MASONRY FOR MANHOLE AND INSPECTION PORT RISERS

- A. Concrete Brick: ASTM C55, Grade S II.
- B. Masonry Concrete Units: ASTM C 139.
- C. Mortar:
 - 1. Portland Cement: ASTM C150, Type II.
 - 2. Sand: ASTM C33, fine concrete aggregate.
 - 3. Hydrated Lime: ASTM C207, Type S.
 - 4. Mortar Mixture: One part of portland cement to two parts sand. Add lime at the rate of 10 lbs./bag of cement.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Core pipe penetrations to guarantee compliance with the lines and grades shown on the Drawings. Cutting and patching to achieve proper line and grade is prohibited.
- B. Waterproofing: coat all exterior buried surfaces of precast concrete septic tanks with waterproofing as specified.
- C. Verify that excavation subgrades preparation is complete and free of standing water. Provide adequate room on sides of manholes, tanks and chambers for compaction equipment.
- D. Set base sections level and plumb on a base of compacted eight (8) inch thickness of $\frac{3}{4}$ inch crushed stone in a geotextile envelope as shown on the drawings.
- E. Plug all lifting holes with patching material.
- F. Backfill all tanks and vaults with granular fill in conformance with Section 31 00 00 Earthwork.

3.03 LEAKAGE TESTING

- A. Infiltration: no infiltration shall be evident in any tank or vault. Visually check after

SECTION 33 34 13 – PRECAST CONCRETE STRUCTURES

completion of backfilling. Check for infiltration after each rainfall event that occurs during the progress of the Work.

- B. Exfiltration: plug penetrations and fill manholes, tanks and chambers with clean water. The test will be considered successful if there is no measurable drop in water level when tested for twelve (12) hours.
- C. Locate and eliminate all visible leaks and exfiltration.

END OF SECTION

SECTION 33 34 51 – SUBSURFACE SEWAGE DISPOSAL SYSTEM

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The Work required by this Section of the Specifications consists of the furnishing of all labor, plant, equipment, tools, materials, incidentals, and the performing of all operations in connection with all Work necessary to provide the complete installation of the subsurface sewage disposal system in accordance with the Drawings and these Specifications, or as directed by the Engineer, or as necessary for the proper completion of the intended Work.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Earthwork – Section 31 00 00.
- B. Geotextiles – Section 31 05 19.
- C. Soil Erosion and Sediment Control – Section 31 25 00.
- D. Trench Excavation and Backfill - Section 31 23 16.
- E. Sanitary Piping – Section 31 31 13.
- F. Precast Concrete Structures – Section 33 34 13.

1.03 QUALITY ASSURANCE

- A. Qualifications of Workers:
 1. The Contractor shall provide at least one person who is thoroughly trained and experienced in the skills required under this Section, who shall be completely familiar with the design and application of Work described for this Section, and who shall be present at all times during progress of the Work of this Section and shall direct all Work performed under this Section.
 2. The construction of the subsurface sewage disposal system shall be accomplished by skilled personnel who are thoroughly trained and experienced in the required Work.
- B. Comply with other related Sections.

1.04 SUBMITTALS

- A. Shop drawings, catalog cuts, manufacturers literature and technical data for all materials required under the related sections.

SECTION 33 34 51 – SUBSURFACE SEWAGE DISPOSAL SYSTEM

1.05 DELIVERY, STORAGE AND HANDLING

- A. Stockpiling and storage of select fill material, granular fill and washed crushed stone shall be done in such a manner as to avoid contamination of these materials with any other materials.
- B. Handle and store all precast concrete tanks, vaults, leaching chambers, castings, piping and other sewage disposal system appurtenances so as to prevent damage.

1.06 COMPENSATION

- A. Compensation for furnishing, placing, and compacting additional Select Fill material as ordered by the Engineer shall be at the unit bid price per cubic yard for Select Fill. The quantity of Select Fill material shall be paid for as measured in-place after compaction.
- B. Compensation for all other labor, plant, equipment, tools, materials, incidentals, and the performing of all operations in connection with all Work necessary to provide the complete installation of the subsurface sewage disposal system in accordance with the Drawings and these Specifications shall be included in the Base Bid price.

PART 2 – PRODUCTS

2.01 SELECT FILL MATERIAL

- A. On-Site Material: The use of the on-site natural sand and gravel soils within the leaching field excavation limits and approved by the Engineer shall be allowed.
- B. Borrow Material: If required and as ordered by the Engineer shall be clean, sand or sand and gravel material free from debris, ice, snow, frozen lumps, vegetation, stumps, roots, or other organic materials, containing no material larger than the three (3) inch sieve, and meeting the following particle size gradation criteria:

Sieve Size	Percent Passing	
	<u>Wet Sieve</u>	<u>Dry Sieve</u>
#4	100	100
#10	70-100	70-100
#40	*10-50	10-75
#100	0-20	0-5
#200	0-5	0-2.5

*The criteria for the percent passing the #40 sieve can be increased to no greater than seventy-five (75) Percent if the percent passing the #100 sieve does not exceed ten (10) percent and the percent passing the #200 sieve does not exceed five (5) percent.

SECTION 33 34 51 – SUBSURFACE SEWAGE DISPOSAL SYSTEM

2.02 CRUSHED STONE

- A. Clean, washed crushed or broken stone of the sizes shown on the drawings meeting the gradation requirements of section M.01 and the requirements of Section M.02.06 3. and 4. regarding resistance to abrasion and soundness respectively of the Standard Specifications.

2.03 PRECAST CONCRETE LEACHING CHAMBERS

- A. Comply with Section 33 34 13 – Precast Concrete Structures.

2.04 ACCESS FRAMES AND COVERS

- A. Comply with Section 33 34 13 – Precast Concrete Structures.

2.05 PIPING

- A. Comply with Section 31 31 13 – Sanitary Piping.

2.06 GEOTEXTILES

- A. Comply with Section 31 05 19 - Geotextiles, non-woven type.

PART 3 - EXECUTION

3.01 EXCAVATION

- A. Perform Excavation in accordance with the requirements of Section 31 00 00 – Earthwork. Avoid over compaction of soils with excavation equipment.
- B. Within the leaching field area, stockpile topsoil and excavate subsoil to subgrade using track mounted equipment. Remove any unsuitable soils as determined by the Engineer. Operation of rubber tired equipment on the excavated subgrade is prohibited.
- C. Scarify subgrade using the teeth of excavation equipment and leave subgrade surface in an uncompacted and unsmear condition prior to placement of required leaching fill material. Areas of compacted or smeared soil, or soils silted from rainfall or runoff shall be corrected by excavation and rescarification at the expense of the Contractor. No additional compensation will be provided for additional select fill material required to correct compacted, smeared or silted in surfaces.

SECTION 33 34 51 – SUBSURFACE SEWAGE DISPOSAL SYSTEM

3.02 PLACEMENT AND TESTING OF SELECT FILL MATERIAL

- A. Place required select fill material by dumping around the perimeter of the leaching field area, keeping rubber tired vehicles and equipment off such areas. Use track mounted vehicles to move leaching fill materials into place, keeping twelve (12) inches of material under tracks to minimize over compaction of the subgrade.
- B. Place and compact all leaching field materials as specified until such materials have been placed to the specified lines, grades and cross-sections shown on the Drawings, prior to installation of crushed stone used in leaching field, precast concrete chambers and distribution piping.

END OF SECTION

IV.

TOWN FORM CONTRACT

**SUCCESSFUL BIDDER WILL BE REQUIRED TO EXECUTE TOWN FORM CONTRACT,
UPON AWARD, WITHOUT EXCEPTION
(TO BE PREPARED)**

V.

NON-COLLUSIVE/NON-CONFLICT AFFIDAVIT OF BIDDERS

**BID # 1-1819 CALVIN LEETE ELEMENTARY SCHOOL
SUBSURFACE SEWAGE DISPOSAL SYSTEM REPLACEMENT**

The undersigned bidder, having fully informed themselves regarding the accuracy of the statements made herein certifies that:

1. the bid has been arrived at by the bidder independently and has been submitted without collusion with, and without any agreement, understanding, or planned common course of action with any other vendor of materials, supplies, equipment, or services described in the invitation to bid, designed to limit independent bidding or competition;
2. the contents of the bid have not been communicated by the bidder and its employees or agents to any person not an employee or agent of the bidder or its surety on any bond furnished with the bid, and will not be communicated to any such person prior to the official opening of the bid;
3. no Selectman or other officer or employee or person whose salary is payable in whole or in part from the Town of Guilford, nor any immediate family member thereof, is directly or indirectly interested in the Bid/Proposal, or in the supplies, materials, equipment, work or labor to which it relates, or in any profits thereof; and
4. he/she has read the Guilford Code of Ethics, set forth in Chapter 31 of the Code of the Town of Guilford, which is available on the Town website and he/she agrees on his/her behalf and on the behalf of his/her firm/company that he/she nor his/her firm/company are in violation of the Code with respect to this bid.

The undersigned further certifies that this statement is executed for the purpose of inducing the Town of Guilford to consider the bid and make an award in accordance therewith.

Legal Name of Bidder: _____

Business Name: _____

Business Address: _____

Signature and Title of Person

Subscribed and sworn to me _____
this _____ day of _____, 20_____.

Notary Public

My Commission Expires _____
Date

VI.

AFFIRMATIVE ACTION/EEO AFFIDAVIT

**BID # 1-1819 CALVIN LEETE ELEMENTARY SCHOOL
SUBSURFACE SEWAGE DISPOSAL SYSTEM REPLACEMENT**

Concerning Equal Employment Opportunities and/or Affirmative Action Policy

I/we, the respondent, certify to the TOWN OF GUILFORD that:

1. I/we are in compliance with the equal opportunity clause as set forth in Connecticut state law (Executive Order No. Three, <http://www.cslib.org/exeorder3.htm>).
2. I/we do not maintain segregated facilities.
3. I/we have filed all required employer's information reports.
4. I/we have developed and maintain written affirmative action programs.
5. I/we list job openings with federal and state employment services.
6. I/we attempt to employ and advance in employment qualified handicapped individuals.
7. I/we are in compliance with the Americans with Disabilities Act.
8. I/we (check one)
 _____ have an Affirmative Action Program, or
 _____ employ 10 people or fewer

Legal Name of Bidder: _____

Business Name: _____

Business Address: _____

Signature and Title of Person

Subscribed and sworn to me _____
this _____ day of _____, 20_____.

Notary Public

My Commission Expires _____
Date

VII.

BID PROPOSAL FORM

**Board of Selectmen
Town of Guilford
31 Park Street
Guilford, CT 06437**

**Attention: Purchasing Department
SECOND FLOOR**

**Re: BID # 1-1819 CALVIN LEETE ELEMENTARY SCHOOL
SUBSURFACE SEWAGE DISPOSAL SYSTEM REPLACEMENT**

Bid Opening Date: Wednesday, August 1, 2018 at 2:00 p.m.

BIDDER

Company Name: _____
Address: _____

Telephone: _____ Fax: _____

E-mail: _____

Contact Person: _____ Title: _____

To the Board of Selectmen:

We submit for your consideration our bid for the above referenced bid. We have read the bidding documents including the Town of Guilford’s General Conditions and Instructions to Bidders and the bid specifications and are submitting our bid in full compliance with all terms and conditions except as noted below under “Exceptions.” We have enclosed our original bid bond/cashier’s check in the amount of 10% of our total base bid. *We acknowledge receipt of all addendums to the bid documents and assume full responsibility to access those addendums from the Town website and/or DAS website, as applicable.*

We will provide the following within five (5) business days after receipt of a notice of award from the Purchasing Department:

- (i) The requested Certificate of Insurance from the following company:

_____.

Within five (5) business days after receipt of final contract from Town, we will forward to the Purchasing Department three original contracts, in the a form provided by the Town, executed by an authorized officer.

BID PROPOSAL FORM CONTINUED

A. BASE BID

We agree to perform the work described in the bid specifications within the time period set forth in the specifications for a **TOTAL BASE BID** amount of:

\$ _____ (\$ _____)
Write amount in words Write dollar amount

B. UNIT PRICE BID ITEMS

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
1.	Select Fill Complete In-Place	C.Y	100		
Total of all Unit Price Bid Items					\$

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

C. TOTAL BID AMOUNT

Total Bid Amount (Total of Base Bid Lump Sum and Unit Price Bids) written in words:

Total Bid Amount (Total of Base Bid Lump Sum and Unit Price Bids) written in figures:

\$ _____

D. ALTERNATE BID PRICE ITEMS

Alternate No. 1 – Existing Septic Tank Modification

Alternate No. 1 Lump Sum Bid Price written in words:

Alternate No. 1 Lump Sum Bid Price written in figures:

\$ _____

On site construction, installation, delivery and storage shall be coordinated with the following Town Department Head: Mr. Clifford Gurnham, Director of Operations.

Exceptions: _____

We agree that the allowable mark-up for overhead and profit on any charges shall not exceed a TOTAL (all tiers) of ten percent (10%).

The undersigned authorized representative hereby submits the above bid to the Town of Guilford.

Name of Contractor Entity: _____

By _____

Print Name and Title: _____

Duly authorized