

REGIONAL SCHOOL DISTRICT 8

BOARD OF EDUCATION

REQUEST FOR PROPOSAL

FOR CONSTRUCTION SERVICES FOR

ATHLETIC FIELDS IMPROVEMENTS

AT

RHAM HIGH SCHOOL

HEBRON, CONNECTICUT

SECTION 000110
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INVITATION TO BID

Regional School District 8 ("Reg. 8") Board of Education is seeking competitive bids for construction services related to **the Improvements to the 316 North Field and the Competition Field, located at RHAM High School/Middle School Campus** in Hebron, CT. Scope of work for this project generally includes surveying, general earthwork, erosion control, site preparation, drainage improvements and establishment of lawn, as more fully described herein and in the plans and specifications.

This Invitation to Bid, Instructions to Bidders, and other Bidding Documents (as defined in the Instruction to Bidders) are available for viewing and downloading on Reg. 8's website https://reg8.ss19.sharpschool.com/departments/business_office/rfp_bids and the Rivereast Newspaper. The plans and specifications for "**RHAM HIGH SCHOOL ATHLETIC FIELDS IMPROVEMENTS**," will be available to bidders through Advanced Reprographics from <https://advancedrepro.net> on May 26, 2023.

Sealed Bids for "**RHAM HIGH SCHOOL ATHLETIC FIELDS IMPROVEMENTS**" may be mailed or delivered in person to: Eva Gallupe, Business Manager, in the Central Office for Reg. 8 at 85 Wall Street, Hebron, CT 06248 until **12:00 pm on June 28, 2023**. All bids will be publically opened and will be read aloud. Bid Results will also be posted on the on-line plan service website for review within 24 hours of due date. Emailed or faxed Bids will not be accepted. To obtain or review Bids refer to the bidding instructions.

Reg. 8 reserves the right to reject any or all Bids, in whole or in part. Any or all Bids may be rejected if there is any reason to believe that collusion exists among the bidders. Individual Bids may be rejected for irregularities of any kind, including without limitations, alteration of form, additions not called for, conditional Bids, incomplete Bids and unexplained erasures. Reg. 8 retains the right to waive any formality or procedural irregularities in the Bids received. Nothing should be constructed to limit in anyway the right of Reg. 8 to reject any and all Bids, should Reg. 8 deem it to be in its best interest. No bidder may withdraw his Bid within sixty (60) days after the actual date of the opening thereof.

Any questions regarding the proposed work should be addressed, in writing, by e-mail to Michael Schlehofer, Director of Facilities at michael.schlehofer@rhamschools.org. Questions will not be considered past 2:00 pm on **June 16, 2023** and responses will be posted via addendum no later than 2:00 pm on **June 20, 2023**.

Eva Gallupe
Business Manager
Regional School District 8
85 Wall Street Hebron, CT 06248
(860) 228-2115
eva.gallupe@rhamschools.org

- C. Any Bid not including the attendant submissions required hereunder shall be considered unresponsive and may be rejected by Reg. 8.
- D. Reg. 8 also reserves the right to negotiate further with one or more of the firms as to any features of their Bids and to accept modifications and clarifications of the Bid when such action will be in the best interests of the District.
- E. **Reg. 8 is AN Affirmative Action/Equal Opportunity Employer. Minority/Women Business Enterprises are encouraged to apply.**

8. **THE CONTRACT**

Reg. 8 intends to use, and the successful Bidder will be required to execute and deliver, a contract in a form substantially similar to the contract attached as Exhibit C (the “**Contract**”), to contract for the Project. Notwithstanding the foregoing, Reg. 8 reserves the right to further modify the Contract prior to its execution. If a Bidder has objections to any of the terms and conditions of the Contract, such objections should be specifically identified and included in the Bid submission.

9. **PERFORMANCE and PAYMENT BONDS**

- A. The successful General Contractor will be required to provide the Owner with Performance and Labor and Materials Payment Bonds, in the amount of 100% of the Contract Price, and the cost of the bonds shall be included in the Bid Amount.
 - 1. The bonds must be issued by a surety rated A minus or better by A.M. Best and listed on the U.S. Department of Treasury’s Listing of Approved Sureties. The bonds must be submitted to Eva Gallupe, Business Manager, 85 Wall Street Hebron, CT 06248 at eva.gallupe@rhamsschools.org.
 - a. It is preferred that the bonds be written on the AIA Document 312 forms. Both bonds shall be written in the full amount of the Contract Price.
 - b. The bonds shall be dated the same date as the Contract.
 - c. Regional School District. 8 shall be named as the obligee on all bonds provided for the Project.
 - d. The bonds shall contain the following provision: “In the event that the surety assumes the contract or obtains a bid or bids for completion of the contract, the surety shall ensure that the contractor chosen to complete the contract is prequalified pursuant to section 4a-100 of the Connecticut general statutes in the requisite classification and has the aggregate work capacity rating and single project limit necessary to complete the contract”.

- e. The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.
- B. Each Bidder shall furnish with its Bid, satisfactory evidence from its surety of such Bidder's ability to obtain the required Performance and Labor and Materials Payment Bonds in the full amount of the Base Bid Amount.
- C. Performance and Labor and Material Payment Bonds will be required from all subcontractors, except that in accordance with Connecticut General Statutes Sections 49-41, et. seq., the following restrictions apply:
 - 1. A Payment Bond shall not be required to be furnished in relation to any sub-bid in which the total estimated cost of labor and materials under the contract with respect to which such sub-bid is submitted is less than One Hundred Thousand Dollars (\$100,000.00).
 - 2. A Performance Bond shall not be required to be furnished in relation to any sub-bid in which the total estimated cost of labor and materials under the contract with respect to which such sub-bid is submitted is less than Fifty Thousand Dollars (\$50,000.00).

10. PREVAILING WAGE REQUIREMENTS

- A. Prevailing wages are required on this Project, pursuant to Connecticut General Statutes Section 31-53 (a) through (h), as amended. For further information on prevailing wage requirements, visit the Connecticut Department of Labor's website. The wages applicable on this Project for the town of Hebron will be posted on July 1, 2023 on the Connecticut Department of Labor website: <https://www.ctdol.state.ct.us/wgwkstnd/prevailwage.htm>
- B. The Contractor and each subcontractor shall be subject to provisions of the Connecticut General Statutes, Section 31-55a concerning annual adjustments to prevailing wages.
- C. Wage Rates will be posted each July 1st on the Department of Labor website: <https://www.ctdol.state.ct.us/wgwkstnd/prevailwage.htm>. Such prevailing wage adjustments shall not be considered a matter for any contract amendment or adjustment to the Contract Price.
- D. The Contract shall provide, and the Contractor and subcontractors for the Project shall comply with the following: "The wages paid on an hourly basis to any person performing the work of any mechanic, laborer or worker on the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such person to any employee welfare fund, as defined in subsection (i) of Connecticut General Statutes Section 31-53, shall be at a rate

equal to the rate customary or prevailing for the same work in the same trade or occupation in the town in which such public works project is being constructed. Any contractor who is not obligated by agreement to make payment or contribution on behalf of such persons to any such employee welfare fund shall pay to each mechanic, laborer or worker as part of such person's wages the amount of payment or contribution for such person's classification on each pay day."

- E. Certified Payrolls: In accordance with Connecticut General Statutes, 31-53 Certified Payrolls with a statement of compliance shall be submitted monthly by the Contractor to Reg. 8 and certified payrolls for the Contractor and all subcontractors working during the period shall be submitted with each Application for Payment submitted by the Contractor, covering all activities relating to such Application for Payment. Contractor shall provide pay scale verification as may be required by the Connecticut Department of Labor.
- F. Each Bidder shall confirm prior to submission of its Bid that the Bidder is carrying in its Bid and Base Bid Amount the proper trade classification for all work required for the Project including composite crews of different trade classifications if needed, as required by the State of Connecticut Department of Labor and/or union agencies if applicable.
- G. Forms and additional information can be found on the Connecticut Department of Labor's website.

11. INSURANCE AND LIABILITY

- A. The successful bidder shall submit the minimum coverage as required below with an insurance company satisfactory to Regional School District 8 Minimum coverage shall be as follows:
 - 1. **Commercial General Liability** - \$1,000,000/occurrence with \$3,000,000/aggregate. Regional School District 8 shall be included as additional insured. Per project aggregate shall apply.
 - 2. **Workers Compensation – Statutory. Employer's Liability** - \$100,000/\$500,000/\$100,000.
 - 3. **Automobile Liability Insurance** at a limit of not less than \$1,000,000 combined single limit.

4. **Umbrella/Excess Liability** \$1,000,000, over the General Liability, Automobile Liability, and Employer Liability section of the Workers Compensation coverage.
- B. The proposer shall not cancel, change, or revise any insurance relating to this contract without at least 30 days prior notice. Prior to the effective date of any such cancellation, the contractor shall take out new insurance to cover the policies so canceled and shall provide certificates stating that such insurance is in effect.
- C. To the extent provided by law, the proposer agrees to indemnify, defend and hold harmless Reg. 8 against any and all suits, claims or liabilities of any name, nature or description arising out of or in consequence of the acts of its agents, servants or employees, in the performance of the obligations under this contract or by reason of its failure to fully comply with the terms of this contract, such indemnity to run to the Town Officers, Agents School Committee, and employees of Reg.8 and Town of Hebron employees.

FURTHER INFORMATIO AND REQUIREMENTS

- A. **NON-DISCRIMINATION**
Reg. 8 system does not and shall not discriminate on the basis of race, color, religion, creed, gender identity, age, national origin, ancestry, ethnicity, disability, pregnancy/parenting status, marital status, sexual orientation, homelessness, veteran or military status, or political affiliation in any of its programs, activities, employment practices, provision of and access to programs and services, as well as selection of volunteers, vendors and employers recruiting at the Reg. 8. The following person has
- B. **O.S.H.A. CERTIFICATION**

The contractor and their employees shall be CONN-OSHA safety qualified and have the proper documentation for this safety training, while on school property.
- C **BACKGROUND CHECK REQUIRMENT**

The Contractor will be required to comply with all applicable laws, including, without limitation, the requirements set forth in Exhibit E.

EXHIBITS TO THESE INSTRUCTIONS:

Exhibit A: Bid Proposal Form
Exhibit B: Submission Requirements
Exhibit C: Form of Contract
Exhibit D: Non-collusion Affidavit
Exhibit E: Background Checks

EXHIBIT A

BID FORM

RHAM High School Athletic Fields Improvements

The undersigned hereby agrees to provide REG. 8 with the following costs as specified herein, except as noted:

DESCRIPTION: "RHAM High School Athletic Fields Improvements" Hebron, Connecticut.

BASE BID:

Practice Field Land Survey	\$ _____
Site Preparation	\$ _____
Fraise Mowing	\$ _____
Core Aeration	\$ _____
Drainage Improvements using linear aeration and sand injection	\$ _____
Re-Location of Irrigation Main Lines and Valve Boxes	\$ _____
Seeding	\$ _____
Top Dressing	\$ _____
Amendment Nutrition	\$ _____
Substantial Completion Field Testing Related Sections	\$ _____
Grow-in and Establishment (3 months from seeding)	\$ _____
Stadium Field Land Survey	\$ _____
Site Preparation	\$ _____
Sawcut of Track and Asphalt to outside of first lane	\$ _____

Trench drain and connection to
Existing drain structures \$ _____

Drainage Improvements using
linear aeration and sand injection \$ _____

Polyurethan track surface between
trench drain and first lane \$ _____

Seeding disturbed areas \$ _____

Company Name: _____

Address: _____

Authorized Signature: _____

Printed Name: _____

Title: _____

Date: _____

Telephone Number: _____

**ANY DEVIATION FROM THE BID SPECIFICATIONS
MUST BE CLEARLY STATED**

ACKNOWLEDGE ALL ADDENDUMS BELOW

ADDENDUM #1: _____

ADDENDUM #2: _____

EXHIBIT B
RHAM High School Athletic Fields Improvements

SUBMISSION REQUIREMENTS

Bids should include the following information and documents organized and presented as provided and in the form listed below:

1. Bidder's History and General Qualifications: Provide a general statement of the Bidder's history and qualifications for the Project. [Use Exhibit B-1]
3. References: Provide references and the other information for at least three projects the Bidder has completed or is currently working on for educational institutions (preferably located in Connecticut) which projects are similar in character and scope to the Project. [Use Exhibit B-2] By submission of a proposal in response to the RFP, each Bidder authorizes Reg. 8 to contact the Bidder's disclosed references regarding the services performed by the Bidder in each case.
4. Financial Capability: Evidence that the Bidder is financially stable and capable of performing the Work and completing the Project. [Use Exhibit B-3]
5. Litigation: Descriptions of all pending and threatened litigation or arbitration in which the Bidder is named as a party as well as any judgments entered against the Bidder during the last five years. [Use Exhibit B-4]
6. Along with the information to be provided above, the Bidder shall submit the following:
 - Fully completed Bid Proposal Form [Use Exhibit A]
 - Completed and Executed Non-Collusion Affidavit [Use Exhibit E]
 - A list of the names and addresses of proposed subcontractors that will perform any part of the work for the Project on behalf of the Bidder. Reg. 8 reserves the right to reject any or all proposed subcontractors. In the event Reg. 8 so rejects any or all subcontractors proposed by a Bidder, such Bidder may, notwithstanding anything to the contrary in these Instructions, withdraw its Bid without penalty. Reg. 8 hereby reserves the right to allow a Bidder whose subcontractor or subcontractors are rejected hereunder, to re-submit a Bid with subcontractors acceptable to Reg. 8.

EXHIBIT B-1

STATEMENT OF QUALIFICATIONS AND EXPERIENCE

1. A Letter of Transmittal signed by a principal of the Bidder, not to exceed two (2) pages, describing in narrative form the company and the company's qualifications for the Project.
2. Company Overview:
 1. Name and location, including the office location that will be serving the Town
 2. Number of years the company has been in the business of providing the services or performing the work upon which they are bidding
 3. Number of employees and how many of them will be dedicated to the Project
 4. Evidence of the company's licensing/authority to do business in the State of Connecticut.
3. Client Base:
 - a. Names and contact information for the three references for whom or which the Bidder has provided services or performed work in the last 2 years in connection with projects similar in size and scope to the services and/or work upon which they are bidding. Provide Owner name and telephone number for each Project.
 - b. Provide a description of each of the three projects and the contractor's role in each project.
4. Company Information:
 - a. Name, email and telephone number of the Bidder's contact person.
 - b. A brief history of the company
 - c. A list of the Project team members that would be assigned to the Project and their roles and responsibilities
 - d. A list of the subcontractors that the Bidder would engage for the Project
 - e. A list of projects for which the company has provided services in the last five years which projects have similar challenges to the Project and indicate if any claims, disputes, arbitration or litigation proceedings have occurred on any of these projects. If so, identify if they were between Owner/Contractor or Contractor/Subcontractor and give the status of each.
5. Litigation/Disputes:

Provide information concerning any suits filed, judgments entered or claims made against your company during the last five (5) years with respect to contractual services provided by your company, or any declaration of default or termination for cause against your company with respect to such services.

6. Additional information, not included above, that the company feels may be useful and applicable to this Project and helpful to the Town's evaluation of the Bidder (limit response to two pages).

EXHIBIT B-2
REFERENCE CHECK

Please provide three (5) references:

1. Name

Contact Person

Telephone Number

Period of Contract

Type of Services Provided to Reference
2. _____
Name

Contact Person

Telephone Number

Period of Contract

Type of Services Provided to Reference
3. _____
Name

Contact Person

Telephone Number

Period of Contract

Type of Services Provided to Reference

4.

Name

Contact Person

Telephone Number

Period of Contract

Type of Services Provided to Reference

5.

Name

Contact Person

Telephone Number

Period of Contract

Type of Services Provided to Reference

EXHIBIT B-3

FINANACIAL CAPABILITY

Submit evidence that the Bidder is financially stable and capable of performing the work and completing the Project.

EXHIBIT B-4

PENDING OR THREATENED LITIGATION

PART 1 - For cases pending, please provide the following information for each matter:

1. Parties (suing or being sued)
2. Docket Number and Court
3. Brief Description and Status

JUDGMENTS

PART 2 - Please provide the following information for each matter:

1. Parties (suing or being sued)
2. Docket Number and Court
3. Brief Description and Amount of Judgment

(Attach additional sheets, if necessary.)

EXHIBIT D

NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

State of _____) ss

County of _____)

_____, being first duly sworn, deposes and says that:

1 That he/she is a () Partner; () Officer; () Member; () Owner of the firm of:

the party making the foregoing proposal or bid;

2. He is fully informed respecting the preparation and contents of the attached bid and of all pertinent circumstances respecting such Bid;
3. Such Bid is genuine and is not a collusive or sham Bid;
4. Neither the said Bidder, nor any of its officers, partners, owners, representatives, employees, or parties in interest, including this affiant has in any way colluded, conspired, connived or agreed, directly or indirectly with any other bidder, firm or person to submit a collusive or sham bid in connection with the contract for which the attached bid has been submitted or refrain from bidding in connection with such contract, or has in any manner, directly or indirectly, sought agreement or collusion or communication or conference with any other bidder, firm or person to fix the price or prices in the attached bid or of any other bidder, or to fix any overhead, profit, or cost element of the bid price or the bid price of any bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against Reg. 8, or any other person interested in the contract; and
5. The price or prices quoted in the attached bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.
6. All statement in said Bid are true.

(Signed) _____

(Title) _____

Sworn and subscribed before me _____ This
_____ day of _____, 2023

_____.

Notary Public

My Commission Expires: _____

EXHIBIT E

BACKGROUND CHECKS

The successful Bidder (referred to as Contractor in this Exhibit) shall be required to comply with the following requirements:

Prohibited Activities and Background Check Requirements

Contractor shall comply with all applicable law including, without limitation, Connecticut General Statutes Section 10-222c, as applicable, and with the requirements set forth in this Exhibit.

Interaction with School Community. The scope of the Work does not, and will not under any circumstances, require any contact with students or any other minors physically present in the facilities of, or the grounds surrounding, the school where the Project is located (the "School Grounds"). None of the Contractor, Subcontractors, Sub-subcontractor, or any of their respective employees, agents or representatives shall, under any circumstances, converse or interact in any manner, with students or any minors physically present on the School Grounds. None of the Contractor, Subcontractors, Sub-subcontractor, or any of their respective employees, agents or representatives shall interact with any adult members of the school community (including, without limitation, employees, officials, or visitors, including parents of students enrolled in the District's schools) with respect to the Project with the exception of the District's Designated Representative as provided in the Contract. All of the Contractor, Subcontractors, Sub-subcontractors, and their respective employees, agents or representatives shall, while on the School Grounds, refrain from use of vulgar language, obscene gestures, or any other behavior inappropriate for a school environment and/or property on which minor children are or may be present.

Background and Employment History Checks.

To the extent permitted by law, the Contractor shall perform (or cause to be performed) as regards all of its employees, agents, and representatives (each, a "Contractor Employee"), and all of the employees, agents, and representatives of Subcontractors and Sub-subcontractors (each, a "Subcontractor Employee"), who will be physically present on the School Grounds in connection with the Project, appropriate background checks on all such Contractor Employees and Subcontractor Employees. Such background checks shall include, at a minimum and without limitation, a search of both the Connecticut Department of Emergency Services and Public Protection's sexual offender registry and the Abuse and Neglect Registry of the Connecticut Department of Children and Families. For those Contractor Employees and Subcontractor Employees who are to be physically present on the School Grounds in connection with the Project and whose current or most recent employment occurred out of state, the out-of-state equivalent of the Connecticut Department of Emergency Services and Public Protection's sexual offender registry and the Abuse and Neglect Registry of the Connecticut Department of Children and Families registry shall be checked. The Contractor shall complete (or cause to be completed) background checks as to each Contractor Employee and Subcontractor Employee prior to such Contractor Employee or Subcontractor Employee being permitted to be physically present on the School Grounds. If the Contractor receives any information indicating that any Contractor Employee or Subcontractor Employee may be registered as a sexual offender, may have a record of abuse or neglect, or is, in any other manner, unfit to perform services which could involve direct contact with minor children, or which may involve working in or near property on which minor children may be present, the Contractor shall

immediately forward such information to the District, to the extent permitted by law, and shall immediately remove the individual from the School Grounds and from participation in the Project.

Contractor represents and warrants that, in its best professional judgment, each Contractor Employee and each Subcontractor Employee maintains the appropriate qualifications and is fit to perform services which could involve direct contact with minor children, or which may involve working in or near property on which minor children may be present. The Contractor shall immediately remove any Contractor Employee or Subcontractor Employee from the School Grounds and from the Project if requested to do so by the District (which request shall be made in the District's sole discretion) or if it becomes known to the Contractor that such Contractor Employee or Subcontractor Employee may be a danger to the health, safety or well-being of the school community, its students, or any minor children. A request by the District to remove any Contractor Employee or Subcontractor Employee from the School Grounds and from the Project shall not constitute a breach of the Contract.

The Contractor shall include, and shall require all Subcontractors to include the foregoing requirements in all subcontracts for the Project.

By execution of the Contract, the Contractor shall represent and warrant that it has fully complied with the requirements of this Exhibit. To the extent permitted by law, the Contractor agrees that upon the District's request, Contractor shall promptly provide the District with any documentation related to such compliance, including, without limitation, the results of the background and employment history checks required by this Exhibit. Failure by the Contractor to comply with its obligations under this Exhibit shall constitute a material breach of the Contract.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 00 72 31
GENERAL CONDITIONS

for the following PROJECT:
(Name and location or address)

Rham High School Athletic Improvements
85 Wall Street
Hebron, CT 06248

THE OWNER:
(Name and address)

Regoinal School District 8
85 Wall Street
Hebron, CT 06248

ATHLETIC FIELDS ADVISORS:
(Name and address)

Tom Irwin Advisors
11 A Street
Burlington, MA 01803

THE ARCHITECT:
(Name and address)

Traverse Landscape Architects, LLC
150 Chestnut Street, 4th Floor
Providence, RI 02903

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of the Agreement between Owner and Contractor (hereinafter the Agreement), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include other documents such as bidding requirements (advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or portions of Addenda relating to bidding requirements).

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Architect and Contractor, (2) between the Owner and a Subcontractor or Sub-subcontractor, (3) between the Owner and Architect or (4) between any persons or entities other than the Owner and Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner or by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 THE PROJECT MANUAL

The Project Manual is a volume assembled for the Work which may include the bidding requirements, sample forms, Conditions of the Contract and Specifications.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only

to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 CAPITALIZATION

§ 1.3.1 Terms capitalized in these General Conditions include those which are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

§ 1.4.1 In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 EXECUTION OF CONTRACT DOCUMENTS

§ 1.5.1 The Contract Documents shall be signed by the Owner and Contractor. If either the Owner or Contractor or both do not sign all the Contract Documents, the Architect shall identify such unsigned Documents upon request.

§ 1.5.2 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 1.6 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.6.1 The Drawings, Specifications and other documents, including those in electronic form, prepared by the Architect and the Architect's consultants are Instruments of Service through which the Work to be executed by the Contractor is described. The Contractor may retain one record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Architect or the Architect's consultants, and unless otherwise indicated the Architect and the Architect's consultants shall be deemed the authors of them and will retain all common law, statutory and other reserved rights, in addition to the copyrights. All copies of Instruments of Service, except the Contractor's record set, shall be returned or suitably accounted for to the Architect, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this authorization shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants. Submittal or distribution to meet official regulatory

requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' copyrights or other reserved rights.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 The Owner shall, at the written request of the Contractor, prior to commencement of the Work and thereafter, furnish to the Contractor reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. Furnishing of such evidence shall be a condition precedent to commencement or continuation of the Work. After such evidence has been furnished, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees, including those required under Section 3.7.1, which are the responsibility of the Contractor under the Contract Documents, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 Information or services required of the Owner by the Contract Documents shall be furnished by the Owner with reasonable promptness. Any other information or services relevant to the Contractor's performance of the Work under the Owner's control shall be furnished by the Owner after receipt from the Contractor of a written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, such copies of Drawings and Project Manuals as are reasonably necessary for execution of the Work.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

§ 2.3.1 If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or persistently fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

§ 2.4.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may after such seven-day period give the Contractor a second written notice to correct such deficiencies within a three-day period. If the Contractor within such three-day period after receipt of such second notice fails to commence and continue to correct any deficiencies, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR § 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Since the Contract Documents are complementary before starting each portion of the Work, the Contractor shall carefully study and compare the various Drawings and other Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, any errors, inconsistencies or omissions discovered by the Contractor shall be reported promptly to the Architect as a request for information in such form as the Architect may require.

§ 3.2.2 Any design errors or omissions noted by the Contractor during this review shall be reported promptly to the Architect, but it is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional unless otherwise specifically provided in the Contract Documents. The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations, but any nonconformity discovered by or made known to the Contractor shall be reported promptly to the Architect.

§ 3.2.3 If the Contractor believes that additional cost or time is involved because of clarifications or instructions issued by the Architect in response to the Contractor's notices or requests for information pursuant to Sections 3.2.1 and 3.2.2, the Contractor shall make Claims as provided in Sections 4.3.6 and 4.3.7. If the Contractor fails to perform the obligations of Sections 3.2.1 and 3.2.2, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. The Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents or for differences between field measurements or conditions and the Contract Documents unless the Contractor recognized such error, inconsistency, omission or difference and knowingly failed to report it to the Architect.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any resulting loss or damage.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for or on behalf of the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 The Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

§ 3.5 WARRANTY

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

§ 3.6.1 The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor which are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES AND NOTICES

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required when bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 It is not the Contractor's responsibility to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations. However, if the Contractor observes that portions of the Contract Documents are at variance therewith, the Contractor shall promptly notify the Architect and Owner in writing, and necessary changes shall be accomplished by appropriate Modification.

§ 3.7.4 If the Contractor performs Work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Architect and Owner, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents:

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances;
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner in sufficient time to avoid delay in the Work.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent

required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.10.2 The Contractor shall prepare and keep current for the Architect's approval, a schedule of submittals which is coordinated with the Contractor's construction schedule and allows the Architect reasonable time to review submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

§ 3.11.1 The Contractor shall maintain at the site for the Owner one record copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record field changes and selections made during construction, and one record copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

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

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required by the Contract Documents the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals which are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Architect without action.

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

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services which constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

§ 3.13 USE OF SITE

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

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor;

such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be charged to the Contractor.

§ 3.16 ACCESS TO WORK

§ 3.16.1 The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

§ 3.17.1 The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and officers, agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions, recklessness, or intentional acts of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ADMINISTRATION OF THE CONTRACT

§ 4.1 ARCHITECT

§ 4.1.1 The Architect is the person lawfully licensed to practice architecture or an entity lawfully practicing architecture identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" means the Architect or the Architect's authorized representative.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a new Architect against whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the former Architect.

§ 4.2 ARCHITECTS ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents, and will be an Owner's representative (1) during construction, (2) until final payment is due and (3) with the Owner's concurrence, from time to time during the one-year period for correction of Work described in Section 12.2. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract.

§ 4.2.2 The Architect, as a representative of the Owner, will visit the site at intervals appropriate to the stage of the Contractor's operations (1) to become generally familiar with and to keep the Owner informed about the progress and quality of the portion of the Work completed, (2) to endeavor to guard the Owner against defects and deficiencies in the Work, and (3) to determine in general if the Work is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will neither have control over or charge of, nor be responsible for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect will have authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken with such reasonable promptness as to cause no delay in the Work or in the activities of the Owner, Contractor or separate contractors, while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion, will receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment upon compliance with the requirements of the Contract Documents.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If no agreement is made concerning the time within which interpretations required of the Architect shall be furnished in compliance with this Section 4.2, then delay shall not be recognized on account of failure by the Architect to furnish such interpretations until 15 days after written request is made for them.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and initial decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions so rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.3 CLAIMS AND DISPUTES

§ 4.3.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be initiated by written notice. The responsibility to substantiate Claims shall rest with the party making the Claim. "Claim"

does not include any claim arising or of which the Owner becomes aware of after final payment is made under this Agreement, and the provisions of section 4 shall not apply to any such claim.

§ 4.3.2 Time Limits on Claims. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be initiated by written notice to the Architect and the other party.

§ 4.3.3 Continuing Contract Performance. Pending final resolution of a Claim except as otherwise agreed in writing or as provided in Section 9.7.1 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 4.3.4 Claims for Concealed or Unknown Conditions. If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment, to the extent permitted by law, in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall so notify the Owner and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within 21 days after the Architect has given notice of the decision. If the conditions encountered are materially different, the Contract Sum and Contract Time shall be equitably adjusted, but if the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Architect for initial determination, subject to further proceedings pursuant to Section 4.4.

§ 4.3.5 Claims for Additional Cost. If the Contractor wishes to make Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.6.

§ 4.3.6 If the Contractor believes additional cost is involved for reasons including but not limited to (1) a written interpretation from the Architect, (2) an order by the Owner to stop the Work where the Contractor was not at fault, (3) a written order for a minor change in the Work issued by the Architect, (4) failure of payment by the Owner, (5) termination of the Contract by the Owner, (6) Owner's suspension or (7) other reasonable grounds, Claim shall be filed in accordance with this Section 4.3.

§ 4.3.7 Claims for Additional Time

§ 4.3.7.1 If the Contractor wishes to make Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

§ 4.3.7.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 4.3.8 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 4.3.9 Claims for Consequential Damages. The Contractor waives Claims against the Owner for consequential damages arising out of or relating to this Contract. This waiver includes, but is not limited to:

- .1 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This waiver is applicable, without limitation, to all consequential damages due to the Owner's termination in accordance with Article 14. Nothing contained in this Section 4.3.10 shall be deemed to preclude an award of liquidated direct damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 4.4 RESOLUTION OF CLAIMS AND DISPUTES

§ 4.4.1 Decision of Architect. Claims, excluding those arising under Sections 10.3 through 10.5, shall be referred initially to the Architect for decision. An initial decision by the Architect shall be required as a condition precedent to mediation, arbitration or litigation of all Claims between the Contractor and Owner arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Architect with no decision having been rendered by the Architect. The Architect will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 4.4.2 The Architect will review Claims and within ten days of the receipt of the Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Architect is unable to resolve the Claim if the Architect lacks sufficient information to evaluate the merits of the Claim or if the Architect concludes that, in the Architect's sole discretion, it would be inappropriate for the Architect to resolve the Claim.

§ 4.4.3 In evaluating Claims, the Architect may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Architect in rendering a decision. The Architect may request the Owner to authorize retention of such persons at the Owner's expense.

§ 4.4.4 If the Architect requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either provide a response on the requested supporting data, advise the Architect when the response or supporting data will be furnished or advise the Architect that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Architect will either reject or approve the Claim in whole or in part.

§ 4.4.5 The Architect will approve or reject Claims by written decision, which shall state the reasons therefor and which shall notify the parties of any change in the Contract Sum or Contract Time or both. The approval or rejection of a Claim by the Architect shall be final and binding on the parties but subject to mediation and arbitration.

§ 4.4.6 When a written decision of the Architect states that (1) the decision is final but subject to mediation and arbitration and (2) a demand for arbitration of a Claim covered by such decision must be made within 30 days after the date on which the party making the demand receives the final written decision, then failure to demand arbitration within said 30 days' period shall result in the Architect's decision becoming final and

binding upon the Owner and Contractor. If the Architect renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence, but shall not supersede arbitration proceedings unless the decision is acceptable to all parties concerned.

§ 4.4.7 Upon receipt of a Claim against the Contractor or at any time thereafter, the Architect or the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Architect or the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 4.4.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines prior to resolution of the Claim by the Architect, by mediation or by arbitration.

§ 4.5 MEDIATION

§ 4.5.1 Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Sections 4.3.10, 9.10.4 and 9.10.5 shall, after initial decision by the Architect or 30 days after submission of the Claim to the Architect, be subject to mediation as a condition precedent to arbitration or the institution of legal or equitable proceedings by either party.

§ 4.5.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Mediation Rules of the American Arbitration Association currently in effect. Request for mediation shall be filed in writing with the other party to the Contract and with the American Arbitration Association. The request may be made concurrently with the filing of a demand for arbitration but, in such event, mediation shall proceed in advance of arbitration or legal or equitable proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order.

§ 4.5.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 4.6 ARBITRATION

§ 4.6.1 Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Sections 4.3.10, 9.10.4 and 9.10.5, shall, after decision by the Architect or 30 days after submission of the Claim to the Architect, be subject to arbitration. Prior to arbitration, the parties shall endeavor to resolve disputes by mediation in accordance with the provisions of Section 4.5.

§ 4.6.2 Claims not resolved by mediation shall be decided by arbitration which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association currently in effect. The demand for arbitration shall be filed in writing with the other party to the Contract and with the American Arbitration Association, and a copy shall be filed with the Architect.

§ 4.6.3 A demand for arbitration shall be made within the time limits specified in Sections 4.4.6 and 4.6.1 as applicable, and in other cases within a reasonable time after the Claim has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such Claim would be barred by the applicable statute of limitations as determined pursuant to Section 13.7.

§ 4.6.4 Limitation on Consolidation or Joinder.

§ 4.6. Claims and Timely Assertion of Claims. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 4.6.6 Judgment on Final Award. Any award rendered by the arbitrator or arbitrators shall be final pursuant to Section 4, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor, The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner or the Architect, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or Architect to reply promptly shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not change a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitute.

§ 5.3 SUBCONTRACTUAL RELATIONS

§ 5.3.1 By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow

to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement which may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner provided that:

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements which the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Section 4.3.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules when directed to do so. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights which apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall

connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Owner shall be reimbursed by the Contractor for costs incurred by the Owner which are payable to a separate contractor because of delays, improperly timed activities or defective construction of the Contractor.

§ 6.2.4 The Contractor shall promptly remedy damage wrongfully caused by the Contractor to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

§ 6.3.1 If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect, stating their agreement upon all of the following:

- .1 change in the Work;
- .2 the amount of the adjustment, if any, in the Contract Sum; and
- .3 the extent of the adjustment, if any, in the Contract Time.

§ 7.2.2 Methods used in determining adjustments to the Contract Sum may include those listed in Section 7.3.3.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the

Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 as provided in Section 7.3.6.

§ 7.3.4 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.5 A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.6 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by the Architect on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.6 shall be limited to the following:

- .1 costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- .2 costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- .5 additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.7 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.8 Pending final determination of the total cost of a Construction Change Directive to the Owner, amounts not in dispute for such changes in the Work shall be included in Applications for Payment accompanied by a Change Order indicating the parties' agreement with part or all of such costs. For any portion of such cost that remains in dispute, the Architect will make an interim determination for purposes of

monthly certification for payment for those costs. That determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a claim in accordance with Article 4.

§ 7.3.9 When the Owner and Contractor agree with the determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order.

§ 7.4 MINOR CHANGES IN THE WORK

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

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance. Unless the date of commencement is established by the Contract Documents or a notice to proceed given by the Owner, the Contractor shall notify the Owner in writing not less than five days or other agreed period before commencing the Work to permit the timely filing of mortgages, mechanic's liens and other security interests.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control, or by delay authorized by the Owner pending mediation and arbitration, or by other causes which the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Section 4.3.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

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

§ 9.2 SCHEDULE OF VALUES

§ 9.2.1 Before the first Application for Payment, the Contractor shall submit to the Architect a schedule of values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment for operations completed in accordance with the schedule of values. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and reflecting retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.8, such applications may include requests for payment on account of changes in the Work which have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Such applications may not include requests for payment for portions of the Work for which the Contractor does not intend to pay to a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that the Work has progressed to the point indicated and that, to the best of the Architect's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor- deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) **made** examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of:

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or another contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 persistent failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

§ 9.6.5 Payment to material suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

§ 9.7.1 If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within fourteen days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within fourteen days after the date established in the Contract Documents the amount certified by the Architect or awarded by arbitration, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item,

whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.4.1.5 and authorized by public authorities having jurisdiction over the Work. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents. (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from:

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 breach of any warranty and/or any guarantee

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

§ 10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities hearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

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

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 If reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 The Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to verify that it has been rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. The Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's

reasonable additional costs of shut-down, delay and start-up. which adjustments shall be accomplished as provided in Article 7.

§ 10.4 The Owner shall not be responsible under Section 10.3 for materials and substances brought to the site by the Contractor unless such materials or substances were required by the Contract Documents.

§ 10.5 EMERGENCIES

§ 10.5.1 In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Section 4.3 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 claims under workers' compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
- .2 claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 claims for damages insured by usual personal injury liability coverage;
- .5 claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 claims for bodily injury or property damage arising out of completed operations; and
- .8 claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 1 1.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment as required by Section 9.10.2. Information concerning reduction of coverage on account of revised

limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief.

§ 11.2 OWNER'S LIABILITY INSURANCE

§ 11.2.1 The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PROJECT MANAGEMENT PROTECTIVE LIABILITY INSURANCE

§ 11.3.1 Optionally, the Owner may require the Contractor to purchase and maintain Project Management Protective Liability insurance from the Contractor's usual sources as primary coverage for the Owner's, Contractor's, and Architect's vicarious liability for construction operations under the Contract. Unless otherwise required by the Contract Documents, the Owner shall reimburse the Contractor by increasing the Contract Sum to pay the cost of purchasing and maintaining such optional insurance coverage, and the Contractor shall not be responsible for purchasing any other liability insurance on behalf of the Owner. The minimum limits of liability purchased with such coverage shall be equal to the aggregate of the limits required for Contractor's Liability Insurance under Sections 1 1.1.1.2 through 1 1.1.1.5.

§ 11.5 PERFORMANCE BOND AND PAYMENT BOND

§ 11.5.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.5.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be made.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered which the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

§ 12.2.1.1 The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the

requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

§ 12.3.1 If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

§ 13.1.1 The Contract shall be governed by the law of the place where the Project is located.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to an institutional lender providing construction financing for the Project. In such event, the lender shall assume the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

§ 13.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available there under shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections or approvals which do not become requirements until after bids are received or negotiations concluded.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- .1 issuance of an order of a court or other public authority having jurisdiction which requires all Work to be stopped;
- .2 an act of government, such as a declaration of national emergency which requires all Work to be stopped;
- .3 because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1. or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 the Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has persistently failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor:

- .1 refuses or fails to supply enough properly skilled workers or proper materials;

- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction;
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents; or
- .5 bankruptcy of the Contractor or an assignment for the benefit of creditors.

§ 14.2.2 When any of the above reasons exist, the Owner may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may subject to any prior rights of the surety:

- .1 take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 accept assignment of subcontracts pursuant to Section 5.4; and
- .3 finish the Work by whatever reasonable method the Owner may deem expedient. Upon request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. No adjustment shall be made to the extent:

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall:

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed`.

SECTION 00 73 12
SUPPLEMENTARY CONDITIONS

1.0 GENERAL AMENDMENT

- A. If the design and administration services for the Project are supplied by a licensed landscape architect rather than a licensed architect, all references to Architect in the General Conditions and Supplementary Conditions shall be deemed to refer to the Landscape Architect.

2.0 ARTICLE 1 GENERAL PROVISIONS

- A. Add the following Sections:

§ 1.1.8 INCONSISTENCIES IN CONTRACT DOCUMENTS

In the event of any conflict, inconsistency or other discrepancy between any of the Contract Documents, the Contract Documents shall be given priority in the following order: (1) executed Change Orders; (2) addenda issued by the Architect; (3) the Agreement; (4) the Supplementary Conditions; (5) the General Conditions of the Contract; (6) Division 1 of the Specifications; (7) the Drawing and Division 2-49 of the Specifications.

§ 1.2.4 Where reference is made to the Standard Specifications of the American Society of Testing and Materials (ASTM) or other standard specifications in connections with the required quality of materials, methods, etc., then the applicable specifications shall be of the latest revised addition effective as of the date bids are opened by the Owner, unless otherwise expressly provided in the technical specifications.

3.0 ARTICLE 2 OWNER

- A. Delete Section 2.2.5 and replace it with the following

"§ 2.2.5 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, up to five (5) copies of Drawing for execution of Work."

4.0 ARTICLE 3 CONTRACTOR

- A. Add the following sections:

§3.4.2.1 All requests for substitutions must be submitted within 30 days following the award of subcontracts. Substitutions requested after that date will receive no consideration. Substitutions are changes in materials, equipment, methods or sequences of construction, design, structural systems, mechanical, electrical, air-conditioning controls, or other requirements of the Drawings or the Specifications.

§3.4.2.2 In substituting materials or equipment, the Contractor assumes responsibility for any changes in systems or for modifications required in adjacent or related work to accommodate such substitution, despite the Architect's approval, and all costs arising from the approval shall be the responsibility of the Contractor. None of the extra costs resulting from such approval shall devolve upon the Owner, the Architect or other Subcontractors. The Contractor shall be responsible for obtaining from the Architect the amount of any redesign or review cost so that the entire value of the change can be evaluated prior to acceptance of the substitution. The Architect

will be responsible for all architectural or engineering revisions to the Drawings and shall be reimbursed by the Contractor for the costs of effecting such revisions.

§3.4.2.3 In making requests for substitutions, the Contractor shall list the particular system, product, or material for which a substitution is requested and the justification for such a request. Requests submitted shall include any and all adjustments required by the substitution and any other Work affected thereby. The Architect may reject a substitution for material reasons or the rejections may be based on aesthetics for which the Architect and the Owner shall be the sole judges.

§3.5.2 The Contractor shall secure and deliver to the Owner written warranties in substantially the same format as the warranties from the Contractor to the Owner from all Subcontractors bearing the date of Substantial Completion, together with assignments thereof, if necessary. Such written warranties shall extend for the benefit of and be available to be asserted in the name of the Owner. Delivery of such written warranties is a condition precedent to final payment. The Owner may require the contractor to enforce Subcontractors' warranties on behalf of the Owner.

§ 3.10.4 The Contractor shall have the option of scheduling a date of Substantial Completion which is earlier than the date established by the Contract Documents for the date of Substantial Completion; provided, however, in such event, such earlier date of Substantial Completion will be recognized by the Owner only as a matter of convenience to the Contractor and shall not change the date for Substantial Completion established by the Contract Documents or be otherwise binding on the Owner or anyone under the Owner's control; and provided further, however, in such event, should events occur during performance of the Work which would justify the granting to the Contractor of an extension of the Contract Time pursuant to the provisions of Article 8 of these General Conditions of the Contract for Construction, the Contractor shall be entitled to receive only such an extension of Contract Time as is determined by the Architect to be due to Contractor as follows:

- 1** In the event the current Contractor's construction schedule indicates completion ahead of the contractually established date for Substantial Completion, the revised date of Substantial Completion shall be determined by adding the total time directly affecting the critical path of the schedule to the end date of the current schedule. No extension of time beyond the contractually established date shall be granted until the aggregate of the current Contractor's construction schedule plus approved extension exceeds the date established by the Contract Documents, at which time the time extension granted will be the net difference between the contractually established date and the aggregate of the current Contractor's construction schedule plus approved extensions thereto.
- 2** In the event the current Contractor's construction schedule indicates completion at or after the contractually established date for Substantial Completion, the time extension shall only be added to the contractually established date for Substantial Completion.
- 3** The Owner will not grant time extensions based on improper scheduling of the Work.

B. The first paragraph of Section 3.12.5 is renumbered 3.12.5.1

C. Add the Following Sections

§3.12.5.2 Shop Drawings shall be fully identified by Project name, location, supplier's name, date, drawing number and specifications section reference. The Contractor shall make no deviation from the approved drawings, and the changes made by the Architect, if any.

§3.12.5.3 Contractor shall properly schedule the submission of Shop Drawings for approval to allow adequate time for checking of drawing, manufacture and shipment of items to job site in sufficient time to prevent delay in the construction schedule.

§3.12.5.4 Contractor shall coordinate the preparation of Shop Drawings of items which will be furnished by more than one manufacturer, but are designed to interface when installed.

D. The first paragraph of Section 3.12.6 is renumber 3.12.6.1

E. Add the following Sections:

§3.12.6.2 Shop Drawings submitted to the Architect for approval shall first be checked and approved by the Contractor, the evidence of which shall be a "checked" stamp marked "Approved", or "Approved as Noted" on each copy of each Shop Drawing, placed thereon by the Contractor. Submitting a Shop Drawing without the Contractor's "checked" stamp will be cause for immediate return without further action. Each drawing correctly submitted will be checked by the Architect and marked "Reviewed," "Reviewed as Noted" or "Not Approved".

§3.12.6.3 Resubmittals necessitated by required corrections due to Contractor's errors or omissions shall not constitute cause for an extension of Contract Time, provided the submittals or Shop Drawings are timely reviewed and returned by the Owner.

F. Delete Section 3.14.1 and replace it with the following:

§3.14.1 Existing structures and facilities, including but not limited to buildings, utilities, topography, streets, curbs, walks, landscape materials, and other improvements that are damaged or removed due to required excavations or Contractor's Work, shall be patched, repaired, or replaced by the Contractor to the satisfaction of the Architect, the owner of such structures and facilities, and authorities having jurisdiction as required by the Plans and Specifications. In the event that a local authority having jurisdiction requires that such repairing and patching be done with its own labor and/or materials, the Contractor shall abide by such regulations and pay for such work.

5.0 ARTICLE 4 ADMINISTRATION OF THE CONTRACT

A. No Change

6.0 ARTICLE 5 SUBCONTRACTORS

A. Add the following Section:

§5.2.6 The Contractor understands and agrees that the Contractor alone is responsible to the Owner for all of the Work under the Contract and that any review of Subcontractors or Sub-subcontractors by the Owner or Architect will not in any way make the Owner responsible to any Subcontractor or Sub-subcontractor or make the Owner responsible for the actions or omissions of any Subcontractor or Subsubcontractor.

7.0 ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

A. No change

8.0 ARTICLE 7 CHANGES IN THE WORK

A. Add the following Section:

§7.2.3 Unless otherwise expressly stated in the Change Order, Contractor waives and releases any and all rights to claim additional time or money for Work to be performed under the Change Order. The Change Order constitutes compensation in full to the Contractor for all costs and markups directly or indirectly attributable to the changes ordered and for all delays and impacts related to it.

9.0 ARTICLE 8 TIME

A. Add the following to the end of Section **8.3.1**:

"The Contractor hereby waives any claims for damages by reason of delay in the commencement, prosecution or completion of the Work, and agrees that an equitable extension of the date for Substantial Completion shall be the contractor's sole remedy for any delays. Such adjustment to the Contract Time shall be made by Change Order. The Contractor shall assure that all of subcontractors and suppliers are bound to a contractual provision providing that they are entitled to no additional compensation or damages on account of delays arising from any cause and shall indemnify Owner from any claims arising from its failure to do so."

10. ARTICLE 9 PAYMENTS AND COMPLETION

A. No Change

11. ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

A. Add the following to the end of Section 10.1.1:

"The Contractor shall require all of its employees and the employees of Subcontractors to conduct themselves in a safe and professional manner and in conformity with all work procedures, either endorsed or prohibited, and utilizing all personal protection devices included, within OSHA and CONN-OSHA Construction Safety Regulations. The Contractor shall take all necessary precautions for the safety of the persons on or near the site of the Work, and shall comply with all applicable laws, rules, regulations and orders to prevent accidents or injuries to persons on or in the proximity of the Project site. The Contractor shall put into place a meaningful and effective safety program comprised of regular safety training of its employees on site, focusing upon various topics which, from time to time, its employees are likely to encounter in performing the Work. The Owner will cooperate with all safety audits and recommendations with regard to improving worker's safety, but the Contractor hereby acknowledges and agrees that the Owner is not responsible, in whole or in part, for the Work, execution of the Work or initiating, maintaining and supervising any safety precautions and programs in connection with the Work or the Project.

12.0 ARTICLE 11 INSURANCE AND BONDS

A. Add the following section:

§11.1.5 The Owner is exempt from and in no way liable for any sums of money which may represent a deductible in any insurance policy. The payment of any deductible shall be the sole responsibility of the Contractor or Subcontractor providing the insurance.

§11.3.4 A loss or losses insured under this insurance policy shall be adjusted by the Contractor and its insurance company. The Contractor shall repair or replace the damaged property with the proceeds from the Contractor's risk policy. The Contractor shall be responsible for all damages and necessary repairs whether or not the loss is covered by the Contractor's risk policy.

§11.3.5 Compliance with insurance requirements shall not relieve the Contractor of any responsibility to indemnify the Owner for any liability to the Owner as specified in any other provision of the Contract for Construction, and the Owner shall be entitled to pursue any remedy in law or equity if the Contractor fails to comply with the provisions of this Contract for Construction. Indemnity obligations specified elsewhere in this Contract for Construction shall not be negated or reduced by virtue of any insurance carrier's (i) denial of insurance coverage for the occurrence or event which is the subject matter of the claim; or (ii) refusal to defend any named insured.

13.0 ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

A. No Change.

14.0 ARTICLE 13 MISCELLANEOUS PROVISIONS

A. Delete Section **13.1.1** and replace it with the following:

"The Contract shall be governed by the law of the State of Connecticut".

B. Add the following Sections:

§13.5.7 If substitute materials or equipment are proposed by the Contractor, he shall pay the cost of all tests which may be necessary to satisfy the Architect that specification requirements are met.

§13.5.8 The Contractor shall pay for all testing costs, including but not limited to, power, fuel, and equipment costs which may be required for complete testing of all equipment and systems for proper operation such as plumbing, heating, ventilation, electrical, etc.,

15.0 ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

A. No changes.

END SECTION

Section 02 41 00
SITE DEMOLITION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS, which are hereby, made a part of this Section of the Specifications.
- B. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this trade.
- C. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.
- D. All demolition shall be in accordance with the Connecticut Standard Specifications and all other applicable local, state, and federal requirements.

1.2 WORK DESCRIPTION

- A. The Contractor shall perform all work and supply all labor, material, tools and equipment necessary to:
 - 1. Demolish, remove, and dispose of items not required for reuse on site and as indicated on Drawings. This shall include, but is not limited to curbing, bituminous and cement concrete pavement, pads, aprons, slabs, bollards, utility poles, drainage systems including piping and structures, and irrigation lines.
 - 2. Any portion of the site soils anticipated by the Contractor for reuse on the project shall be stockpiled and tested by the Contractor for source investigation of potential reuse of material. Soil materials to be reused onsite may require amendment including blending of onsite and imported soil materials.
 - 3. Disposal of items to an approved off-site disposal facility.
 - 4. Cleaning of catch basins and drain manholes.
 - 5. Filling voids and excavations resulting from the work.
 - 6. Removing above- and below-grade site features.
 - 7. Remove all existing athletic facilities unless otherwise specified.
 - 8. Removal from the site and legal disposal of all materials resulting from the demolition and construction operations except those specified to be stockpiled or reused.
 - 9. Removal of all additional site items required to complete the work, as shown on the plans.
 - 10. Stockpiling of materials for reuse by the Owner.
- B. Related Sections include the following:
 - 1. Section 31 00 00 - Earthwork

1.3 SUBMITTALS

- A. Submit at least 1 week prior to the start of construction:
 - 1. Permits for transport and disposal of debris.
 - 2. Permits and notices authorizing demolition.
 - 3. Certificates of utility services severances.
 - 4. Demolition procedures and operational sequence.

1.4 PERMITS AND CODES

- A. All work shall comply with all codes, rules, regulations, laws and ordinances for the Town of Hebron, the State of Connecticut, and all other authorities having jurisdiction. All work necessary to make site demolition comply with such requirements shall be provided without additional cost to the Owner.
- B. The Contractor shall procure and pay for all permits and licenses required for work under this Section.
- C. The Contractor shall not close or obstruct any streets or passageways, unless and until the Contractor shall have first secured all necessary municipal, State, or other permits thereof. No material whatsoever shall be placed or stored nor shall parking be permitted in streets or passageways. The Contractor shall conduct operations to interfere as little as possible with the use ordinarily made of both on-site and off-site roads, driveways, sidewalks or other facilities near enough to the work to be affected thereby.

1.5 DISPOSITION OF EXISTING UTILITIES

- A. Active utilities existing on the site shall be carefully protected from damage and relocated or removed as necessitated by the work. When an active utility line is exposed during construction, its location and elevation shall be recorded and both the Architect and the Owner notified in writing.
- B. Active utilities to be abandoned once new utility is installed shall be removed and disposed once Contractor has completed the proposed work. Contractor is responsible for maintaining existing utility performance throughout construction.
- C. Inactive or abandoned utilities encountered during construction operations shall be removed. The location of such utilities shall be noted and reported in writing to the Architect.

1.6 QUALITY ASSURANCE

- A. Pre-installation Conference: Conduct conference at Project site to comply with Project Meeting Requirements in Section 010000 Summary.

1.7 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the Architect and authorities having jurisdiction.
 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- B. Utility Locator Service: Notify utility locator service for area where Project is located before commencing any site work.
- C. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place and all permits are obtained.
- D. Contractor is responsible for all construction permits.

PART 2 - PRODUCTS

2.1 DEMOLITION TECHNIQUES

- A. Contractor shall not use any explosives for demolition.

PART 3 - EXECUTION

3.1 WORKMANSHIP

- A. Before beginning demolition work, coordinate with utility companies and disconnect all utility service lines to the structures shown to be demolished. Notify the proper local authorities and utility companies, in writing before work commences. Remove all utility and service lines in accordance with the authorities and/or companies having jurisdiction over such work. Identify the location and size of all caps and plugs to the Architect in writing.
- B. Take all possible precautions to avoid damaging those materials, which are to remain.
- C. Demolition work shall be carried out in a careful and orderly manner. Provide adequate protection to persons and property inside and outside of the site.
- D. Do not commence work until trees and other items to be saved have been protected as directed by the Architect in the field. Protection shall remain for the duration of the work.
- E. Burn no material or debris on the site.
- F. Take all possible precautions to avoid damaging those materials which are to be salvaged or reused on the site.
- G. Sanitary filter media, materials within sanitary tanks, materials within sanitary structures, and all other existing sanitary disposal features shall be removed within the work area and legally disposed. Sanitary materials shall be reused onsite.

3.2 TITLE, SALVAGE AND REUSE

- A. Property belonging to public bodies or public service companies shall not become the property of the Contractor, unless written authorization is given by the Architect.
- B. All other salvage and materials resulting from the Demolition work shall become the property of the Contractor unless otherwise directed by the Architect or specified herein or on the Contract Drawings to be stockpiled and shall be removed from the site.
- C. The existing condition of all materials specified to be: Removed and Reset, Removed and Stockpiled, or Removed and Stockpiled for the Owner; shall be recorded in a video provided in electronic format to the Architect for approval. Any damage or condition not noted in the recorded video approved by the Architect will be deemed damage caused by the Contractor and the Contractor shall replace the feature at no additional cost to the Owner.

3.3 REMOVAL

- A. Demolish and remove the aforementioned items in their entirety, including footings and underground structures.
- B. Remove and legally dispose of, at no cost to the Owner, all materials and debris resulting from the Demolition work except those specified herein to be stockpiled. Leave the site in safe and clean condition.

3.4 RESTORATION OF SITE ITEMS

- A. Wherever streets, lawns or other items outside the Contract Limit Lines have been excavated in fulfilling the work required under this Contract, the Contractor shall furnish and install all material at no cost to the Owner to bring finish surfaces level with the existing adjacent conditions. All work shall be installed to match the existing conditions. Notify the proper authorities prior to restoring surfaces outside the Limit of Work to assure conformance to existing requirements.

3.5 GENERAL

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Depressions, excavations and voids resulting from demolition shall be filled with suitable material as outlined in Section 31 00 00.
- C. Conduct demolition operations in a manner that will prevent damage to adjacent structures, utilities, pavements and other facilities to remain.
- D. Cease operations immediately if any damage, settlement or other adverse effect on adjacent structures occurs. Immediately notify the Architect and regulatory authorities. Do not resume operations until conditions are corrected, damage repaired, and approval received from the Architect.
- E. Provide hoses and water connections. Spray water onto demolition to prevent dust.
- F. Grade site and stockpile material to prevent runoff from leaving the site.

- G. Clean neighboring properties and improvements of dust, dirt, and debris caused by demolition operations. Return properties to conditions prior to start of work.
- H. Demolition limits of existing pavement shall be saw-cut along straight lines resulting in clean vertical edges.
- I. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Architect.

3.6 UTILITIES

- A. Notify all corporations, companies, individuals, or local authorities owning or having jurisdiction over utilities running to, through, or across areas to be affected by demolition operations.
- B. The Contractor shall mark locations of underground utilities prior to initiating site work; Dig-Safe clearance shall be obtained.
- C. The Contractor shall exercise reasonable care to verify locations of existing subsurface structures and utilities.
- D. Have all discontinued utility services disconnected in accordance with the requirements of the utility owner. Utilities shall be abandoned in accordance with details shown on the Drawings.

3.7 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
 - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

3.8 DISPOSAL

- A. Disposal: Remove surplus soil material, unsuitable topsoil, unsuitable soils, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off property.
 - 1. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

3.9 REMOVE AND DISPOSE FLEXIBLE PAVEMENT, CURBING, CONCRETE, CONCRETE WALKS, AND FENCE

- A. All pavement, base course, sidewalks, curbs, gutters, of whatever nature designated to be removed shall be so-removed and legally disposed of. When specified, ballast, gravel, bituminous material or other surfacing or pavement materials shall be removed and stockpiled. Otherwise, such material shall be legally disposed. Where the

remainder of the existing pavement or sidewalks is to remain undisturbed, a clean saw cut shall be made to separate the remaining pavement from that being removed.

End of Section

03 3000
CAST IN PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Connecticut State Highway Department, Standard Specifications for Highways and Bridges, latest Edition with amendments, hereinafter referred to as the "Standard Specifications".
- C. Connecticut State Highway, Construction Standards, latest Edition with amendments hereinafter referred to as the "Construction Standards".
- D. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 31 0000 – Earthwork

1.02 DESCRIPTION OF WORK

- A. The scope of work includes providing all materials, equipment and labor necessary to complete the work as indicated on the drawings and as specified herein.
- B. This Section includes the following:
 - 1. Cast-in Place Concrete

1.03 REFERENCE

- A. General: Where the language in any of the documents referred to herein be in the form of a recommendation or suggestion, such recommendations or suggestions shall be deemed to be mandatory for these Specifications.
- B. American Concrete Institute (ACI):
 - 1. ACI 117: Standard Tolerances for Concrete Construction and Materials (except as modified in this Specification Section for anchor rod placement).
 - 2. ACI 211.2: Standard Practice for Selecting Proportions for Structural Lightweight Concrete
 - 3. ACI 213: Guide for Structural Lightweight Aggregate Concrete
 - 4. ACI 301: Specifications for Structural Concrete
 - 5. ACI 302: Guide for Concrete Floor and Slab Construction
 - 6. ACI 304R: Guide for Measuring, Mixing, Transporting and Placing Concrete.
 - 7. ACI 305R: Hot Weather Concreting
 - 8. ACI 306: Cold Weather Concreting

9. ACI 308: Standard Practice for Curing Concrete
10. ACI 309R: Guide for Consolidation of Concrete
11. ACI 318: Building Code Requirements for Structural Concrete
- C. American Society for Testing and Materials (ASTM):
 1. C31 Making and Curing Concrete Compression and Flexural Strength Test Specimens in the Field
 2. C33 Specification for Concrete Aggregates
 3. C39 Test Method for Compressive Strength of Cylindrical Concrete Specimens
 4. C94 Specifications for Ready Mixed Concrete
 5. C127 Standard test method for Density, Relative Density (Specific Gravity) or coarse aggregate C136 Sieve Analysis of Fine and Coarse Aggregate
 6. C138 Unit Weight, Yield, and Air Content of Concrete
 7. C143 Test for Slump of Portland Cement Concrete
 8. C150 Specification for Portland Cement
 9. C171 Sheet Materials for Curing Concrete
 10. C172 Sampling Fresh Concrete
 11. C173 Standard test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
 12. C595 Standard Specifications for Portland Blast Furnace Slag Cement
 13. C231 Test for Air Content of Freshly Mixed Concrete by the Pressure Method
 14. C260 Specification for Air-Entraining Admixtures for Concrete
 15. C309 Specification for Liquid Membrane Forming Compounds for Curing Concrete
 16. C340 Standard Specifications for Portland-Pozzolan Cement
 17. C494 Specification for Chemical Admixtures for Concrete
 18. C618 Standard Specifications for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
 19. C827 "Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures
 20. C845 Standard Specifications for Expansive Hydraulic Cement
 21. C989 Specification for Ground Iron Blast-Furnace Slag for Use in Concrete and Mortars
 22. C1017 Standard Specifications for Chemical Admixtures for Use in Producing flowing Concrete
 23. C1064 Test Method for Temperature of Freshly Mixed Portland-Cement Concrete
 24. C1107: Specification for Packaged Dry, hydraulic Cement Grout (Non-Shrink)
 25. C1157 Standard Performance Specifications for Silica Fume in Cementitious Mixtures
 26. C1240 Standard Specification for Silica Fume for Use in Hydraulic-

Cement Concrete

- 27. D1751: Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - 28. E154 Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
- D. Federal Specifications (Fed. Spec.):
- 1. TT-S-00230: Sealing Compound: Elastomeric Type, Single Component (for Caulking, Sealing, and Glazing in Buildings and Other Structures)

1.04 DESIGN REQUIREMENTS

- A. Codes: Building concrete shall be in conformance with the requirements of ACI 318, and the Connecticut State Building Code.
- B. Coordinate use of curing compounds with the floor coatings, sealers, and hardeners.
- C. Air-entrain all exterior exposed concrete.

1.05 SUBMITTALS

- A. Product Data: Submit design mix including color additives as applicable. Submit manufacturer's product data with application and installation instructions for proprietary materials and items, including reinforcement and forming accessories, synthetic fibers, admixtures, color additives, patching compounds, waterstops, joint systems, curing compound, and others as requested by the Engineer.
- B. Shop Drawings: Submittals included in the Section shall be in accordance with the requirements specified. Submit Working drawings for all Work under this Section to the Engineer for approval. Show location of joints, concrete pouring sequence, schedule dates, rate of placement and methods. All concrete mix designs shall conform to ACI-318, Chapter 5 and as specified. All concrete mix designs and concrete material tests shall be signed and sealed by a Professional Engineer in the State of Connecticut.
- C. Samples: Submit samples of materials as specified, including names, sources and descriptions.
- D. Laboratory Test Reports: Submit laboratory test reports for concrete, concrete materials, and mix design tests.
- E. Material Certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

- F. Submit prior to start of Work written reports of each proposed mix for each class of concrete. Do not begin concrete production until mixes have been approved by the Engineer.
- G. Batch Ticket Information: Provide concrete delivery tickets showing job name and location, date and time of delivery, quantity of concrete, quality and type of concrete, admixtures, amount of water added, and all other relevant information as described in ASTM C-94. Submit original batch tickets and 2 copies at the end of each week.

1.06 QUALITY ASSURANCE

- A. Provide in accordance with the requirements as specified.
- B. Concrete Testing Service: The Contractor shall employ and pay an independent testing laboratory to perform material evaluation tests and to design concrete mixes and provide copies of recently made material tests and mix designs.
- C. Materials and installed Work may require testing and retesting at any time during progress of Work. Allow free access to material stockpiles and facilities. All tests, including retesting of rejected materials and installed Work, shall be done at Contractor's expense.
- D. Workmanship: The Contractor is responsible for correction of corrected Work that does not conform to the specified requirements, including strength, tolerances and finishes. Correct deficient concrete as directed at no additional cost to the Owner.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Order concrete from batching plant so that trucks arrive at discharge locations when concrete is required. Avoid excessive mixing of concrete or delays in placing successive layers of concrete in forms.
- B. Deliver concrete to discharge locations in watertight agitator or mixer trucks without altering the water-cement ratio, slump, air entrainment, temperature and homogeneity.
- C. Concrete not conforming to specification, unsuitable for placement, exceeding the time or temperature limitations or not having a complete delivery batch ticket will be rejected.

1.08 JOB SITE

- A. Weather: Protect concrete from damage and reduced strength or performance due to weather extremes during mixing, placing and curing.
- B. Cold Weather: Unless special precautions are taken to protect concrete, do not Work when temperatures are below 40°F or when temperatures are expected to fall below 40°F within 72 hours after placing concrete.

1. Comply with ACI 306 in cold weather.
 2. Maintain concrete temperature of at least 60°F. Reinforcement, forms and ground in contact with concrete shall be free of frost.
 3. Keep concrete and formwork at least 50°F for at least 96 hours after placing concrete.
 4. The use of calcium chloride in any form is not permitted. Non-chloride accelerator shall be used when ambient temperature is below 50°F.
 5. Admixture manufacturer shall provide technical assistance at no additional cost. A manufacturer's representative shall be available for consultation by phone or on site upon 72-hour notice.
- C. Hot Weather: Concrete, when deposited, shall be less than 85°F. Cool the mix in a manner acceptable to the Engineer if the concrete temperature is higher.
1. Comply with ACI 305 in hot weather.
 2. Retarder shall be used when ambient temperature exceeds 80°F.
- D. Schedule delivery of colored concrete to provide consistent mix times from batching until discharge.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type II for all Work unless otherwise specified. Use one brand of cement throughout project.
- B. Fly Ash and Ground Granulated Blast-Furnace Slag: Fly Ash shall conform with ASTM C 618, Type F or C. Ground Granulated Blast-Furnace Slag shall conform with ASTM C 989, Grade 100 or 120. Products used shall be of the same type, brand, and source throughout the Project. Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
1. Fly Ash: 25 percent.
 2. Ground Granulated Blast-Furnace Slag: 50 percent.
 3. Combined Fly Ash and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash not exceeding 25 percent.
- C. Normal Weight Aggregates: ASTM C 33, and as herein specified. Use ¾" maximum size for all concrete. Provide aggregates from a single source for exposed concrete.
- D. Water: Clean, potable and free from foreign materials such as oils, acids, alkalis, and organic materials in amounts harmful to concrete and embedded steel. Provide water which meets ACI/ASTM requirements for concrete mix water.
- E. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
1. Products: Subject to compliance with requirements, products which may be incorporated in the Work include the following

- a. "Air-Mix"; Euclid Chemical Co.
 - b. "Sika AeA-14"; Sika Corp.
 - c. "MasterAir VR 10 or MasterAir AE 90"; Master Builders
 - d. "Darex AEA" or "Daravair"; W.R. Grace
 - e. Or equal.
- F. Water Reducing Admixture: ASTM C 494, Type A, and containing not more than 0.1% chloride ions. Follow manufacturer's recommendations for amount of admixture to be added to the concrete. Admixture shall be compatible with air-entraining admixtures.
 1. "WRDA with Hycol"; W. R. Grace.
 2. "Eucon WR-75"; Euclid Chemical Co.
 3. "Master Pozzoloth" Master Builders
 4. "Sikament 686"; Sika Chemical Corp.
 5. Or equal.
- G. High-Range Water Reducing Admixture (SuperPlasticizer): ASTM C 494, Type F or Type G and containing not more than 0.1% chloride ions. Follow manufacturer's recommendations.
 1. Products: Subject to compliance with requirements, products which may be incorporated in the Work include the following:
 - a. "ADVA CAST 585"; W. R. Grace.
 - b. "Super P"; Anti-Hydro.
 - c. "Sikament 686"; Sika Chemical Corp.
 - d. "Master Rheobuild 1000"; Master Builders.
 - e. Or equal.
- H. Water Reducing, Non-Chloride Accelerator Admixture: ASTM C 494, Type E or C, and containing not more than 0.1% chloride ions.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Accelguard 80"; Euclid Chemical Co.
 - b. "MasterSet FP 20"; Master Builders, Inc.
 - c. "PolarSet"; Grace Construction Products.
 - d. Or equal.
- I. Water Reducing, Retarding Admixture: ASTM C 494 Type D, and containing not more than 0.1% chloride ions.
 1. Products: Subject to compliance with requirements, products that may be incorporated in the Work include the following:
 - a. "MasterPozzoloth-80"; Master Builders.
 - b. "Eucon Retarder 75"; Euclid Chemical Co.
 - c. "Daratard 17"; W. R. Grace.
 - d. "Plastiment"; Sika Chemical Co.
 - e. Or equal.

- J. Prohibited Admixtures: Calcium chloride thycyanates or admixtures containing more than 0.1% chloride ions are not permitted.

2.02 RELATED MATERIALS

- A. Reglets: Where resilient or elastomeric sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 26 gauge galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.
- B. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. Per sq. yd., complying with AASHTO M 182, Class 2.
- C. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
 - 1. Waterproof paper.
 - 2. Polyethylene film.
 - 3. Polyethylene-coated burlap.
- D. Joint Sealants shall be provided in color to match color of concrete.
- E. Liquid Membrane-Forming Curing Compound: Liquid type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.055 gr./sq. cm. when applied at 200 sq. ft./gal.
 - 1. Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
 - a. "MasterKure"; Master Builders.
 - b. "A-H 3 Way Sealer WB"; Anti-Hydro Waterproofing Co.
 - c. "Kurez DR VOX"; Euclid Chemical Co.
 - d. "Clear Seal"; A.C. Horn, Inc.
 - e. "Sealco 309"; Gifford-Hill/American Admixtures.
 - f. "Cure & Seal LV 25% J20UV"; Dayton Superior.
- F. Underlayment Compound: Free flowing, self-leveling, pumpable cementitious base compound.
 - 1. Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
 - a. "Ardex K-15"; Ardex Engineered Cements.
 - b. "Silflo 230"; Silpro Masonry Systems.
 - c. "Ultraplan"; Mapei.
- G. Bonding Compound: Polyvinyl acetate or acrylic base.
 - 1. Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
 - a. Acrylic or Styrene Butadiene:
 - 1) "J-40 Bonding Agent"; Dayton Superior Corp.

- 2) "Everbond"; L & M Construction Chemicals.
- 3) "Hornweld"; A. C. Horn, Inc.
- 4) "Daraweld C"; W. R. Grace.

- H. Adjustable inserts: Adjustable inserts shall be hot-dip galvanized in conformance with ASTM A123 and A153. Adjustable insets shall be:
1. Ductile iron wedges inserts, Type F-7 manufactured by Dayton Sure-Grip & Shore Co.
 2. Malleable iron peerless wedge inserts, insert as manufactured by Richmond Screw, Anchor Co., Inc.
 3. Malleable iron wedge inserts, Type HW as manufactured by Hohmann & Barnard Inc.

2.03 PROPORTIONING AND DESIGN OF MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to the Engineer for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing.
- B. Submit written reports for review of design mix for specified strength of concrete within 15 days prior to start of Work. Do not begin concrete production until mixes have been reviewed.
- C. Normal weight concrete mixes: Provide normal weight concrete having the following minimum compressive strength at 28 days:
1. Class 4000 – 3/4" normal weight concrete: Typical, unless noted otherwise.
 2. Class 4000 – 3/8" normal weight concrete: Concrete fill at metal pan stairs (only).
 3. Class 3000 – 3/4" normal weight concrete: Concrete on composite metal deck (only).
 4. Class 5000 – 3/4" normal weight concrete: Exterior site concrete (only).
 - a. The concrete quality, mixing and placing shall conform to ACI-318, Chapter 5.

Design mixes to provide normal weight concrete with the following properties, as indicated:

Minimum Design Compressive Strength	Minimum Strength fc 7 days	Laboratory Testing Age 28 day	Minimum ** Cement Content/cu.yd.	Maximum* W/C Ratio
4,000 (3/4") psi	2,400 psi	4,000 psi	565	0.45
4,000 (3/8") psi	2,400 psi	4,000 psi	611	0.45
3,000 (3/4") psi	1,800 psi	3,000 psi	505	0.48
5,000 (3/4") psi	3,500 psi	5,000 psi	705	0.40

*Maximum: Decrease if possible

**Minimum: Increase as necessary to meet all other stated requirements.

- D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by the Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by the Engineer before using in Work.
- E. Admixtures:
1. Use water-reducing admixture or high range water reducing admixture (super plasticizer) in all concrete in strict accordance with the manufacturer's printed instructions.
 2. Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50°F in strict accordance with the manufacturer's printed instructions.
 3. Use high-range water-reducing admixture in pumped concrete required to be watertight, and concrete with water/cement ratios below 0.40.
 4. Use air-entraining admixture in all concrete except interior slabs, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content as follows:
 - a. $\frac{3}{4}$ " aggregate normal weight concrete: 6.0% with a tolerance of $\pm 1\%$
- F. Consistency:
1. The consistency shall be uniformly maintained within the allowable range of slump for the job materials. Ordinarily the slump shall not be less than 1-1/2" inch nor more than 4 inches, unless in the opinion of the Engineer, job conditions warrant exceeding these limits. The consistency shall be determined by the AASHTO Method T-119. This range of slump is to be maintained for all concrete including pumped concrete.
 2. Concrete containing HRWR admixture (super-plasticizer): Not more than 7" after addition of HRWR to site-verified 1-1/2" to 4" slump concrete.
 3. Ramps, slabs and sloping surfaces: Not more than 3 inches.
 4. Reinforced foundation systems: Not less than 1-1/2" inch nor more than 4 inches.

2.04 CONCRETE MIXING

- A. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified. Delete references for allowing additional water to be added to batch for material with insufficient slump. Addition of water to the batch will not be permitted.
1. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94 may be required. When air temperature is between 85°F (30°C) and 90°F (32°C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90°F (32°C), reduce mixing and delivery time to 60 minutes.
 2. During cold weather heat water, sand and cement materials per recommendations of ACI 306.
- B. High Early Strength Concrete: Follow manufacture's product specific installation

guidelines. Cement shall be added to a pre-measured amount of water that does not exceed the manufacturer's maximum recommended water content. Material can be extended up to 60% using pea gravel.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Batch, mix and deliver Portland cement concrete in conformance with ASTM C 94. Batch all constituents at central batching or mixing plant. Produce concrete in conformance with ACI 301 and as specified.
- B. Seasonal Conditions:
 - 1. Conform to ACI 305R and as specified for hot weather concreting. Do not add retarder admixture to any concrete.
 - 2. Conform to ACI 306R and as specified for cold weather concreting. Do not add accelerator admixture to any concrete.

3.02 INSTALLATION OF EMBEDDED ITEMS

- A. Set and build into Work, anchorage devices and other embedded items required for other Work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached thereto. Embedded items, including column anchor rods and concrete reinforcement, shall be set prior to the placement of concrete. Embedded items shall not be "wet-set" without prior written approval from the Engineer of Record.
- B. Install anchor rods, accurately located, to elevation required and complying with the following tolerances (acceptable deviation from rod locations shown on the Drawings):
 - 1. 3/4" and 7/8" diameter rods: +/- 1/4"
 - 2. 1", 1-1/4", and 1-1/2" diameter rods: +/- 3/8" 3. 1-3/4", 2", and 2-1/2" diameter rods: +/- 1/2"
 - 3. Clean embedded items of oil, ice, dirt and all other foreign items.
 - 4. For embedded pipes, complete all necessary testing requirements prior to placing concrete.

3.03 PLACING CONCRETE

- A. General:
 - 1. Concrete formwork shall satisfy the requirements of Section 03 11 00, Concrete Formwork. Do not place concrete until the depth, character and adequacy of forms, falsework, embedment's, and the placing of the steel reinforcement have been approved by the Engineer. The method and manner of placing the concrete shall be such as to avoid segregation of aggregate and displacement of the reinforcement. Troughs, pipes and chutes may be used as aids in placing concrete when necessary. Dropping the concrete, a distance of more than five feet, or depositing a large quantity at one point, will not be permitted. Concrete shall be placed upon clean, damp surfaces, free from running water, or upon properly

consolidated soil.

2. Do not add water to concrete during delivery, at the Project site, or during placement, unless approved by the Engineer of Record. Amount of water to be added at the project site shall be indicated on the mix design and batch tickets submitted by the contractor. Water shall be added prior to on-site testing of the concrete mix.
3. Before placing concrete, and if agreed upon by the Engineer of Record, water may be added at the Project site, subject to the limitations of ACI 301.
 - a. Do not add water to concrete after adding high-range water-reducing admixtures.
4. Retempering of concrete by adding water or any other material shall not be permitted.
5. Concrete placement, finishing and curing, and all other pertinent construction practices shall be in accordance with ACI 117 and ACI 301. In addition to the requirements of ACI 117 and ACI 301, the following shall apply:
 - a. Concrete shall be placed so that a uniform appearance of surfaces will be obtained. Concrete shall be placed and consolidated free of rock pockets, honeycombs, and voids.
 - b. Concrete shall be deposited as nearly as practicable in its final position, to avoid segregation due to rehandling or flowing, and shall not be subjected to any procedure that will cause segregation.
 - c. Concrete shall be placed and consolidated in walls in approximately 18- inch layers, proceeding at a uniform rate or per the form designer's recommendation.
 - d. Subgrade shall be slightly moist when the concrete is placed for floor slabs, to prevent excessive loss of water from the concrete mix.

B. Consolidating:

1. Consolidate concrete with suitable mechanical vibrators operating within concrete. When necessary, vibrating shall be supplemented by hand spading with suitable tools to assure proper and adequate consolidation. Vibrators shall be manipulated so as to Work the concrete thoroughly around the reinforcement and embedded fixtures and into corners and angles of the forms. The vibration at any joint shall be of sufficient duration to accomplish consolidation but shall not be prolonged to the point where segregation occurs.
2. Employ as many vibrators and tampers as necessary to secure the desired results. For every two vibrators required for the job, an additional standby vibrator shall be kept on the site. Do not place subsequent layers of concrete until the previous layer has been consolidated as specified. Internal vibrators shall have a minimum frequency of 8000 vibrations per minute when immersed in concrete and shall have sufficient amplitude to effectively consolidate the concrete.
3. Prevent the following practices:
 - a. Pushing of concrete with vibrator.
 - b. External vibration of forms.

- c. Allowing vibrator to vibrate against reinforcing steel where steel projects into green concrete.
 - d. Allowing vibrator to vibrate against the contact faces of forms.
- C. Cold Weather: Do not place concrete when the ambient temperature is below 40°F, unless specifically authorized by the Engineer. Conform to the requirements of ACI 306R during cold weather.
- D. Hot Weather: Do not place concrete with a mix temperature exceeding 90°F, unless specifically authorized by the Engineer. Conform to the requirements of ACI 305R during hot weather.
- E. Construction Joints:
 - 1. When the placing of concrete is suspended, necessary provisions shall be made for joining future Work before the placed concrete takes its initial set. For the proper bonding of old and new concrete, such provisions shall be made for grooves, steps, keys, dovetails, reinforcing bars or other devices as may be prescribed. Before depositing new concrete against concrete which has hardened, the surface of the hardened concrete shall be cleaned by a heavy steel broom, roughened slightly, wetted, and covered with a neat coating of cement paste or grout. Install joint sealant where shown on the Drawings, in accordance with manufacturer's instructions.
 - 2. Joints shall be perpendicular to the main reinforcement.
 - 3. Construction joints in floors shall be located within the middle third spans of slabs, beams, and girders.
- F. Expansion and Control Joints: Expansion and control joints shall be constructed in the locations and to the dimensions and details shown on the Drawings.
- G. Defective Work:
 - 1. All defective Work disclosed after the forms have been removed shall be immediately removed and replaced. If dimensions are deficient, or if the surface of the concrete is bulged, uneven, or shows honeycomb, which in the opinion of the Engineer cannot be repaired satisfactorily, the entire Section shall be removed and replaced at no cost to the Owner.
 - 2. Other Work considered to be defective includes, but is not limited to, the following:
 - a. Concrete in which defective or inadequate steel reinforcement has been placed.
 - b. Concrete incorrectly formed, or not conforming to details and dimensions on the Drawings or with the intent of these documents, or the concrete surfaces of which are out of plumb or level beyond specified tolerances.
 - c. Concrete below specified strength.
 - d. Concrete containing wood, cloth, or other foreign matter, rock pockets, voids, honeycombs, cracks or cold joints not scheduled or indicated on the Drawings.

3.04 CONCRETE FINISHING

- A. Exposed concrete surfaces shall be true, smooth, and free from open or rough spaces, depressions, or projections. The concrete in horizontal plane surfaces shall be brought flush with the finished top surface at the proper elevation and shall be struck off with a straightedge and floated. Mortar finishing will not be permitted, nor shall dry cement or sand-cement mortar be spread over the concrete during the finishing of horizontal plane surfaces.
- B. Following placement of concrete for slabs and floors, tamp to force coarse aggregate away from surface, bull float, and steel trowel. Floor areas designated to receive a floor coating shall receive a finish as recommended by the coating manufacturer. Steel trowel finish shall be provided for surfaces that will receive flooring and all exposed floor areas.
- C. Overall conformance to design grade shall be within $\frac{3}{4}$ " of design elevation.
- D. The following requirements shall govern concrete finishes so indicated on the Drawings.
 - 1. Float Finish: Force coarse aggregate away from surface; float to a smooth and even surface.
 - 2. Trowel Finish
 - a. After floating, begin the first trowel finish operation using a power-driven trowel; begin final troweling when the surface produces a ringing sound as the trowel is moved over the surface.
 - b. Do not over-trowel or start troweling late.
 - c. Consolidate the concrete surface by the final hand troweling operation, free from trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding $\frac{1}{8}$ " in 10'-0" when tested with a 10'-0" straight-edge.
 - 3. Apply nonslip broom finish to exterior concrete as specified, immediately after trowel finishing; roughen the concrete surface by brooming in the direction perpendicular to the main traffic route.
 - a. Use a fiber bristle broom.
 - b. Frequently clean broom to avoid deep brooming.
 - 4. Finishing Formed Surface:
 - a. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or Concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding $\frac{1}{4}$ inch in height rubbed down or chipped off.
 - b. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch

defective areas with fins and other projects, completely removed and smoothed.

- c. Smooth-Rubbed Finish: Provide smooth-rubbed finish on scheduled concrete surfaces that have received smooth-formed finish treatment not later than one (1) day after form removal. All concrete walls shall have a smoothed rubbed finish.
 - 1) Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- d. Grout-Cleaned Finish: Provide grout-cleaned finish on scheduled concrete surfaces that have received smooth-formed finish treatment.
 - 1) Combine one part Portland Cement to one and one-half parts fine sand by volume, and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to form the consistency of thick paint. Blend standard Portland Cement and white Portland Cement in amounts determined by trial patches so that final color of dry grout will match adjacent surfaces.
 - 2) Thoroughly wet concrete surfaces, apply grout to coat surfaces, and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least thirty-six (36) hours after rubbing.
- e. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

E. Monolithic Slab Finishes

- 1. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.
 - a. After placing slabs, finish surface to tolerances of F(F) 15 (floor flatness) and F(L) 13 (floor levelness) measured according to ASTM E 1155. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.
- 2. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.
 - a. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats or by hand-floating if area is small or

- inaccessible to power units. Finish surfaces to tolerances of F(F) 18 (floor flatness) and F(L) 15 (floor levelness) measured according to ASTM E 1155. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
3. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or thinset quarry tile, paint, or another thin film-finish coating system.
 - a. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F(F) 25 (floor flatness) and F(L) 20 (Floor levelness) measured according to ASTM E 1155. Grind smooth any surface defects that would telegraph through applied floor covering system.
 4. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately flow by slightly scarifying the surface with a fine broom.
 - a. Non-slip Broom Finish: Apply a non-slip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
 - b. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
 5. Non-slip Aggregate Finish: Apply non-slip aggregate finish to concrete stair treads, platforms, ramps, sloped walks.
 6. After completing float finishing and before starting trowel finish, uniformly spread 25 lbs. Of dampened non-slip aggregate per 100 sq. ft. of surface. Tamp aggregate flush with surface using a steel trowel, but do not force below surface. After broadcasting and tamping, apply trowel finishing as specified.
 - a. After curing, lightly work surface with a steel wire brush or an abrasive stone, and water to expose non-slip aggregate.

3.05 CURING AND PROTECTION

- A. Initial Curing: All concrete shall be properly cured and protected in accordance with ACI 308. Maintain concrete above 50 degrees F during first seven days after placing. The Work shall be protected from the elements, flowing water, and from defacement of any nature, during construction. The concrete shall be cured as soon as it has sufficiently hardened, by covering with an approved material. Water- absorptive coverings shall be thoroughly saturated when placed, and kept saturated for a period of at least seven days. Curing mats or blankets shall be sufficiently weighted or tied down to keep the concrete surface covered and to prevent the surface from being exposed to air currents. Where wooden forms are used, they shall be kept wet at all time until removed, to prevent the opening of joints and drying out of the concrete. Membrane curing compounds shall be

coordinated with the surface to be painted, covered with plaster, covered with sealer, and other surfaces which curing compound would adversely affect subsequent construction.

- B. Duration of Curing: The final curing shall continue until the cumulative number of days or fractions thereof, not necessarily consecutive, during which the temperature of the air in contact with the concrete is above 50°F, has totaled 7 days beyond the initial curing period.
 - 1. If high-early strength concrete has been used, the final curing shall continue for a total of 3 days beyond the initial curing period.
 - 2. Rapid drying at the end of the curing period shall be prevented.
- C. Formed Surfaces: Steel forms heated by the sun and all wood forms in contact with the concrete during the curing period shall be kept wet.
 - 1. If forms are to be removed during the curing period, one of the specified curing materials or methods shall be employed immediately.
 - 2. Such curing shall be continued for the remainder of the curing period.

3.06 CONCRETE SURFACE REPAIRS

- A. General: Any defective Work disclosed after removal of forms shall be immediately removed and replaced. If in the opinion of the Engineer, the surface of the concrete cannot be repaired satisfactorily, the entire Section shall be removed and replaced at no additional expense to the Owner.
- B. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to the Engineer.
 - 1. Cut out honeycomb, rock pockets, voids over 1" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface.
 - 2. Thoroughly clean, dampen with water, and brush coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.
- C. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- D. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to the satisfaction of the Engineer. Surface defects, as such, include color and texture irregularities, bulges, uneven surfaces, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.

- E. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
- F. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic labs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.
- G. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least $\frac{3}{4}$ " clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- H. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cutout holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.
- I. Perform structural repairs with prior approval of the Engineer for method and procedure, using specified epoxy adhesive and mortar.
- J. Repair methods not specified above may be used, subject to acceptance of the Engineer.

3.07 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. A statement of special inspections will be established by the Registered design professional in responsible charge who will prepare a schedule of tests to be carried out by an independent testing agency. All costs for inspection and testing shall be borne by the Owner. Materials and workmanship shall be subjected to inspection and testing in mill, shop, and/or field by the Registered design professional in responsible charge and/or Testing Agency. Such inspection and testing shall not relieve the Contractor of his responsibility to provide his own inspection, testing, and quality control as necessary to furnish materials and workmanship in accordance with requirements of Contract Documents.
- B. The General Contractor shall notify the Registered design professional in responsible charge and the Testing Agency prior to start of any phase of concrete work so as to afford them reasonable opportunity to inspect the work.

Such notification shall be made at least 24 hours in advance.

- C. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
1. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 2. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; one for each day's pour of each type of air-entrained concrete.
 3. Concrete Temperature: Test hourly when air temperature is 40°F and when 80°F and above; and each time a set of compression test specimens are required.
 4. Compressive Strength Tests: ASTM C39; one set for each day's pour exceeding 5 cu. yds. plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
 - a. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches if fewer than 5 are used.
 - b. When total quantity of a given class of concrete is less than 50 cu. yds, strength test may be waived by the Engineer if, in his judgment, adequate evidence of satisfactory strength is provided.
 - c. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 - d. Strength level of concrete will be considered satisfactory if both of the following requirements are met:
 - 1) Every arithmetic average of any three consecutive strength tests equals or exceeds the specified 28-day compressive strength (f'_c).
 - 2) No individual strength test results falls below the specified 28-day compressive strength (f'_c) by more than 500 psi when f'_c is 5000 psi or less; or by more than $0.1 \times f'_c$ when f'_c is greater than 5000 psi.
- D. Test results will be reported in writing to the Engineer and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name and location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

- F. Additional Tests: The Contractor's Independent testing service shall make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by the Engineer. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed.

END OF SECTION 03 30 00

SECTION 310000
EARTHWORK

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Examine all drawings and all other Sections of the Specifications for the requirements therein affecting the work of this trade. Plans, surveys, measurements and dimensions, under which the work is to be performed are believed to be correct to the best of the Architect's knowledge, but the Contractor shall have examined them for himself during the bidding period, as no allowance will be made for any errors or inaccuracies that may be found herein.
- B. The Contractor shall become thoroughly familiar with the site, consult records and drawings of adjacent structures and of existing utilities and their connections, and note all conditions which may influence the work of this Section.
- C. By submitting a bid, the Contractor affirms that he has carefully examined the site and all conditions affecting work under this Section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions.
- D. Coordinate work with that of all other trades affecting, or affected by work of this Section. Cooperate with such trades to assure a steady progress of work under this Contract.

1.2 SCOPE OF WORK

- A. Work covered by this specification includes the following but is not limited to:
 - 1. Excavation of all types, including but not limited to excavations for footings, slabs, foundations, structures, and utilities, to the lines and grades shown in the Drawings or the limits specified herein, whichever is deeper. Excavation shall include removal and legal offsite disposal of all materials that cannot be reused.
 - 2. All topsoil, subsoil, root balls, organic soil, existing fill, and other deleterious matter should be entirely removed from within the proposed building footprint. All topsoil, subsoil, organic material, root balls, and other deleterious material shall be entirely removed from within the paved areas. The existing fill shall be improved under the subbase of paved areas.
 - 3. Rehandling, hauling and placing of stockpiled materials for use in refilling, filling, backfilling, grading and such other operations. Stockpiling shall include protection to maintain materials in a workable condition.
 - 4. Furnishing, placing, and compacting fill materials.
 - 5. Removing, hauling, stockpiling, rehandling, and placement of materials. Over-excavation to remove unsuitable materials
 - 6. Proof rolling of exposed subgrade for fill, footings, foundations, slabs, walks, pavements, lawns and grasses, and exterior plants
 - 7. Backfilling of excavations for foundations, footings, walls, utilities, pavements, sidewalks, and landscaped areas with specified on-site and imported materials.
 - 8. Off-site disposal of excess or unsuitable materials
 - 9. Placement of bedding, sub-base and base course layers

10. Stabilization/mitigation of saturated or otherwise disturbed materials
11. Final grading
12. Fill slopes and site retaining walls;
13. Excavation support, shoring or bracing as necessary
14. Coordination of material testing shall be the responsibility of the Contractor. All imported material tested shall be under ASTM D422 and shall be paid for by the Contractor.
15. Dust control and cleanup
16. Notifying all affected utility companies and Dig Safe before the start of work,

- B. The Work of this Section shall include performance of pre and post blasting surveys, preparation of a blast design plan and analysis, and provision of all services in accordance with requirements of 527 CMR 13.00 Explosives and the Contract Documents, for all existing building structures and utilities located within 500 feet of the Limit of Work Line (LOW) as indicated on the Drawings. The Contractor shall coordinate with the City of Fall River Fire Department to provide fire watch services before, during, and after all blasting performed under the Contract, in accordance with requirements of 527 CMR 13.00 Explosives and the Contract Documents.

1.3 CONTRACT REFERENCE

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Sections
1. Section 01 40 00, Quality Control
 2. Section 01 42 00, References
 3. Section 01 50 00, Temporary Facilities
 4. Section 311000 Site Preparation and Clearing
 5. Section 334000 Storm Drainage Systems

1.4 DESCRIPTION

- A. The Contractor shall furnish all labor, material, tools and equipment necessary to excavate materials; segregate, track, handle, sample, analyze, and test excavated materials, backfill, and re-grade as indicated on the Drawings.
- B. The Contractor shall use suitable on-site soils and fill, and soil from off-site sources, as needed. ***Please note that not all on-site materials will be suitable for reuse, nor will all required material gradations be present on the site. Imported materials or blending of onsite materials with imported materials are anticipated for this project.***
- C. The Contractor shall make excavations in such a manner and to such widths that will provide suitable room for performing the Work and shall furnish and place all sheeting, bracing, and supports, if necessary.

- D. The Contractor shall provide labor and material for all pumping and draining, if necessary; and shall render the bottom of excavation firm and dry and in all respects acceptable. The Contractor shall collect and properly dispose of all discharge water from dewatering systems in accordance with local and State requirements and permits.
- E. The Contractor shall raise the Site to final grades and compact the subgrade and intermediate layers to the required criteria set forth within this Section.
- F. Routine monitoring of in-place excavation support system shall be provided.
- G. Contractor shall protect and moisture condition all on site and imported materials for proper installation, compaction and use. This includes covering, drying, and adding moisture in order to maintain suitable workability of the soil materials.

1.5 INFORMATION

- A. Information on the Drawings, Reference Drawings, Geotechnical Reports, and in the Specifications relating to subsurface conditions, natural phenomena, and existing utilities and structures is from the best sources presently available. Such information is furnished only for information and is not guaranteed.
- B. Site Information – Data on indicated subsurface conditions are not intended as representations or warrants of continuity of such conditions between soil borings. It is expressly understood that Owner will not be responsible for interpretations or conclusions drawn there by the Contractor. Data is made available for the convenience of the Contractor. The Owner, Architect and Engineer assume no responsibility for the accuracy of the data other than at the particular locations and at the time the explorations were made.
- C. The Contractor, at his/her own expense, may conduct additional subsurface testing for his/her own information after approval by the Owner.

1.6 SUBSURFACE CONDITIONS AND SPECIAL SITE CONSIDERATIONS

- A. Gale Associates, Inc. of 163 Libbey Parkway, PO Box 890189, Weymouth, MA 02189 prepared a geotechnical report titled: "Subsurface Conditions Summary Letter," and dated December, 2005. The Owner assumes no responsibility for the Contractor's failure to make his own site investigation and makes no representation other than the soils reports regarding the character of the soil or subsurface conditions which may be encountered during the performance of the work. Failure by the Contractor to be aware of existing site conditions shall not be cause for additional cost to the Owner.
- B. The Geotechnical Report indicates that some of the materials present at the site contain quantities of silt beyond the limit deemed acceptable for reuse by the specification. The contractor is made aware of this condition and will not be eligible to receive additional compensation for imported material exceeding the Contractor's initial bid.
- C. It is the responsibility of the Contractor under this Contract to do the necessary excavation, filling, grading and rough grading to bring the existing grades to subgrade and parallel to finished grades as specified herein and as shown on the

Drawings for this Work. The Contractor shall visit the site prior to submitting a bid to become familiar with the extent of the work to be done under this Contract. The Contractor shall be responsible for determining the quantities of earth materials necessary to complete the work under this Section. All earth materials shall be included in the Contractor's base bid.

- D. Test boring locations as depicted on the Drawings are located by tape measurements from existing site features and structures and should only be considered as accurate as the procedure utilized.
- E. No claim for extra cost or extension of time resulting from reliance by the Contractor on information presented herein shall be allowed, except as provided in the Contract Documents.

1.7 QUALITY CONTROL

- A. The Owner may retain and pay for the services of an independent testing agency (Soils Representative) to monitor backfill operations, perform laboratory tests on soil samples, and to perform field density tests; and a Geotechnical Engineer to periodically observe the earthwork operations, observe the preparation of the subgrade for footings, slabs, and paved areas, and to review laboratory and field test data. The geotechnical engineer may from time-to-time request that the contractor excavate tests pits ahead of excavation to confirm subsurface conditions. Test pits shall be performed at no additional cost to the Owner.
- B. The Contractor shall make provisions for allowing observations and testing of Contractor's Work by the Geotechnical Engineer and by the independent testing and inspection firm. The presence of the independent testing agency and/or the Geotechnical Engineer does not include supervision or direction of the actual work of the Contractor, his employees or agents. Neither the presence of the independent testing agency and/or the Geotechnical Engineer, nor any observations and testing performed by them, nor failure to give notice of defects shall excuse the Contractor from defects discovered in his work.
- C. Costs related to retesting due to unacceptable quality of work and failures discovered by testing shall be paid for by the Contractor at no additional expense to Owner, and the costs thereof will be deducted by the Owner from the Contract Sum.
 - a.

Material	Responsible Party	Situation	Test	Minimum Frequency
Structural Fill/	Contractor	Source Investigation	Grain Size through 0.002 mm	1 per source
Ordinary Fill/			Moisture Density Relationship	1 per source
Gravel Borrow/	Owner	During Placement	Grain Size through 0.002 mm	1 per 100 tons
Common Borrow/			Moisture Density Relationship	1 per 100 tons
Bedding	Owner	As-Placed	Dry Density and As-Placed Moisture	2 per lift per location or activity and no less than 1 every 500 sf
Material/				
Crushed Stone				
/ Pea Gravel				

Loam Borrow	Contractor	During Place- ment	PH, Nitrogen, Phosphorous, Po- tassium, and USDA Classification	2 per Acre
Riprap	Contractor	Source Inves- tigation	Source Material Certification Specific Gravity	1 per source 1 per source
	Contractor	During Place- ment	Source Material Certification Specific Gravity	1 per 500 tons 1 per 500 tons

- d. The Soils Representative's presence or the Geotechnical Engineer does not include supervision or direction of the actual work by the Contractor, his employees or agents. Neither the presence of the Soils Representative, nor any observations and testing performed by him, nor any notice or failure to give notice shall excuse the Contractor from defects discovered in his work.
- e. The Owner reserves the right to modify the services of the soil's representative or Geotechnical engineer.

1.8 COORDINATION

- A. Prior to start of earthwork, the Contractor shall arrange an onsite meeting with the Architect, Engineer, the Geotechnical Engineer, and the testing agency for the purpose of establishing the Contractor's schedule of operations, and scheduling observation and testing procedures and requirements.
- B. As construction proceeds, the Contractor shall be responsible for notifying the Geotechnical Engineer at least 2 days and the testing agency at least 24 hours prior to the start of earthwork operations requiring observation and/or testing.
- C. The work of this Section shall be coordinated with that of other trades affecting, or affected by, this work, as necessary to ensure the steady progress of all work of the Contract.

1.9 PERMITS, CODES AND SAFETY REQUIREMENTS

- A. This project is subject to the Safety and Health regulations of the U.S. Department of Labor set forth in 29 CFR, Part 1926. Contractors shall be familiar with the requirements of these regulations.
- B. The Contractor is responsible for the adequacy of the excavation support system and shall retain the services of a Professional Engineer registered in Connecticut to design any required excavation support systems. The Contractor's Professional Engineer shall practice in a discipline applicable to excavation work, shall have experience in the design of excavation support systems and shall design in conformance with OSHA requirements. The Contractor's Professional Engineer shall provide sufficient on-site inspection and supervision to assure that the excavation support system is installed and functions in accordance with his design. Criteria listed herein defining the responsibilities of the Contractor's Professional Engineer are minimum requirements.
- C. All work shall conform to the Drawings and Specifications and shall comply with applicable codes and regulations.

- D. Comply with the rules, regulations, laws and ordinances of the Town of Hebron, of the State of Connecticut, appropriate agencies of the State of Connecticut and all other authorities having jurisdiction. Coordinate all work done within City and State rights of way with the appropriate agencies. Provide all required traffic control and safety measures, including uniformed police officers per City and State requirements. All labor, materials, equipment and services necessary to make the work comply with such requirements shall be provided without additional cost to the Owner.
- E. Comply with the provisions of the Manual of Accident Prevention in Construction of the Associated General Contractors of America, Inc., and the requirements of the Occupational Safety and Health Administration (OSHA), United States Department of Labor whichever is more stringent.
- F. The Contractor shall procure and pay for all permits and licenses required for the complete work specified herein and shown on the Drawings.
- G. The Contractor shall not close or obstruct any street, sidewalk, or passageway unless authorized in writing by the Architect. The Contractor shall so conduct his operations as to interfere as little as possible with the use ordinarily made of roads, driveways, sidewalks or other facilities near enough to the work to be affected hereby. The Contractor shall comply with the time limits established by the terms for trucking onto and off of the site.
- H. Any apparent conflict between the Drawings and Specifications and the applicable codes and regulations shall be referred to the Architect in writing, for resolution before the work is started.
- I. The Contractor shall comply with all excavation, trenching, and related sheeting and bracing requirements of Occupational Safety and Health Administration (OSHA) excavation safety standards, 29 CFR Part 1926.650 through 1926.652.

1.9 LAYOUTS AND GRADES

- A. Basic layout for the project is shown on the drawings. The Contractor shall supply all additional layout and grade control as necessary to properly implement and construct the work. The Contractor shall establish permanent bench marks and replace as directed any which are destroyed or disturbed.
- B. The words "finished grades" as used herein shall mean final grade elevations indicated on the Drawings. Spot elevations shall govern over proposed contours. Where not otherwise indicated, project site areas outside of the building shall be given uniform slopes between points for which finished grades are indicated or between such points and existing established grades.
- C. The word "subgrade" as used herein, means the surface or elevation remaining after completing excavation or top surface of a fill or backfill required surface of subsoil, borrow fill or compacted fill. This surface is immediately beneath the site improvements, fill materials as dimensioned on the Drawings, or other proposed surface material.

1.10 DISPOSITION OF EXISTING UTILITIES

- A. All work shall be executed in such a manner as to prevent any damage to existing buildings, streets, curbs, paving, service utility lines, structures and adjoining property. Existing streets, sidewalks and curbs damaged during the project work shall be repaired or replaced to their condition prior to commencement of Earth Moving operations.
- B. Locate and mark underground utilities to remain in service before beginning the work. Active utilities existing on the site and work areas shall be carefully protected from damage and relocated or removed as necessitated by the work. When an active utility line is exposed during construction, its location and elevation shall be plotted on the record drawings as described in this Section and both Architect and Utility Owner notified in writing.
- C. Inactive or abandoned utilities encountered during construction operations shall be removed and suitably backfilled if within the building area. Abandoned utilities outside the building area shall be removed, grouted, plugged or capped. The location of such utilities shall be noted on the record drawings and reported in writing to the Architect.
- D. The Contractor shall notify "Dig Safe" and local utility companies prior to the start of construction. The "Dig Safe" number shall be submitted by the Contractor in writing to the Architect prior to construction.
- E. Acceptance of any of the Contractor's plans, design calculations and methods of construction by the Designer shall not relieve the Contractor of the responsibility for the adequacy of the excavation lateral support system; preventing damage to existing or new structures, utilities and streets adjacent to excavations; the safety of persons working within excavated areas and the public at large; and excavation dewatering.

1.11 DRAINAGE AND GROUNDWATER CONTROL

- A. The Contractor shall control the grading in areas under construction on the site so that the surface of the ground will properly slope to prevent accumulation of groundwater and surface water in excavated areas and adjacent properties.
- B. The Contractor shall provide, at his own expense, adequate pumping and drainage facilities to maintain the excavated area sufficiently dry from groundwater and/or surface runoff so as not to adversely affect construction procedures nor cause excessive disturbance of underlying natural ground. The flows of all water resulting from pumping shall be managed so as not to cause erosion, siltation of drainage systems, or damage to adjacent property.
- C. Damage resulting from the failure of the dewatering operations of the Contractor, and damage resulting from the failure of the Contractor to maintain all the areas of work in a suitable dry condition, shall be repaired by the Contractor, as directed by the Engineer, at no additional expense to the Owner. The Contractor's pumping and dewatering operations shall be carried out in such a manner as to prevent damage to the Contract work and so that no loss of ground will result from these operations. Precautions shall be taken to protect new work from flooding during storms or from other causes. Pumping shall be continuous to protect the work and/or to maintain satisfactory progress.

- D. All pipelines or structures not stable against uplift during construction or prior to completion shall be thoroughly braced or otherwise protected. Water from the trenches, excavations, and stormwater management operations shall be disposed of in such a manner as to avoid public nuisance, injury to public health or the environment, damage to public or private property, or damage to the work completed or in progress.
- E. The Contractor shall excavate interceptor swales and ditches, as necessary, prior to the start of major earthmoving operations to insure minimal erosion and to keep areas as free from surface and ponded water as possible.
- F. All piping exposed above ground surface for this use, shall be properly covered to allow foot traffic and vehicles to pass without obstruction.
- G. Presence of groundwater or stormwater in soil will not constitute a condition for which an increase in the contract price may be made. Under no circumstances place concrete fill, lay piping or install appurtenances in excavation containing free water. Keep utility trenches free of water until pipe joint material has hardened and backfilled to prevent flotation.
- H. For further information refer to paragraphs on SPECIAL REQUIREMENTS FOR SEQUENCE OF CONSTRUCTION OPERATIONS AND DRAINAGE AND EROSION CONTROL as specified herein.

1.12 FROST PROTECTION/WORK IN FREEZING WEATHER

- A. Protect excavation bottoms and sides against freezing.
- B. A layer of fill shall not be left in an uncompacted state at the close of a day's operation when there is the potential for that layer to freeze.
- C. The Contractor shall not place any material on snow, ice, frozen soil, or soil that was permitted to freeze prior to compaction. Removal of these unsatisfactory materials will be at the Contractor's expense.
- D. Do not excavate to full indicated depth when freezing temperatures may be expected, unless work can be completed to subgrade, the materials installed, and the excavation backfilled the same day. Protect the excavation from frost if placing of materials or backfilling is delayed.
- E. The Contractor shall keep the operations under this Contract clear and free of accumulation of snow within the limits of Contract Lines as necessary to carry out the work.
- F. No materials shall be installed on frozen ground. Fill materials shall be free of frost.
- G. The subgrade of footings and slabs shall be protected from frost before placing concrete. The subgrade on the sides of the footings shall be protected from frost after the footings are constructed until sufficient fill is placed to protect the bottom of footings from frost induced heave.
- H.

1.13 DISTURBANCE OF EXCAVATED AND FILLED AREAS DURING CONSTRUCTION

- A. The Contractor shall take the necessary steps to avoid disturbance of subgrade and underlying natural soils/compacted fill during excavation and filling operations. Methods of excavation and filling operations shall be revised as necessary to avoid disturbance of the subgrade and underlying natural soils/compacted fill, including restricting the use of certain types of construction equipment and their movement over sensitive or unstable materials. The Contractor shall coordinate with the Architect or Soils Representative to modify his operations as necessary to minimize disturbance and protect bearing soils, based on the Architect's or Soils Representative's observations.
- B. All excavated or filled areas disturbed during construction, all loose or saturated soil, and other areas that will not meet compaction requirements as specified herein shall be removed and replaced with compacted Sand Gravel Fill or Crushed Stone. Fill that cannot be compacted within 48 hours because of its saturated condition shall be removed and replaced with compacted Sand Gravel Fill or Crushed Stone. Costs of removal of disturbed material and replacement with Sand Gravel Fill or Crushed Stone shall be borne by the Contractor.
- C. If requested by the Architect, the Contractor shall place a six inch layer of Crushed Stone or 12 inch layer of Granular Fill over natural underlying soil to stabilize areas disturbed during construction.
 - 1. The placement of the Crushed Stone layer or Granular Fill as well as material costs shall be borne by the Contractor.
- D. Material that is above or below optimum moisture for compaction of the particular material in place as determined by the Architect or the Soils Representative and is disturbed by the Contractor during construction operations so that proper compaction cannot be reached shall be construed as unsuitable bearing materials. This material shall be removed and replaced with lean concrete, Sand Gravel Fill, or Crushed Stone as directed by the Architect or Soils Representative at no additional cost to the Owner.

1.14 SPECIAL REQUIREMENTS FOR SEQUENCE OF CONSTRUCTION OPERATIONS AND DRAINAGE AND EROSION CONTROL

- A. An initial procedure for sequencing of construction operations is specified under Section 31 25 00, EROSION CONTROL. This procedure shall be extended through earthwork operations as follows:
 - 1. Perform initial procedures as specified under Section 31 25 00, EROSION CONTROL – Initial Sequence of Construction Activities and Preliminary Drainage Control.
 - 2. Repair any broken or damaged Sections of the haybales or siltation fencing installed during site preparation and install any additional Sections necessary for proper erosion control.
 - 3. Throughout earthwork operations, in addition to drainage swales, check dams, siltation sumps, and other items shown on the Drawings, the Contractor shall take other necessary precautions, including installation of temporary drainage swales, siltation sumps, check dams, haybales, silt fencing and temporary pipe to direct and control drainage from disturbed areas on the site so that erosion and siltation is minimal. In addition, no erosion or discharge of silt or larger particles shall occur in water bodies or wetland areas to remain undisturbed or onto adjacent properties.

4. Damaged or loose haybales and siltation fence shall be replaced as necessary to maintain their function of controlled erosion and siltation. Damaged or broken down check dams and filtration dams shall be replaced immediately.
5. Throughout construction, remove any accumulation of silt or soil build-up behind haybales, silt fences, check dams and filtration dams as it occurs. Remove accumulations of silt and build-up from the siltation pumps and silt traps when it is approximately 18 inches deep, or when it adversely affects the performance of the system. Remove silt sacks in catch basins when they have become clogged and replace to maintain their function.
6. Replace the crushed stone on the inside of all siltation sumps as necessary to permit adequate flow through the media and to maintain their function as a filter of silt and larger particles. Excavate silt and other material from the basins of all siltation sumps as it accumulates.
7. Remove temporary drainage swales, check dams, siltation sumps, haybales and other temporary drainage, erosion and siltation control measures when permanent drainage control measures have been installed, and grass is established in drainage areas and lawn areas. Do not remove the above items without approval of the Architect. If, in the Architect's opinion, these measures are still necessary, they shall stay in place.

1.16 DEFINITIONS

- A. Backfill: Soil material used to fill an excavation.
 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Course placed between the grade and hot-mix asphalt paving.
- C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Building Area: the area defined by the projection of a line from two foot outside of the edge of the footing extending upward and outward at a slope of 1.5H: 1V. (If overexcavation is required below the footing the building area will be redefined from the bottom of overexcavation)
- F. Compaction: The tamping and rolling of all backfill placed in uniform horizontal layers not exceeding a defined uncompacted lift thickness.
- G. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- H. Deleterious Material: Trash, debris, clay, topsoil, roots, organic material friable, glass, or otherwise degradable materials that compromise the strength and properties of soils.
- I. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated. Excavation is unclassified.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions.
 2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- J. Fill: Soil materials used to raise existing grades or meet proposed grades.
- K. Frost Zone: The area within 4 feet of finished grade.
- L. Influence Area: The area below a footing defined by the projection of a line from two foot outside of either edge of the footing extending downward and outward at a slope of 1V:1H.
- M. "In-the-dry": In-situ soil moisture content of no more than two percentage points above the optimum moisture content for that soil.
- N. Optimum Moisture Content: Determined by the ASTM standard specified to determine the maximum dry density for relative compaction.
- O. Prepared Ground Surface: The ground surface after clearing, grubbing, stripping, excavation, and scarification and/or compaction.
- P. Proof-rolling: The tamping and rolling of all subgrades including running a loaded rubber tire truck over the subgrade when requested by the Geotechnical Engineer.
- Q. Relative Density: As defined by ASTM D4253 or D4254.
- R. Relative Compaction: The ratio, in percent, of the as-compacted field dry density to the laboratory maximum dry density as determined by ASTM D1557. Corrections for oversized material may be applied to either the as-compacted field dry density or the maximum dry density, as determined by the Architect.
- S. State Standards: Connecticut Highway Department Standard Specifications for Highways and Bridges.
- T. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- U. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- V. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- W. Unclassified Excavation: The nature of materials to be encountered has not been identified or described herein.
- X. Unsuitable material shall be material having at least one of the following properties:

1. Material with a maximum unit dry weight per cubic foot less than 110 lbs., as determined by ASTM D1557.
2. Material containing greater than 2% organic matter by weight, topsoil, organic silt, peat, construction debris, roots and stumps.
3. Material which has a Liquid Limit greater than 55 when tested in accordance with ASTM D 4318.
4. Materials that do not meet one of the gradation specifications in this section.
5. Material classified as unsuitable by the Geotechnical Engineer.
6. Unsuitable material shall be disposed of off-site as directed by the Architect.
7. Material processed onsite that is not well graded or contains excess stones and exhibits honeycombing when placed in lifts.
8. Materials that are unstable as a result of inadequate construction dewatering, excessive subgrade disturbance, or other means and methods used by the Contractor are not considered unsuitable materials. This include materials that were stable and that have become unstable.

- Y. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.17 REFERENCES

- A. American Society of Testing and Materials Publications
- B. Connecticut Highway Department Standard Specifications for Highways and Bridges.

1.18 SUBMITTALS

- A. Product Data: For the following:
 1. Each type of plastic warning tape.
 2. Geotextile.
 3. Controlled low-strength material, including design mixture.
- B. Submit a detailed construction sequence plan for project excavation indicating temporary stockpile areas, side slopes of excavations, limits of required temporary excavation support and sequence and procedures for subgrade protection, excavation, concrete placement, moisture conditioning of on-site excavated soils used as fill, filling, backfill, and compaction.
- C. Grain-size distribution analysis test data shall be delivered with the samples. The analysis shall be performed in accordance with ASTM D 422. The data shall include a plot of the gradation and the envelope of the specified material. A material shall be considered meeting the specifications when its gradation curve fits entirely within the specified envelope.
- D. The Contractor shall provide to the Architect, on a daily basis, copies of field records documenting the location of stockpiled material, and stockpile identification data.
- E. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
 1. Classification according to ASTM D 2487 of each onsite and borrow soil material proposed for fill and backfill.

2. Laboratory compaction curve according to ASTM D 1557 for each on-site and borrow soil material proposed for fill and backfill.
- F. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.19 SAMPLING AND TESTING

- A. A 50-lb. Sample of each off-site material proposed for use, and of any on-site material when so requested by the Architect, Soils Representative, or the geotechnical engineer shall be submitted for testing by the testing agency.
 1. Samples shall be delivered to the office of the Architect or as directed.
 2. Samples required in connection with compaction tests will be taken and transported by the Soils Representative.
 3. If approval is based on the test results from a sample of material to be imported, additional tests, including grain-size analyses and laboratory compaction tests should be performed on the material after it is delivered to the site.
- B. Product Data: Submit location of pits for borrow material.
- C. Samples shall be representative of the source pit. If materials are found to vary once construction begins, the Contractor will be required to submit additional representative samples at his own cost.
- D. Materials imported to the site by the Contractor for on-site use shall not contain oil, hazardous waste, or deleterious materials.
 1. The Contractor shall be responsible for all costs incurred by the Owner as a result of the Contractor's action to import materials containing concentrations of oil and/or hazardous materials to the site.
 2. In the event that site characterization of off-site borrow sources indicates that soils are acceptable to the Architect or Engineer for use, then chemical testing will not be required. It is anticipated that chemical testing would not normally be required for material from customarily utilized commercial borrow sources.

No fill material from "urban areas" will be accepted for fill at the site, even if chemical testing indicates no exceedances of "Reportable Concentrations".

If requested by the Owner or Engineer, based on review of the borrow site characterization, the Contractor shall conduct testing on proposed fill material and submit results prior to delivery to the site, at no additional cost to the Owner. Testing shall be conducted by a DEP-certified testing laboratory and shall include, at a minimum, the following analytical test data.

 - a. Total Petroleum Hydrocarbons (EPA Method 418.1) every 100 yards
 - b. Volatile Organic Compounds (EPA Method 8420) every 500 yards
 - c. PCB and Pesticides (EPA Method 8080) every 500 yards
 - d. Total RCRA Metals (EPA Method 6000-7000 series) every 500 yards
 - e. Polynuclear Aromatic Hydrocarbons (EPA Method 8270) every 500 yards
 - f. TCLP for those total parameters which exceed twenty times the TCP criteria every 500 yards

- g. Total cyanide (EPA 9020)
- 3. All sieve analyses for conformance of on-site and off-site fill materials to be used in the work shall be done by means of a mechanical wet sieve analysis and in accordance with ASTM D 422.

1.20 QUALITY ASSURANCE

- A. The Engineer's duties do not include the supervision or direction of the actual work by the Contractor, his employees or agents. Neither the presence of the Engineer nor any observation and testing by the Engineer shall excuse the contractor from defects discovered in his Work at that time or subsequent to the testing.
- B. Subgrades shall be approved for compactness and material composition by the Architect prior to placing subsequent lifts. If inspections indicate Work does not meet specified requirements, the Work shall be removed, replaced and compacted at no additional cost to the owner or architect.
- C. Pre-excavation Conference: Conduct conference at Project site
 - 1. Before commencing earthwork, meet with representatives of the Owner, Architect, consultants, independent testing agency, and other concerned entities. Review earthwork procedures and responsibilities including testing and inspection procedures and requirements. Notify participants at least 3 working days prior to convening conference. Record discussions and agreements and furnish a copy to each participant.
- D. Contractor shall notify Architect when excavations have reached required subgrade and provide a minimum notice of 24 hours prior to placement of backfill on exposed subgrade. Density and Compaction Testing: The contractor is responsible to schedule compaction tests and allow adequate time for the proper execution of said tests

1.21 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by the owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated.
 - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.
 - 3. Contact a utility-locator service for the area where Project is located before excavating.
- B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies and City of Fall River to shut off services if lines are active.
- C. Subsurface investigations indicated the presence of fill material which contains organic matter. This material has limited reuse applications at the site.
- D. All fill to be removed from the Building Area and Influence Zone as presented on the plans and described herein.

- E. Subsurface investigations indicated the presence of sandy materials which will likely be easily disturbed due to construction activities. This material is also likely to require regular moisture conditioning to obtain required compaction requirements.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Segregate excavated material based upon material type to enable reuse in appropriate locations based upon material type.
- B. Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

2.2 SOIL MATERIALS

- A. Use of materials shall be as described below and as shown in the Drawings.
- B. Fill material will not be accepted from off-site borrow sources that are Connecticut disposal sites. Common borrow material obtained from off-site borrow sources that have no known releases or disposal of oil and/or hazardous material shall be acceptable for use only when accompanied by documentation stating there has been no known releases or disposal of oil and/or hazardous materials at the off-site borrow site.
- C. Fill material shall be free from frost/ice and snow, rocks with a diameter greater than 2/3 of the loose lift thickness as specified herein, and foreign matter, such as construction debris, asphalt, trash, wood, roots, leaves, sod, and organic matter. All fill material shall be maintained by the contractor at suitable moisture contents for proper placement and compaction as specified herein.
- D. Offsite pulverized pavement and crushed concrete are not acceptable for fill material. Onsite concrete that is crushed to meet one of the gradation requirements specified herein can be used as backfill.

2.3 STRUCTURAL FILL

- A. Structural fill should have a plasticity index of less than 6, and should meet the gradation requirements shown below. Structural Fill should be compacted in maximum 9-inch loose lifts to at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557), with moisture contents within ± 2 percentage points of optimum moisture content.

Sieve Size	Percent Passing by Weight
3 inches	100
1 ½ inch	80 – 100
½ inch	50 – 100
No. 4	30 – 85

No. 20	15 – 60
No. 60	5 – 35
No. 200*	0 - 10

*0 – 5 Under sidewalks and unheated slabs

- B. Use structural fill within building areas beneath floor slabs, foundations, and in other soil-bearing situations. Use Structural Fill with less than 5 percent fines in top 12 inches under exterior slabs-on-grade including under sidewalks

2.4 ORDINARY FILL

- A. Ordinary Fill should have a plasticity index of less than 6, and should meet the gradation requirements shown below. Ordinary Fill should be compacted in maximum 9-inch loose lifts to at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557), with moisture content s within ± 2 percentage points of optimum moisture content.

Sieve Size	Percent Passing by Weight
6 inches	100
1 inch	50 – 100
No. 4	20 - 100
No. 20	10 - 70
No. 60	5 – 45
No. 200	0 - 20

- B. Use Ordinary Fill for general grading; as backfill for embankments, behind the free draining backfill behind retaining walls, landscape areas, and athletic fields; and beneath the subbase layer in paved areas outside the building footprint.
- C. The processing of the existing building concrete and brick materials into Ordinary Fill shall be allowed.

2.5 COMMON BORROW

- A. Common Borrow material shall be soil containing no stone larger than 8 inches and shall be substantially free of organic loam, wood, trash, or other objectionable materials which may be decomposable, compressible or which cannot be properly compacted. Common Borrow materials shall not contain more than 30 percent by weight of silt and clay.
1. No Common Borrow shall be imported until available onsite Ordinary Fill has been utilized or with prior written approval from the Architect.
 2. Common Borrow material from off-site borrow sources shall contain no detectable concentrations of asbestos.
 3. Common Borrow to be placed within 10 inches of athletic fields shall be soil containing no stone larger than 3 inches and shall meet all other requirements listed herein.

2.6 GRAVEL BORROW

- A. Granular Fill shall be onsite or imported material conforming to Item M1.03.0 type a or b of the State Standards.

- B. Sand Gravel Fill shall be onsite or imported material conforming to Item M1.03.0 type b of the State Standards.
- C. Processed Gravel shall be onsite or imported material conforming to Item M1.03.1 of the State Standards.
- D. Gravel Borrow materials are not anticipated to be present onsite.

2.7 BEDDING MATERIAL

- A. Gravel Borrow Bedding Material shall be imported material conforming to Item M1.03.0 type c of the State Standards.
- B. Crushed Stone Bedding Material shall be imported material conforming to Item M2.01.3 of the State Standards.
- C. Coarse Sand Bedding Material shall be imported material conforming to Item M1.04.0 type A of the State Standards.
- D. Dense Grade Crushed Stone shall be imported material conforming to Item M2.01.7 of the State Standards.

2.8 CRUSHED STONE

- A. Crushed Stone shall be impacted durable material with maximum of 1 ½ " or 2" as specified in the Drawings. Stone used for drainage components shall be double washed. For all other applications fines shall be <1% unless otherwise noted. Crushed stone shall meet the following gradation:

Size (inches)	Percent Finer
1 ½" – 2"	100%
1 ¼"	85% - 100%
¾"	10% - 40%
½"	0% - 8%
#200	< 1%

- B. ¾" Crushed Stone shall comply with State Standards M2.01.4.
- C. ¼" to 3/8" Crushed Stone shall comply with State Standards M2.01.6.

2.9 PEA GRAVEL

- A. Clean naturally rounded aggregate with particle sizes no larger than ¾ of an inch with no more than 5% passing the #8 sieve. The dry density shall be a minimum of 95 pounds per cubic foot.

2.10 GEOTEXTILE FABRIC

- A. Geotextile No. 1: Geotextile Fabric for erosion control/slope protection shall conform to Item M9.50.0 type IV of the State Standards. Geotextile No. 1 is a nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that fibers retain their relative position. The product is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids.

Mechanical Properties	Test Method	Unit	Minimum Average Roll Value
Grab Tensile Strength	ASTM D 4632-91	lbs	120
Grab Tensile Elongation	ASTM D 4632-91	%	50
Trapezoid Tear Strength	ASTM D 4533-91	lbs	50
Mullen Burst Strength	ASTM D 3786-87	psi	225
Puncture Strength	ASTM D 4833-00	lbs	65
Apparent Opening Size (AOS)	ASTM D 4751-99A	U.S. Sieve	70
Permittivity	ASTM D 4491-99A	sec ⁻¹	1.8
Permeability	ASTM D 4491-99A	sec	0.21
Flow Rate	ASTM D 4491-99A	gal/min/ft	135
UV Resistance (at 500 hours)	ASTM D 4355-02	% strength retained	70

Physical Properties	Test Method	Unit	Typical Value
Weight	ASTM D 5261-92	oz/yd	4.8
Thickness	ASTM D 5199-01	mils	55
Roll Dimensions (width x length)	--	ft	12.5 x 360 / 15 x 360
Roll Area	--	yd	500 / 600
Estimated Roll Weight	--	lb	164 / 197

- B. Geotextile No. 2: Geotextile No. 2 is a nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that fibers retain their relative position. The product is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids.

Mechanical Properties	Test Method	Unit	Minimum Average Roll Value
Grab Tensile Strength	ASTM D 4632	lbs	160

Grab Tensile Elongation	ASTM D 4632	%	50
Trapezoid Tear Strength	ASTM D 4533	lbs	60
Mullen Burst Strength	ASTM D 3786	psi	305
Puncture Strength	ASTM D 4833	lbs	95
Apparent Opening Size (AOS)	ASTM D 4751	U.S. Sieve	70
Permittivity	ASTM D 4491	sec ⁻¹	1.4
Permeability	ASTM D 4491	sec	0.22
Flow Rate	ASTM D 4491	gal/min/ft	110
UV Resistance (at 500 hours)	ASTM D 4355	% strength retained	70

Physical Properties	Test Method	Unit	Typical Value
Weight	ASTM D 5261	oz/yd	6.4
Thickness	ASTM D 5199	mils	75
Roll Dimensions (width x length)	--	ft	15 x 300
Roll Area	--	yd	500
Estimated Roll Weight	--	lb	217

- C. Geotextile No. 3: Geotextile for the installation of underground tank
 - 1. Woven geotextile fabric with a minimum grab tensile strength of 120 lbs/inch and a maximum apparent opening size of #50 US sieve (0.300 mm)
- D. A geotextile fabric shall not be used between crushed stone and soil fill material at the base of retaining walls. Where separation between crushed stone and soil fill material is required, the crushed stone should be choked by means of a soil filter.

2.11 OTHER SOIL MATERIAL

- A. Drainage Aggregate: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.
- B. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100

percent passing a 1-inch (25-mm) sieve and 0 to 5 percent passing a No. 4 (4.75-mm) sieve.

- C. Fine Aggregate: ASTM C 33; fine aggregate, natural, or manufactured sand.
- D. River Stone: River stone shall be 1 ½" to 3" rounded and 3" to 6" rounded and oval, smooth stone, color range shall be warm tones of buff, beige, tan and gray. Color range shall be consistent throughout. Stone shall be clean and washed free of deleterious material. Contractor to submit 5 gallon container sample for each size range with source indicated.
- E. Rip-rap: rip-rap shall be sound, durable rock which is angular in shape in accordance with M2.02.0 of the State Specifications.

2.12 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility; colored as follows:
- B. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored as follows:
 - 1. Red: Electric.
 - 2. Yellow: Gas, oil, steam, and dangerous materials.
 - 3. Orange: Telephone and other communications.
 - 4. Blue: Water systems.
 - 5. Green: Sewer systems.

PART 3 – EXECUTION

3.1 GENERAL

- A. Prior to commencing work, the Contractor shall establish property line locations and place construction control markers clearly visible and understandable to workers in the field. The Contractor shall exercise due care so as not to disturb adjacent structures and shall leave the Site in clean and orderly condition upon completion of the work.
- B. Unanticipated Soil Conditions:
 - 1. If unsuitable bearing materials are encountered at the specified subgrade depths, the Contractor shall notify the Architect. The Contractor shall carry excavation deeper and replace the excavated material with suitable compacted fill or concrete as directed by the Architect or geotechnical engineer.
 - 2. Removal of such material and its replacement as directed will be paid an extra compensation in quantity approved by the Architect. Only changes in the work authorize in advance by the Architect in writing shall constitute an adjustment in the Contract Price.

3. Material that is above or below optimum moisture for compaction of the particular material in place as determined by the Architect or the Soils Representative and is disturbed by the Contractor during construction operations so that proper compaction cannot be reached shall not be construed as unsuitable bearing materials. This material shall be removed and replaced with lean concrete or compacted Gravel Borrow as directed by the Architect or Soils Representative at no additional cost to the Owner.
 4. The Contractor shall follow a construction procedure which permits visual identification of firm natural ground.
- C. Excessive Excavation: If any part of the general or trench excavation is carried, through error, beyond the depth and dimensions indicated on the Drawings or called for in the Specifications, the Contractor at his own expense, shall furnish and install compacted gravel fill, concrete, or take other remedial measures as directed by the Architect to bring fill material up to the required level or dimension.
- D. The Contractor shall reuse on-site all on-site excavated soils that meet the gradation requirements of materials specified herein. Solid waste consisting of brick, concrete, asphalt, cobbles, boulders, and all unsuitable excavated materials shall become the property of the Contractor and be legally disposed of off-site at no additional cost to the Owner. Excavated on-site soils which are suitable for re-use at the time of excavation but become frozen or too wet for re-use due to poor material handling practices shall be disposed of off-site and replaced as necessary at no additional cost to the Owner. Samples and Testing:
1. Excavated material taken directly from on-site cuts that will meet the Specifications may be used as fill provided the Contractor obtains written approval from the Architect. No such fill material shall be put in place until approved for use by the Architect in writing. Sand Gravel Fill is not anticipated to be found on the site.
 2. Testing of materials as delivered may be made from time to time. Materials in question may not be used, pending test results. Tests of compacted materials will be made regularly. Remove rejected materials and replace with new, whether in stockpiles or in place.
- E. Deficiency of Fill Material: Provide required additional fill material to complete the work if a sufficient quantity of suitable material is not available from the required excavation on the project site at no additional cost to the Owner.
- F. Surplus Fill Material: Surplus fill that is not required to fulfill the requirements of the Contract shall be removed from the site and legally disposed of.
- G. Protect all benchmarks, monuments, and property boundary pins. Replace if destroyed by contractor's operation.
- 3.2 PREPARATION
- A. The Contractor shall be deemed to have inspected the Site and satisfied himself/herself as to actual grades and levels and true conditions under which the Work will be performed.
 - B. Areas required for execution of Work shall be cleared. The work area shall be free of standing water and shall be dry.

- C. All site health and safety controls shall be fully established and in operation prior to beginning any demolition, soil, and fill excavation. Site controls shall include but not be limited to work zones properly barricaded, wheel wash and decontamination facilities, and all support equipment and supplies including personal protective equipment. All site controls shall be reviewed by the Architect in the field.
- D. The Contractor shall provide all layout field data, including ties, to the Architect. The Contractor shall maintain all required field controls throughout the performance of the Work.
- E. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- F. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Section 31 10 00 Site and Preparation Clearing."
- G. Protect and maintain erosion and sedimentation controls, which are specified in Division 31 Section 31 10 00," during earthwork operations.
- H. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.3 BUILDING PAD PREPARATION

- A. The topsoil/subsoil layer shall be entirely removed from within the proposed building footprint and paved areas.
- B. The existing fill shall be entirely removed from under the proposed building. The removal should extend laterally beyond the limits of the influence zone of 5 feet beyond the limits of the proposed building, whichever is greater.
- C. After the existing fill is removed, the exposed subgrade in the natural sand and gravel shall be compacted using at least four passes of a vibratory roller compactor imparting a minimum dynamic effort of 40 kips.
- D. In areas with no existing fill, the subgrade of the proposed slab and paved areas in the natural sand and gravel shall be compacted with a heavy vibratory roller compactor imparting a dynamic effort of at least 40 kips.
- E. The base of the footing excavations in the natural sand and gravel should be compacted with a dynamic vibratory compactor weighing at least 200 pounds and imparting a minimum of 4 kips of force to the subgrade, before placing the backfill or concrete.
- F. The grades within the proposed building should be restored using Structural Fill. At a minimum, 12 inches of Structural Fill should be placed under the proposed slab.
- G. Due to the susceptibility of the natural sand and gravel to disturbance under foot and vehicular traffic, a minimum of 6 inches of Structural Fill shall be placed under the footings to provide a firm working surface during placement of formwork and rebar.

- H. To improve the existing fill under the proposed paved areas, the top one foot of existing fill beneath the bottom of the proposed subbase layer shall be removed and the exposed subgrade shall be compacted with at least six (6) passes of a heavy vibratory roller compactor imparting a dynamic effort of at least 40 kips. Where soft zones are revealed by the compaction effort and where organic soil is exposed, the soft materials or organic soil shall be removed and replaced with Ordinary Fill. After the exposed subgrade is compacted, the removed existing fill that meets the gradation requirements of Ordinary Fill shall be placed back in 9-inch loose lifts up to the bottom of the proposed pavement subbase layer.
- I. Existing building foundations, and other underground structures should be entirely removed from under the proposed building.
- J. Existing building foundations, and other underground structures should be removed at least 18 inches beneath the bottom of the pavement and 18 inches beneath the ground surface of athletic fields.
- K. Boulders should be removed at least 18 inches beneath the bottom of slabs and pavement, and 18 inches beneath the ground surface of athletic fields
- L. The excavations resulting from the removal of abandoned foundations, structures, and boulders shall be backfilled with compacted Structural Fill within the proposed building and with Ordinary Fill in paved areas and athletic fields
- M. In areas requiring rock excavations, disturbed rock material shall be removed and replaced with Structural Fill or crushed stone within the footprint of the proposed building, and with Ordinary Fill beneath the pavement subbase of the proposed parking lots and driveways.
- N. The bottom of footings bearing in bedrock shall be prepared as level as possible and should not be sloped steeper than 12H:1V.
- O. Rock surfaces that heave due to blasting shall be compacted with a vibratory roller compactor that imparts a minimum of 40 kips to the rock surface, prior to placing fill. Where the thickness of heaved rock is more than 2 feet, the heaved rock shall be removed and replaced with suitable material.
- P. Granular fill shall not be placed directly on rock surfaces containing voids. Suitably sized crushed stone or a geotextile for separation shall be placed on the fractured surface prior to placing the fill to limit migration of smaller particles into the voids.
- Q. Rock shall be cut at least 12 inches beneath the bottom of footings, 5 feet beneath the FFE, and 18 inches beneath the bottom of paved areas.
- R. Under utility pipes, manholes, and catch basins, rock shall be cut a minimum of 12 inches beneath the pipe or structure.
- S. Laterally, the rock shall be removed at least 1 foot beyond the limits of footings and 2 feet beyond the limits of walls. Rock shall be cut a minimum of 12 inches outside utility structures and a minimum of 12 inches on each side of utility pipes up to 18 inches and a minimum of 18 inches on each side of utility pipes greater than 18 inches..

- T. To reduce overblasting and the potential for heaved rock, drill holes for blasting shall not extend more than 2 feet beneath the minimum depths shown above.
- U. Rock blasting shall be controlled to reduce vibrations and airblast overpressure to below thresholds established in the contract documents.
- V. Pre-splitting or controlled blasting may be desirable to reduce the amount of overblast. To reduce the potential for blasted rock mixing with organic soil, the topsoil, roots, tree stumps, and vegetation shall be removed before blasting. The remainder of the overburden soils and excavatable weathered rock shall not be removed before blasting.
- W. Contractor shall excavate from within the Building Area and Influence Area all unsuitable soils to a depth sufficient to reach the native soils as specified herein, within the geotechnical report, and within the contract plans. Note this may require excavation below footing subgrade as specified herein, within the geotechnical report, and within the contract plans.
- X. All excavated materials shall be segregated such that reusable material meeting the gradations provided for above are separated from organics and all other deleterious material
- Y. Once the final subgrade has been reached, and upon acceptance by the Architect and Soils Representative, Contractor shall backfill the excavated area with Structural Fill in the influence zone of building areas and Ordinary Fill in paved areas. Limits of excavation shall be determined in the field based upon observed conditions.
- Z. Structural Fill shall be placed within 1 foot of the bottom of all footings and slabs as structural bedding. NOTE: NOT ALL EXCAVATED MATERIAL WILL MEET THE GRADATIONS FOR GRANULAR FILL AND STRUCTURAL FILL.

3.4 PROOF COMPACTING

- A. Areas requiring excavation shall be excavated to subgrade and then proof compacted as specified in Section 1.2 of this Specification Section.
- B. Where soft zones are revealed by compaction efforts and where organic soil is exposed, the soft material or organic soil shall be removed and replaced with Structural Fill in the influence zone of building areas and utility trenches and Ordinary Fill in paved areas.

3.5 REUSE OF ONSITE MATERIALS AND PROCESSING OF ONSITE MATERIALS

- A. The Contractor may re-use onsite excavated soils that meet the gradation requirements of materials specified herein.
- B. The Contractor may use a crusher onsite and to blend and crush blasted rock, boulders, and overburden soils to produce materials that meet the gradation requirements specified herein for reuse onsite.

- C. Solid waste consisting of brick (brick is not from building demolition), concrete, asphalt, cobbles and boulders that measure less than 3 cubic yards in volume shall become the property of the Contractor and be legally disposed of off-site at no additional cost to the Owner.
- D. Excavated onsite soils which are suitable for re-use at the time of excavation but become frozen or too wet for re-use due to poor material handling practices shall be disposed of off-site and replaced as necessary at no additional cost to the Owner.
- E. The processing of the existing building concrete and brick materials into Ordinary Fill shall be allowed.
- F. The Contractor must inspect all existing stockpiles on site including soil testing for each stockpiled material.
- G. The Contractor must amend the existing stockpiles if testing determines that the stockpiles do not meet the specifications for their intended use. The Contractor shall provide third party sampling and testing for all soils amended on-site.
- H. Excavation material free of organic matter and approved for reuse by the environmental professional can be placed in paved areas at depths greater than 3 feet from the bottom of the subbase layer provided that the maximum particle size is less than 2/3 of the lift thickness and that the material is compacted to a minimum relative compaction of 95 percent.
- I. The Contractor is cautioned that the onsite materials are high in fines. Materials with high fines contents are typically difficult to handle when wet as they are sensitive to moisture content variations. Subgrade support capacities may deteriorate when such soils become wet and/or disturbed. The contractor shall keep exposed subgrades properly drained and free of ponded water. Subgrades shall be protected from machine and foot traffic to reduce disturbance. Placed onsite material that become soft and unsuitable to support additional lifts of fill shall be removed and replaced at no additional cost to the owner.
- J. The Contractor shall be allowed to mobilize a rock crusher to the site to process boulders, blasted rock, and imported rock by blending these materials with the existing fill and natural soil and crushing them to produce a well graded materials, provided that these materials are maintained at suitable moisture contents for proper compaction. Processed material obtained by crushing blasted rock, boulders, and soil shall meet the gradation requirements of Ordinary Fill and Structural Fill. Material produced by the crushing operation shall be well graded so as to reduce the potential for formation of honeycombs during its placement and compaction.
- K. Re-use of Unprocessed Material: The contractor shall be allowed to use unprocessed material in deep fill areas within the proposed paved areas and athletic fields if the following recommendations are followed:
 - 1. Large particles (larger than 2/3 of lift thickness) should be culled out or screened.
 - 2. Unprocessed materials should not be used within 3 feet of the bottom if the subbase of parking lots and athletic fields.
 - 3. Unprocessed materials should not be used within the proposed building footprint.
 - 4. Unprocessed materials should not be used during wet weather or when they are wet.

- L. The contractor should protect stockpiled unprocessed materials from exposure to moisture using tarps. The tarps should be secured so as not to be moved by wind or other action.
- M. When processing the blasted rock, the Contractor shall mix the blasted rock with onsite soil, including subsoil that is free of organics to produce a well graded processed material.
- N. Before blasted rock that is crushed and processed onsite is reused, it should be observed and approved by the geotechnical engineer. The soil to rock proportions placed into the crusher should be varied until the processed material meets the appropriate gradation requirements. The soil to rock proportion thus achieved should be maintained throughout the duration of the project.
- O. The material placed into the crusher should be free of organics, wood, and other deleterious matter.
- P. The jaws of the crusher should be adjusted periodically to maintain the crushing gradation.
- Q. Excess blasted rock, processed or unprocessed, not used on site shall be the property of the Contractor and shall be removed offsite at no additional cost to the Owner.

3.6 EXCAVATION, GENERAL

- A. The Contractor shall remain responsible for adequacy and safety of construction means, methods and techniques.
- B. The Contractor shall complete all excavations regardless of the type, nature or condition of the material encountered. The Contractor shall be solely responsible for making all excavations in a safe manner.
- C. The Architect shall be notified of unexpected subsurface conditions. Work shall be discontinued in affected areas until notified to resume work by the Architect.
- D. Displaced or loose soil shall be prevented from falling into any excavation. The stability of soil slopes shall be maintained in accordance with applicable local, state and federal regulations and guidelines.
- E. All loose material shall be removed from the bottom of the excavation so that the bottom shall be in an undisturbed condition. If removal of the loose material results in excavation beyond the work limits and over excavation has not been approved by the Architect; the restoration of the excavation to grade shall be done at no additional cost to the Architect.
- F. When the bottom of the excavation shall, by error of the Contractor, have been taken to a depth greater than the depth specified, or directed by the Architect, said condition shall be corrected by refilling to the proper grade with granular fill or the design shall be altered in a fashion acceptable to the Architect to compensate for said error. All measures taken to rectify conditions caused by over excavation shall have the Architect's approval, and any increase in cost resulting from such measures shall be borne by the Contractor.
- G. Excavation shall not be performed when weather conditions or the conditions of the materials are such that, in the opinion of the Architect, work cannot be performed satisfactorily.

- H. Appropriate measures shall be provided to retain excavation sidewalls and to ensure that persons working in or near the excavation are protected. Sheet piling or bracing may be used to support the walls of excavations. Method, design, construction and adequacy of any required bracing shall meet the OSHA requirements of 29 CFR Part 1926 and are the responsibility of the Contractor.
- I. All damage related to or caused by the excavation shall be repaired at the expense of the Contractor.
- J. Unclassified Excavation - For the purposes of payment, materials shall be unclassified except for those beyond the greater of the lines and grades shown in the Drawings and the limits specified herein (item 1.10.B). Unclassified excavation shall comprise and include the satisfactory excavation, removal, and disposal of all materials encountered within the lines and grades shown in the Drawings or limits specified herein, whichever is deeper, regardless of the nature of the materials, and shall be understood to include, but not be limited to, earth, topsoil, subsoil, hardpan, fill, foundations, pavements, curbs, piping, railroad track and ties, cobblestones, footings, bricks, concrete, abandoned drainage and utility structures, debris, and materials classified as unsuitable materials. All excavation and replacement, if applicable, with suitable material within the lines and grades shown in the Drawings or the limits specified herein, whichever is deeper, will be considered and bid as unclassified and shall be included in the Contractor's lump sum (i.e., shall not be paid for using Unit Prices)
- K. For bidding purposes, the limits of excavation to remove the existing fill and organic soil within the building shall be 12 inches beneath the bottom of the slab, 6 inches beneath the bottom of the footings, 12 inches laterally outside the outer edge of footings and 3 feet laterally from the outer edge of perimeter walls. The removal of surficial organic soil (topsoil and subsoil) in paved areas shall be in accordance with item 3.3.H.
- L. Removal of unsuitable material beyond the grades and lines shown on the Drawings and specified herein and its replacement, if applicable, as directed will be paid on the basis of contract conditions relative to changes in work or as provided for under the unit rates for respective classification in accordance with the allowance included in the contract documents. The removal of organic soil and existing fill within synthetic turf fields shall be per the requirements of the landscape architect as shown in the Drawings.
- M. Should quantities of certain materials or classes of work be increased or decreased from what is shown in the drawings and specified herein, the Contract Unit Rates listed below should be the basis of payment to the Contractor, or credit to the Owner, for such increase or decrease in the work. The Contract Unit Rates shall represent the exact net amount, per unit, to be paid to the Contractor in the case of increases in the quantities, and the exact amount to be refunded to the Owner in the case of decreases in the quantities. No additional adjustment shall be allowed for overhead, profit, insurance, or other direct or indirect expenses by the Contractor. Contract Unit Rates of materials shall include hauling, storing, stockpiling, moving, importing, spreading, and compacting. Increases or decreases in the quantities should be approved by the Owner

- N. The Contractor shall excavate soil and fill to the limits necessary to achieve the required grades determined by the Architect. The limits of excavation may not coincide with those areas indicated on the Drawings. The excavation areas shown on the Drawings are estimated areas only.
- O. If unanticipated bearing soils are encountered beyond the limits of excavation as specified on the Drawings and in the Specifications and at the specified subgrade depth, the Contractor shall notify the Owner's Representative in writing. The Contractor shall carry the excavation deeper and replace the excavated material with appropriate specified material or concrete as directed by the Architect or Engineer.
- P. Removal of topsoil, subsoil, rock, boulder, and organic silt, or silty sand as specified herein and in the Geotechnical Report will not be considered as unanticipated, unsuitable soil conditions at an elevation above specified subgrade elevations. Similarly removal of these materials within paved areas as specified herein will not be considered unanticipated unsuitable soil conditions. Proposed over excavation as shown on the plans will not be considered unanticipated soil conditions.

3.7 ROCK EXCAVATION

- A. Definitions and Classifications: The following classifications of excavation will be made only when rock excavation is required.
 - 1. "Earth Excavation" consists of removal and disposal of pavement and other obstructions visible on ground surface, underground structures and utilities indicated to be demolished and removed, material of any classification indicated in data on subsurface conditions, and other materials encountered that are not classified as rock excavation.
 - 2. "Rock Excavation" consists of removal and disposal of materials encountered that cannot be excavated without continuous and systematic drilling and blasting or continuous use of a ripper or other special equipment, except such materials that are classed as earth excavation. Typical of materials classified as rock excavation are as follows:
 - a. Rock or stone in original ledge.
 - b. Hard shale in original ledge.
 - c. Boulders on site, outside trench limits, exceeding three cubic yards in volume.
 - d. Boulders within trench limits, exceeding one cubic yard in volume.
 - 3. Should highly fractured or weathered bedrock be encountered during excavation, the following shall apply:
 - a. When the material is encountered in trenching operations or under footings, it shall be excavated or ripped with a hydraulic backhoe equal to or larger than Caterpillar 225 backhoe, and will be classified as Earth Excavation. When it is demonstrated to the satisfaction of the Architect and the Soils Representative that this material can no longer be removed with a hydraulic backhoe and requires drilling and blasting, this material shall be classified as Rock Excavation. For excavation procedures when this material is encountered under footings, refer to paragraph below.
 - b. When this material is encountered in open excavation, it shall be classified as earth excavation until drilling and blasting or continuous ripping is necessary as defined hereinabove.

4. Intermittent drilling and ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.
- B. Measurements:
1. When, during the process of excavation, rock is encountered, such material shall be uncovered and exposed in such a manner that the unbroken ledge surface is clearly visible, and the Architect shall be notified by the Contractor, before proceeding further. The areas in question shall then be cross-sectioned as hereinafter specified.
 2. Failure on the part of the Contractor to uncover such material and to notify the Architect and proceeding by the Contractor with the rock excavation before cross-sections are taken, will forfeit the Contractor's right of claim towards the stated allowance or additional payment over and above the stated allowance at the quoted unit price.
 3. The Contractor shall employ and pay for a Professional Civil Engineer or Land Surveyor registered in the State of Connecticut to take cross-sections of rock before removal and to make computations of volume of rock encountered within the Payment Lines. Cross-sections shall be taken in the presence of the Soils Representative and the computations approved by the Architect. The Owner has the option to perform independent cross-sections and computation of rock quantities.
 4. Where removal of boulder or ledge is required outside the established payment lines, the extent of this removal and basis of payment shall be determined by the Architect.
- C. If ledge is encountered within the limits of the Proposed Building Area, the Contractor shall excavate this material 12 inches below subgrade of footings and 18 inches below subgrade of slabs and pavement unless otherwise directed by the Architect or Soils Representative. All loose or shaken rock shall be removed and replaced with compacted gravel fill, crushed stone or lean concrete as directed by the Soils Representative.
- D. Rock excavation for foundations outside of the Building Area: Remove rock to foundation or footing subgrade. All rock bottoms for foundations shall be carefully examined. Loose or shaken rock shall be removed to solid bearing, and the rock surface leveled, or shelved to a slope not exceeding one inch per two feet, or as directed.
- E. Prepared rock subgrades shall be compacted with at least four passes of a self-propelled vibratory roller such as Dyna Pac CA-30D (44,000 lbs. Centrifugal force) or equivalent. Rock subgrades in utility trenches shall be recompact with at least four passes a walk-behind vibratory drum roller or other equivalent equipment having at least 10,000 pounds centrifugal force and sufficient to provide a firm, stable subgrade.
- F. If any part of the rock excavation at footings to be carried beyond the depth and the dimensions indicated on the Drawings or called for in the Specifications, the Contractor shall, at his own expense, furnish and install concrete of same strength as footings to the required subgrade level of the footings as shown on the Drawings. Dowelling or other corrective structural measures as directed by the Architect may

also be required to properly anchor or reinforce the concrete. If rock excavation is carried beyond the depth and dimensions to subgrade in other areas, the Contractor shall, at his own expense, furnish and install compacted gravel fill to subgrade as directed by the Architect.

- G. Basis of Payment: The total amount of rock excavation will be based upon the in-situ volume of rock excavated within and/or above the lines referred to in the next paragraph as "Payment Lines". The payment lines are only to be used as a basis of payment, and are not to be used as limits of excavation. Limits of excavation area as shown on the Drawings and as specified herein.
- H. Payment Lines for Rock Excavation:
 - 1. Payment lines for columns and footings shall be a vertical line one-foot off the edge of the footings; the depth shall be measured at 12 inches below the bottom elevations shown on the Drawings. . Payment lines for walls to be damp-proofed shall be a vertical line three feet outside the walls. . Vertical payment lines shall be as specified hereinafter.
 - 2. Payment lines for manholes and catch basins shall be one-foot outside of the outer wall and 12 inches below subgrade beneath the structure.
 - 3. Payment lines for rock excavation under slabs on grade shall be 18 inches below the bottom of the slab. Payment lines for rock excavation at plant beds shall be 12" at edge and full depth of required elevation for loam.
 - 4. Payment lines for rock excavation at paved areas and lawns shall be 18 inches below bottom of asphalts.
 - 5. Payment lines for rock excavation within athletic fields shall be the greater of 18 inches and the bottom of the turf subbase shown in the Drawings
 - 6. Payment lines for rock excavation under pipes within the building and for utility trenches outside the building lines shall in no case be calculated as greater in width than the outside diameter of the pipe plus two feet for pipes up to 18 inches. For pipes 18 inches and larger payment lines shall in no case be calculated as greater in width than the outside diameter of the pipe plus three feet. Payment lines at bottom of all pipe and utility trenches shall be 12 inches below the bottom of the pipe.

3.8 STORAGE OF SOIL MATERIALS - STOCKPILING

- A. The Contractor shall be responsible for managing and tracking any and all materials excavated and placed in stockpiles for testing.
- B. Materials shall be stockpiled on site at locations proposed by the Contractor and approved by the Architect. Stockpiled materials shall be of sufficient quantities to meet project schedule and requirements
- C. Tracking of the stockpiles shall be performed in accordance with the approved Work Plan submitted by the Contract in accordance with Section 01 33 00.
- D. The temporary stockpiled fill must be removed from the Site in accordance with applicable regulatory deadlines however no later than the completion date of this contract or 90 days from the date the stockpile was created, whichever is encountered first.

- E. Stockpiles shall be securely barricaded and clearly labeled. Differing materials shall be separated with dividers or stockpiled apart to prevent mixing.
- F. The Contractor shall direct surface water away from stockpile site to prevent erosion or deterioration of materials. Soils shall be suitably dewatered prior to their relocation on Site or disposal off site.
- G. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.9 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.10 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
 - 1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- B. Trenches shall be excavated to the necessary width and depth for proper laying of pipe or other utility and excavation side slopes shall conform to OSHA requirements. Minimum width of trenches shall provide clearance between the sides of the trench and the outside face of the utility. Maximum trench sizes are as shown on the Drawings or as specified herein. The depth of the trench shall be twelve inches below the bottom of the pipe barrel or respective utility. If the existing soil at the final subgrade excavation is found not suitable, the Architect or Soils Representative may approve removal and replacement of material.
 - 1. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit, unless otherwise indicated.
 - 2. Clearance: As indicated on plans.
 - 3. For pipes and conduit 6 inches (150 mm) or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
 - 4. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- C. The Contractor shall provide, at his own expense, suitable bridges over trenches where required for accommodation and safety of the traveling public and as necessary to satisfy the required permits and codes.

3.11 SUBGRADE INSPECTION, COMPACTION AND PROOF ROLLING

- A. Notify Architect when excavations have reached required subgrade.
- B. Proof compact all subgrades in accordance with Subsection 1.2 of this Specification Section and the Geotechnical Report to identify soft pockets and areas of excess yielding. Do not proof compact wet or saturated subgrades.

1. Completely proof compact subgrade in one direction repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph (5 km/h).
 2. Revise minimum weight or type of vehicle in first subparagraph below if required.
 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect and/or Soil Representative, and replace with compacted fill as directed.
 4. Proof compacting shall be completed utilizing a 20-Ton vibratory drum roller for granular soils. Should clay or other cohesive soils be encountered, sheep's foot roller shall be utilized. A total of 6 passes shall be considered complete.
- C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect and/or soil representative, without additional compensation.

3.12 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
1. Construction below finish grade including, where applicable, subdrainage,
 2. Surveying locations of underground utilities for Record Documents.
 3. Testing and inspecting underground utilities.
 4. Removing concrete formwork.
 5. Removing trash and debris.
 6. Removing temporary shoring and bracing, and sheeting.
- B. If, through failure or neglect of the Contractor to conduct the excavation work in a proper manner, the surface of the subgrade is in an unsuitable condition for proceeding with construction, the Contractor shall, at his own expense, remove the unsuitable material and replace it. Failure of the Contractor to control surface or ground water adequately, premature excavation at the work site, or other manifestations of the Contractor's neglect or improper conduct of the work, as determined by the Architect, shall be grounds for requiring removal and replacement of unsuitable subgrade without additional compensation.
- C. Grading in the vicinity of backfilling shall be properly pitched to prevent water from running into the backfilled area. Work areas shall be kept free from water during performance of the work under this Contract at no expense to the Architect. The Contractor shall build diversion berms and other devices necessary for this purpose.
- D. The Contractor shall not commence backfilling operations until the Architect gives approval.
- E. After the subgrade has been prepared, fill material shall be placed and built-up in successive layers until the required elevations are reached. No fill shall be placed on a frozen surface, nor shall snow, ice, or other frozen material be included in fill. Wet materials containing moisture in excess of the amount necessary for satisfactory placement or compaction shall not be used.
- F. All fill shall be brought up in essentially level lifts and shall be placed in levels by standard methods. The method of placement shall not disturb or damage other work.

Layers of fill shall not exceed twelve inches of uncompacted thickness before compaction, unless otherwise specified or as necessary for proper subgrade stabilization.

- G. Place backfill on subgrades free of mud, frost, snow, or ice.
- H. Filling operations shall continue until the fill has been brought up to the finished slopes, lines, and grades making proper allowances for thickness of surface treatment.
- I. The entire surface of the work shall be maintained free from ruts and in a condition that will permit construction equipment to travel readily over any Section. The top surface of each layer shall be made level or slightly sloped away from the center of the filled area. Fills should be graded to drain and compacted/sealed whenever precipitation is expected.
- J. Backfilling shall not be performed when weather conditions or the conditions of the material are such that, in the opinion of the Architect, work cannot be performed satisfactorily.

3.13 ACCEPTABLE BACKFILL MATERIALS

- A. Backfill materials shall be placed in the areas as indicated in the table below:

Fill at depths greater than 1-foot below footings and slabs within the Building Area	Structural Fill (Geotech Report)
Fill around footings for building and structures within the Influence Area	Structural Fill (Geotech Report)
Fill below pavement subbase	Ordinary Fill (Geotech Report)
Fill below sidewalk subbase	Ordinary Fill (Geotech Report)
Fill placed in top 1 foot below sidewalks	Select Fill (Geotech Report)
Fill within utility trenches below pavement and sidewalk subgrade	Granular Fill
Fill below utility bedding	Granular Fill
Fill placed 6 inches below footings	Structural Fill (Geotech Report)
Fill placed 1 foot below slabs	Structural Fill (Geotech Report)
Fill placed in landscaped areas outside of the Influence Area of footings, retaining walls, and slopes	Common Borrow

3.14 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.

- B. Place and compact bedding on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Place and compact initial backfill material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit.
 - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- D. Backfill voids with satisfactory soil while installing and removing shoring and bracing.
- E. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- F. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.

3.15 BELOW GRADE TANK BACKFILL

- A. Backfill with Pea Gravel as specified in paragraph 2.9 of this section. The manufacturer has indicated that the use of the proper material is critical to the long term tank performance.
- B. Do not mix approved backfill material with sand or native materials. Do not backfill tank with sand or native materials.
- C. Replace all excavated native materials with approved Pea Gravel which meets ASTM C 33 for quality and soundness.

3.16 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
 - i. Sequentially place and compact fill material in layers to required elevations.
- B. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.17 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by +2 to -3 percent and is too wet to compact to specified dry unit weight.
 - 3. If in the opinion of the Architect, additional moisture is required, water shall be applied by sprinkler tanks or other uniform distribution devices. If excessive amounts of water or if rain should cause excessive wetness, the area shall be allowed to dry as provided above.

3.18 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross Sections, lines, and elevations indicated. Grading shall be done by standard methods. Areas adjacent to structures and other areas inaccessible to heavy grading equipment shall be graded by manual methods. Embankments shall be graded at all times to ensure runoff of water.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
 - 3. Provide proper drainage from the site, no grading shall be done to direct water to damage or potentially damage adjacent property or work executed under this contract.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus [**1 inch**]
 - 2. Walks: Plus or minus [**1 inch**]
 - 3. Pavements: Plus or minus [**1/2 inch**]

3.19 FIELD QUALITY CONTROL

- A. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- B. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed in accordance with Subsection 1.7 of this Specification Section and:
 - 1. Paved Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every **500 sq. ft.** or less of paved area, but in no case fewer than 3 tests.
 - 2. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for each **150 feet** or less of trench length, but no fewer than 2 tests.
- C. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.20 COMPACTION REQUIREMENTS

- A. The following table lists minimum compactive efforts, which are required for all, fill materials. Compaction of each lift shall be completed before placement and compaction of the next lift is started. The compaction equipment shall make an equal numbers of transverse and longitudinal coverages of each lift. The degree of compaction for fill placed in various areas shall be as follows:
 - 1. Under concrete slabs and footings 95%
 - 2. In paved areas

	Within aggregate base course	95%
	Within aggregate subbase course	95%
	Below subbase course	92%
3.	In landscaped areas	90%
4.	Around and Above Utilities below	
	Below Pavement subbase in paved areas	92%

*Percentage of maximum dry density of the materials at optimum moisture content as determined by methods or tests for ASTM designation D1551 Method D.

- B. Compaction shall be accomplished by vibratory rollers, multiple wheel pneumatic tired rollers or other types of approved compacting equipment. Loaded trucks, low beds, water wagons and the like shall not be considered as acceptable compaction equipment unless specifically approved by the Architect for a particular location. Equipment shall be of any such design that it will be able to compact the fill to the specified density in a reasonable length of time. All compaction equipment shall be subject to the approval of the Architect.
- C. The Contractor shall compact all fills made during the day of work prior to leaving the project for the evening. The upper layer shall be pitched as necessary to provide positive drainage towards swales or interceptor ditches to minimize ponding and erosion should it rain.

3.21 COMPACTION TESTING

- A. The Contractor shall make all necessary excavations and preparations for testing. Excavations for density tests shall be backfilled with material similar to that excavated, and compacted to the specified density by the Contractor. Failure of the backfill material to achieve the specified density will be just cause for rejection of any or all portions of the excavation Section tested. The Contractor will not be granted an extension of time or additional compensation for testing or repair of backfill ordered by the Architect.
- B. Field density tests will be made by the Owner's Inspection Agency in accordance with the Method of Test for ASTM Designation D1556 or D6938, to determine adequacy of compaction; the location and frequency of such field tests shall be at the Architect's Inspection Agency's discretion.
- C. All field density tests results shall be reviewed by the Architect prior to the placement of concrete.
- D. The Contractor shall notify the Inspection Agency when an area is ready for compaction testing. This notification shall be 48 hours in advance of placing or final compaction so that the Architect Inspection Agency has adequate time to take compaction tests.
- E. Cooperate with the Architect in obtaining field samples of in-place materials after compaction. Furnish incidental field labor in connection with these tests. The Contractor will be informed by the Architect of areas of unsatisfactory density which may require improvements by removal and replacement, or by scarifying, aerating, sprinkling (as needed), and recompaction prior to the placement of the new lift. No additional compensation shall be paid for work required to achieve proper compaction.

- F. The Owner or Architect's Inspection Agency's presence does not include supervision or direction of the actual work by the Contractor, his employees, or agents. Neither the presence of the Inspection Agency nor any observations and testing performed by him shall excuse the Contractor from defects discovered in his work.

3.22 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
 - ii. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
- B. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
 - 1. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 2. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.23 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Project property.

3.24 REMOVAL OF EROSION CONTROL MEASURES

- A. Remove temporary drainage swales, check dams, siltation sumps, hay bales, siltation fencing and other temporary drainage, erosion and siltation control measures when permanent drainage control measures have been installed and grass is established in drainage areas leading to siltation sumps. Contractor shall excavate and remove all sediments from siltation sumps prior to backfilling the sumps. Remove erosion control measures when approved by the Architect.

End of Section

Section 31 25 00
EROSION CONTROL

PART 1 – GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 1 – GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

- A. This Section specifies requirements for control of erosion from the Limits Work onto adjacent down gradient areas as shown on the Drawings, as specified herein for applicable construction activities.
- B. Furnish and install hay bales, silt fence, swales, soil berms, mulches, grasses, channels, crushed stone, rip-rap, grading to control runoff, dewatering filter basins, and all other devices required to control erosion. Continually maintain all erosion control devices within the limits of the contract areas. Remove and clean up of all erosion control devices within the limits of the contract areas.
- C. RELATED WORK: The following items are not included in this Section and will be performed under the designated Sections.
 - 1. Section 31 00 00, Earthwork for excavation, backfilling and compaction requirements
 - 2. Section 33 40 00, Storm Drainage for installation of Storm Drainage System

1.3 APPLICABLE REGULATIONS

- A. In order to prevent erosion and sedimentation from construction activities related to the performance of this project, the Contractor and his subcontractors shall comply with permits issued for the project, all applicable federal, state and local laws and regulations concerning erosion and sediment control, as well as the specific requirements stated in this Section and elsewhere in the Specifications.
 - 1. State of Connecticut, Department of Public Works, Standard Specifications for Highways and Bridges, latest edition, herein referred to as the "Standard Specifications" and related articles.

1.4 QUALITY ASSURANCE

- A. The Contractor shall install and maintain sedimentation control devices during construction as specified to prevent the movement of sediment from the construction site to off site areas via surface runoff or underground drainage systems. Measures in addition to those indicated to prevent the movement of sediment off site shall be installed, maintained, removed, and cleaned up at no additional cost to the Owner.

1.5 DESIGN CRITERIA

- A. Conduct all construction in a manner and sequence that causes the least practical disturbance of the physical environment.

- B. Stabilize disturbed earth surfaces in the shortest practical time and employ any and all such temporary erosion control devices as may be necessary until such time as adequate that soil stabilization has been achieved or permanent erosion control devices are operational.
- C. The erosion control devices specified herein represent the minimum required work for erosion control. The Contractor shall add to these minimum devices any and all measures to effectively prevent migration of sediment from the limits of the work area.

1.6 SUBMITTALS

- A. SUBMITTALS for submittal provisions and procedures.
- B. At least 5 days prior to the start of any other construction, the Contractor will review the installed erosion controls with the Architect.
- C. At least 5 days prior to intended use, the Contractor shall provide the following samples and/or submittals for approval. Do not order materials until the Architect's approval of samples, certifications or test results has been obtained. Delivered materials shall closely match the approved samples.
 - 1. Silt Fence: Submit manufacturer's material specification and installation instructions.
 - 2. Inlet Protection.
 - 3. Mulch Material: Submit one Cubic Foot Sample.
 - 4. Mesh of Matting: Submit One square foot sample and manufacturer's technical description and installation instructions.
- D. Implementation Plan

Prior to commencement of the work, the Contractor shall:

- 1. Meet with the Architect to develop mutual understandings relative to compliance with the provisions of this Section.
- 2. Install all erosion control measures as specified on the Drawings.
- 3. Should the Contractor desire to change or modify the specified erosion controls then he shall submit in writing his plans to the Architect for implementing erosion and sediment control including, but not limited to, placement of hay bales, silt fence, containment berms, temporary channels, settling ponds, and dewatering filter basins, as well as a description of all construction techniques intended to minimize erosion and sedimentation, and a program for maintenance of these facilities throughout the performance of construction activities.
- 4. The Contractor shall submit design and sizes of all dewatering filter basins.

PART 2 – MATERIALS

2.1 HAY BALES

- A. Bales shall be made of straw or hay with forty pounds minimum weight and one hundred- and twenty-pounds maximum weight. They should be either wire or nylon bound. Wood stakes shall be a minimum of 2 inch by 2-inch nominal size by a minimum of 3 feet long. As an alternate, No. 4 size steel reinforcing bars may be

used with rubber safety tops.

2.2 SILT FENCE

- A. Silt fences or sedimentation barriers shall consist of wood posts with industrial support netting and sediment control filter fabric attached.
- B. Wood post shall be standard 2"x2"x4.5' long hardwood stakes commonly used to support filter fabric. Silt fence shall be furnished standard with filter fabric attached to hardwood posts and spaced at a maximum distance of 8 feet.
- C. Provide suitable heavy nylon cord for securing abutting silt fence posts.
- D. The filter fabric material shall be needle punched non-woven polypropylene geotextile conforming to the following criteria:

Minimum Acceptance

Fabric Properties	Value	Test Method
Grab Tensile Strength (lbs)	124	ASTM D4632
Elongation of Failure (%)	15	ASTM D4632
Mullen Burst Strength (PSI)	300	ASTM D3786
Puncture Strength (lbs)	100	ASTM D4833
Flow Rate (gal/min/sf)	10	ASTM D4491
Apparent Opening Size (sieve)	30	ASTM D4751
Ultraviolet Radiation (% strength retained)	70	ASTM D4355
Trapezoidal Tear Strength (lbs)	60	ASTM D4533
Permittivity (sec ⁻¹)	.01	ASTM D4491

- E. Control fabric shall be at least 3 feet wide.

2.3 CATCH BASIN INSERTS

- A. Siltsack®, Basin bag, Ultra-BasinGuard or equal shall be manufactured from a specially designed woven polypropylene geotextile. The insert will be manufactured to fit the opening of the catch basin or drop inlet.

2.4 FILTER SOCKS

- A. Filter Socks are biodegradable sediment-trapping devices. Manufacturers include SiltSoxx, Corr Logs, Straw Wattles, or equivalent.

2.5 STONE STABILIZATION PAD

- A. Material as shown on Drawings to ensure no offsite tracking of soil.

2.6 WATER

- A. Water used for dust control and equipment washes shall be clean and free of salt, oil, and other injurious materials. Water is not available on site. The Contractor shall provide all necessary water.

PART 3 – EXECUTION

3.1 GENERAL EROSION CONTROL REQUIREMENTS

- A. All materials and installation shall be in accordance with the Drawings.
- B. Means of protection as noted on the Drawings indicate the minimum provisions necessary. Additional means of protection shall be provided by the Contractor as needed for continued or unforeseen erosion problems, at no additional expense to the Owner.
- C. The Architect has the authority to control the surface area exposed by construction operations and to direct the Contractor to immediately provide permanent or temporary erosion control measures to prevent contamination of adjacent streams, watercourses, lakes, ponds or other areas of water impoundment. Every effort shall be made by the Contractor to prevent erosion on the site and abutting property.
- D. All slopes shall be stabilized by mulching, seeding or otherwise protected as the work progresses to comply with the intent of this specification. All damaged slopes shall be repaired as soon as possible. The Architect shall limit the surface area of earth material exposed if the Contractor fails to sufficiently protect the slopes to prevent pollution.
- E. The Contractor shall at all times have on hand the necessary materials and equipment to provide for early slope stabilization and corrective measures to damaged slopes.
- F. The Contractor shall continually maintain all erosion control devices within the contract work limit and shall remove such devices upon completion of the Work and surface stabilization, or if ordered by the Architect.
- G. The Contractor shall operate all equipment and perform all construction operations so as to minimize pollution. The Contractor shall cease any of his operations, which will increase pollution during rainstorms.

- H. The Contractor shall place additional erosion and sedimentation controls in accordance with by laws and regulations.
- I. After any significant rainfall (more than 1 inch of rainfall in a 24 hour period), sediment control structure shall be inspected for integrity. Any damaged devices shall be corrected immediately.

3.2 HAY BALE INSTALLATION

- A. Bales shall be set lengthwise on the contour for sheet flow applications. They shall be held in place by two wooden stakes in each bale as detailed on the Drawings. Bales shall be maintained or replaced until they are no longer necessary for the purpose intended or are ordered removed by the Architect.
- B. Bales shall be set with bindings parallel to grade and entrenched to a minimum depth of 6 inches. Stakes shall be driven a minimum of 18 inches into the ground and cut off flush with the top of the bale.
- C. After the bale lines are staked, the end joints shall be chinked with loose straw to close any gaps. Excavated soil shall then be backfilled against the uphill side of the barrier to a depth of 4 inches above the downhill grade.
- D. Inspection shall be weekly and repair or replacement shall be made as needed.
- E. Following compaction of the backfill, loose straw shall be scattered over the surface directly behind the barrier.
- F. Hay bale checks should be placed in diversions generally at 50-foot intervals and in accordance with the detail on the Drawings. Sediment shall be removed from behind the checks when it has accumulated to one-half the original height of the dam measured at the low point.

3.3 SILT FENCE INSTALLATION

- A. Silt fence shall be installed utilizing posts 4.5 feet long minimum staked at least 8' on center. Prior to installation, a 6-inch by 8-inch deep anchor trench shall be installed at the base of the fence and the final height will be at minimum 2 feet.
- B. Inspect siltation fence periodically and remove accumulated sediment.

3.4 DIVERSIONS

- A. Diversions for directing surface runoff away from and/or around trenching and other construction operations shall be installed and stabilized in advance of new work. The Contractor shall select the cross-Sectional shape (parabolic, v-shaped or trapezoidal) of diversions and shall have proper equipment available on-site for maintenance of the diversions.
- B. The minimum capacity of the diversion shall be sized to accommodate a 2-year design storm.
- C. Periodic cleaning shall be done to maintain capacity.

3.5 DEWATERING DISCHARGES

- A. All pumped discharges and surface water flow from work areas shall be passed through a filter barrier of hay bales and silt fence combination or dewatering bags before being discharged into gutters, ditches, drainage swales, storm sewer systems, wetlands, natural water bodies, streams, or rivers. The method of all such discharges shall be subject to the approval of the Architect.
- B. The Contractor shall design and size all dewatering discharge basins such that the discharge from the basins is free of silt and debris to the satisfaction of the Architect and all applicable regulatory agencies.

3.6 CATCH BASIN INSERTS

- A. Installation of inserts shall be prior to any upstream soil disturbance.
- B. Inserts shall be inspected after each rain event and at a minimum every two weeks.
- C. Debris and silt shall be cleaned on a regular basis.

3.7 REMOVAL AND CLEAN-UP

- A. All temporary erosion control facilities and accumulated sediments shall be removed and legally disposed in a neat and workmanlike manner when all disturbed areas have been satisfactorily stabilized.

End of Section

SECTION 32 91 04
SOIL PREPARATION FOR ATHLETIC FIELDS

PART 1 - GENERAL

1.01 SUMMARY

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 13 00 00 – Earthwork

1.02 DESCRIPTION OF WORK

- A. Provide all materials, equipment and labor necessary to complete the work as indicated on the drawings or as specified herein.
- B. The principal work of this section includes, but may not be limited to, the following:
 - 1. Loam from off-site, if on-site is insufficient.
 - 2. Grading and Spreading Loam.
 - 3. Fraise Mowing.
 - 4. Core Aeration.
 - 5. Linear Aeration and Sand Injection.
 - 6. Top Dressing.
 - 7. Amendment Nutrition.
 - 8. Substantial Completion Field Testing
 - 9. Grow-in and Establishment

1.03 MINIMUM REQUIREMENTS

- A. The successful contractor shall meet the following minimum requirements in order to be considered for installation of the athletic fields. All requirements listed in 1.03 MINIMUM REQUIREMENTS shall be documented and submitted to the Landscape Architect for approval prior to commencement of any athletic field work.
 - 1. The Contractor should have staff that possesses adequate experience in the use and operation of the equipment and machinery identified in these specifications.
 - 2. The Contractor must be able to prove that they have all LGP (low ground pressure – less than six (6) psi) Rehabilitation equipment or equivalent as listed and specified in section - Site Work Equipment by Use for Low Ground Pressure (LGP) Equipment
 - 3. Selected installer must have installed a minimum of (5) years old of similar materials and design. Documentation of this shall be furnished per 1.03, A above.
 - 4. Selected installer must install athletic fields using his/her own crews, subcontracting of installation work will not be allowed.
 - 5. Selected installer must have a minimum of ten (10) outdoor fields at over 70,000 square feet each installed in the Northeast United States of similar construction. A list of these installations with owner's name and phone number shall be furnished per 1.3, A above.
 - 6. Provide reports of previous Athletic Fields experience as it pertains to the types of projects involved in, including but not limited to; start and end dates, adherence to set targets, key performance indicators

- and scope of works completed.
7. Provide testimonies from previous clients, including but not limited to; quality of work, staff/employee interactions, tidiness of site, timekeeping, punctuality, and overall client satisfaction levels.
 8. Provide evidence of continued professional development for last 3 consecutive years(i.e., professional association membership, professional conferences, continuing education).

1.04 QUALITY ASSURANCE

- A. The approved contractor shall review all plans and specification including the following prior to the start of construction:
 1. Review the entire system including subgrade, base, utilities, and drainage to ensure all components are complimentary.
- B. Installation of the athletic field shall be done only after excavation and construction work which might injure work that has been complete. Damage caused during construction shall be repaired prior to acceptance.
- C. Do not make substitutions without written approval. If specified materials are not available, obtain approval for substitution from the Owner's Representative.

1.05 SUBMITTALS

- A. Must provide evidence that staff/employees used for this project have at least a 3-year experience of similar scope of work for project.
- B. Provide resumes for all staff/employees who will be responsible for carrying out scope of works, including but not limited to, full time and seasonal/short term employees.
- C. Provide evidence of continued professional development of all/any employees involved in the Project for last 2 consecutive years.
- D. Shall always have a supervisor on site throughout the project duration who is experienced in the rehabilitation of Athletic Supervisor's name and experience shall be submitted to the Owner and Athletic Field Consultant for approval.
- E. Shall have membership in one or more of the following Professional Associations for a minimum of the last 3 consecutive years.
 1. New England Sports Turf Managers Association (NESTMA)
 2. Sports Turf Managers Association (STMA)
- F. Provide a project plan identifying all key indicator/target points and deadlines for meeting each target point, clearly showing an integrated approach to quality control and quality assurance.
- G. Provide a detailed methodology of how the required works will be carried out, this should be inclusive and consistent with the Project Plan.
- H. Is required to submit samples, test results and/or certification of all material prior to delivery on site. All materials are to be approved by the Owner prior to their use. These shall comply with specifications and scope of project and where applicable, with any standards that may be implied.
- I. At least 30 days to ordering material, the Contractor shall submit to the engineer samples, manufacturer's product data, source of off-site loam to be provided, and certified test results for materials as specified below. Certification shall list soil additives to loam including rates and type.
- J. Existing On-Site loam: Sample and test existing on-site loam. The Contractor shall sample the existing loam soils from the construction site with the following requirements:
 1. The contractor shall provide a one cubic foot representative sample per each 1,000 cubic yard on-site stockpile of existing loam for testing. All stockpile sampling shall be per ASTM D 75 and Appendixes.
 2. Preparation of Samples: Contractor shall place these soil slices into a large, clean plastic container and mix thoroughly. Contractor shall take one cup of soil mixture and dry it room temperature (do not dry samples in an oven or on a stove or radiator). Once soil is dry, place soil in sandwich size type plastic bag and close.

Label each sample on outside of bag, identifying sample by soil type and acre.

- K. Loam from off-site, if on-site is insufficient: The Contractor shall provide a one cubic foot representative sample per each 1,000 cubic yard proposed stockpile of loam borrow for testing. All stockpile sampling shall be per ASTM D 75 and Appendixes.
- L. All testing shall be at the expense of the contractor. Contractor shall deliver samples to the testing facility and have the results forwarded to the Architect. Perform all tests for gradation, organic content, soil chemistry and Ph. Testing reports shall include the following tests and recommendations:
1. Mechanical gradation (sieve analysis) shall be performed and compared to the USDA Soil Classification System.
 2. Chemical Analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Magnesium, Lead, Zinc, Soluble Salts, extractable Aluminum, Cadmium, Copper, pH and buffer pH. Except where otherwise noted, nutrient tests shall be for available nutrients.
 3. Soil analysis tests shall show recommendations for soil additives to correct soils to meet the specifications and for additives necessary to accomplish lawn work as specified.
 4. Permeability rates for materials.
- M. Certification and/or labels of proposed soil additives stating names of each.

1.06 DEFINITIONS

- A. The following definitions shall apply to the work of this section.
- B. The following size distributions of mineral particles by diameter and sieve size shall apply to the following conventional names of soil types:

Conventional Name	Retained on US Sieve No.	Diameter (mm)
Very Coarse Sand	#18	1-2
Coarse Sand	#35	0.5-1
Medium Sand	#60	0.25-0.5
Fine Sand	#140	0.10-0.25
Very Fine Sand	#270	0.05-0.10
Silt	by hydrometer	0.002-0.05
Clay	by hydrometer	Less than 0.002

1.07 PRODUCT DELIVER, STORAGE AND HANDLING

- A. Grass Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.
- B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways, and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.
4. Fertilizers, lime, seed, and soil amendments must be stored in a secure, locked area, and must be protected from the elements.
5. Provision has been made to allow on-site storage of all materials. Please note this storage is not covered, heated, or secured. Contractor to provide storage units for materials that require controlled storage.
6. The location of the storage is to be determined by RHAM High School

1.08 ATHLETIC FIELD CONDITIONS

- A. Planting Restrictions: Plant seed during one of the following periods. Coordinate seeding activities and initial maintenance protocols to provide required maintenance from date of Substantial Completion.

1. Spring Planting: March 15th to June 15th.
2. Fall Planting: August 15th to November 15th.

Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting activities to be performed adequately, where beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

PART 2 - PRODUCTS

3.01 SEED - ATHLETIC FIELD

All products and material required for the successful completion of the project shall be as specified unless otherwise communicated by the contractor. All products and materials shall be authenticated by the supplier and Athletic Field Consultant upon delivery and before use.

Grass Seed: Must be certified through the National Turfgrass Evaluation Program (NTEP).

A. Seed Mixtures:

1. Seed Mix #1: 80/20 Kentucky Bluegrass and Perennial Ryegrass mix comprising of Two (2) cultivars of Perennial Ryegrass and Three (3) cultivars of Kentucky Bluegrass (KBG) or equivalent as follows:
 - a. 25% Wicked Perennial Ryegrass
 - b. 25% Karma Perennial Ryegrass,
 - c. 17% Mercury Kentucky Bluegrass
 - d. 17% Jackrabbit Kentucky Bluegrass
 - e. 16% Sombrero Kentucky Bluegrass

Aggressive, Wear Tolerant, and Fast Germinating Kentucky Bluegrasses combined with Fast Germinating, disease resistant, dark colored Perennial Ryegrass.

Evenly apply, Seed Mix #1 at a rate of 5 lbs./1,000 Sq. Ft. in One (1) direction, utilizing a disc seeding implement as per equipment specification towed behind a LGP turf tractor or equal.

2. Seed Mix #2: 100% Perennial Ryegrass mix comprising of Three (3) cultivars or equivalent as follows:
 - a. 34% Karma Perennial Ryegrass
 - b. 33% Wicked Perennial Ryegrass
 - c. 33% Fiesta Perennial Ryegrass

Very Fast Germination and Establishment, Disease Resistance, Wear Tolerance.

Evenly apply to Athletic field Seed Mix at the rate of 5lbs./1000 Sq Ft total in Two (2) directions (2.5lbs in each direction) utilizing a dimple seeding implement towed behind a LGP turf tractor or equal.

3. Certification of grass seed selected shall clearly state no less than 98 percent germination, no less than 98 percent pure seed, and no more than 0.2 percent weed seed.

3.02 FERTILIZERS- ATHLETIC FIELD

Granular Application – Dates to be determined.

- A. Nutrient application – Evenly apply using a Vicon Applicator with pendulum action, to the Athletic field, 10 lbs./1000 sq. ft. of Myco - Replenish 3:3:3 to each field.
- B. Evenly apply using a Vicon Applicator with pendulum action, Nutrite 16:24:10 SGN 200 Starter fertilizer with humid acids and soluble calcium or equal at the rate of 4.17 lbs./1,000 Sq. Ft. to the field.
- C. All fertility applications must be carried out inline with established Connecticut fertilizer regulations.

Granular Application – Dates to be determined.

- A. Evenly apply using a Vicon pendulum action Applicator, Nutrite 16:24:10 SGN 200 Starter fertilizer with humid acids and soluble calcium or equal at the rate of 4.17 lbs. /1,000 Sq. Ft. to the field.
- B. Evenly apply using a Vicon pendulum action Applicator, Country Club 24:0:18 SGN 145 or equal at the rate of 2.08 lbs. /1,000 Sq. Ft. to the field.

Spray Application – Dates to be determined.

- A. Evenly apply the following:
 - a. Nutrite 28:0:0 or equal at the rate of 6oz/1,000 sq. ft
 - b. TurfRx Si or equal at the rate of 3 oz/1,000 sq. ft.
 - c. TurfRx Fairway+ or equal at the rate of 6 oz/1,000 sq. ft.
 - d. "Sea-3" or equal at the rate of 3oz/1,000 sq. ft.
 - e. Union Fungicide or equal at the rate of 4 oz/1,000 sq. ft. Apply as specified.

Note: Application must be carried out by an applicator licensed in the State of Connecticut.

Granular Application – Dates to be determined.

- A. Evenly apply the following:
- a. Using a Vicon pendulum action Applicator, Vivax Plus fertilizer 0-0-20 hydration agent or equal at the rate of 5 lbs./1,000 sq. ft. broadcast on the surface.

Spray Application – Dates to be Determined.

- A. Evenly apply the following:
- a. Nutrite 28:0:0 or equal at the rate of 6oz/1,000 sq. ft.
 - b. TurfRx Si or equal at the rate of 3 oz/1,000 sq. ft.
 - c. TurfRx Fairway+ or equal at the rate of 6 oz/1,000 sq. ft.
 - d. "Sea-3" or equal at the rate of 3oz/1,000 sq. ft.

Note: Application must be carried out by an applicator licensed in the State of Connecticut.

All fertilization applications must be carried out in accordance with State of Connecticut guidelines.

3.03 SAND TOPDRESSING MATERIAL

- A. An approved sand topdressing shall conform to the following sieve analysis results:

Percentage of Main Fractions		
Description	Size (mm)	Per- cent
Sand	0.05 – 2.0	92-97
Silt	0.002 – 0.05	2-5
Clay	<0.002	1-3
Percentage of Sand Fractions		
Description	Size (mm)	Per- cent
Very Coarse	1.0 – 2.0	≤10
Coarse	0.5 – 1.0	≥30
Medium	0.25 – 0.5	≥30
Fine	0.10 – 0.25	≤20
Very Fine	0.05 – 0.10	≤5

- B. WATER
- a. Clean, fresh potable water.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Protect structures, fencing, utilities, sidewalks, pavements, other facilities, trees, shrubs,

and plantings from damage caused by planting operations.

- B. This includes protecting grade stakes set by others until directed to remove them.
- C. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties, storm drains, waterways, and walkways.

3.02 EXAMINATION

- A. Examine areas to be renovated for compliance with requirements and other conditions affecting performance.
- B. Verify that no foreign, deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, roots in excess of ½ in. diameter, ~~for~~ root materials, intact plants, and weed laden soils, has been deposited in soil within Athletic Field rehabilitation area.
- C. Do not mix or work soils and soil amendments in frozen, wet, or muddy conditions.
- D. Suspend operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results without causing damage.
- E. Uniformly moisten excessively dry soil that is not workable, and which is too dusty.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.
- G. If contamination by foreign, deleterious material or liquid is present in soil within the Athletic Field rehabilitation area, remove the soil and contamination as directed by the Athletic Field Consultant and replace with new material that meet the ~~old~~ specifications.
- H. Alert the Athletic Field Consultant so any new material and installation techniques may be inspected and approved.

3.03 REHABILITATION TO BE PERFORMED TO THE ATHLETIC FIELD

- A. All work must be performed in the sequence as listed below:
- B. SUMMARY (RHAM High School Athletics Grounds Maintenance Team will mow/prepare the surfaces to prepare for the following operations)
- C. This Section Includes:
 - 1. Mobilization of Equipment
 - 2. Land Survey

3. Site Preparation
4. Fraise Mowing
5. Drainage Improvement- Linear Aeration and Sand Injection
6. Re-Location of Irrigation Main Line and Valve Boxes
7. Core Aeration
8. Top Dressing Seeding
9. Application of Soil Amendments and Nutrition
10. Substantial Completion Field Testing
11. Related Sections

3.04 MOBILIZE EQUIPMENT:

- A. Delivery of all required equipment to site. Mobilization will require Forty-Eight (48) hour notice of intent prior to delivery, of any Rehabilitation equipment needed to be left on site. Notify the Athletic Field Consultant for authorization of mobilization.

3.05 LAND SURVEY:

- A. Prior to the use of any equipment, the Contractor's proposed field layout and elevation control strategies must be determined and marked.
- B. Prior to use of equipment Contractor must locate all underground utilities via "Call before you Dig 811" or "Dig Safe". Also, the depths of all irrigation lines must be confirmed.
- C. Prior to work commencing, the Contractor is responsible for examining the site, and its existing contours.
- D. Any and all issues must be reported to the Athletic Field Consultant prior to work commencing.

3.06 SITE PREPARATION:

- A. Utilizing Global Positioning System or equivalent, locate and mark all site fixtures including, but not limited to, irrigation heads, quick couplers, goal post sleeves, and valve boxes.
- B. The RHAM High School Athletic Grounds Team will arrange to have the system operational and carry out an initial irrigation system audit to make sure all components and delivery of irrigation water is working efficiently and effectively prior to the project start date.
- C. The contractor is not expected to have to remove existing irrigation heads prior to the Rehabilitation of existing turf. However, it is the contractor's responsibility to make sure no damage to the irrigation heads occurs throughout the project.
- D. It is the contractor's responsibility to repair any damage caused by their actions during the construction period.

- E. Irrigation equipment that is removed is to be held by Contractor until reinstallation.

3.07 FRAISE MOWING:

- A. An initial depth of operation should be identified, by Contractor and athletic field consultant to be within the range of one quarter inch (1/4") and one inch (1") depth for budgeting purposes. The equipment must be set correctly to achieve agreed depth. An initial pass down the center of the field, should be carried out to ascertain acceptance. The initial depth should start shallow and be taken down gradually until the desired depth is met.
- B. After the desired depth is agreed upon by the Contractor and Athletic Field Consultant for the center of the field, the contractor will move to the sides of the field and perform the same adjustment process as in the center of the field, to identify the desired depth setting.
- C. Fraise mowing will start in the middle of the field and work towards the sides of the Athletic Field, adjusting depths as determined from earlier test strips.
- D. The contractor must take care to avoid any damage to existing irrigation heads.
- E. Once fraise mowing is completed the areas around the irrigation heads must be ~~made~~ consistent to the field conditions this must be confirmed through consultation ~~with~~ the Athletic Field Consultant.
- F. All material that is harvested is to be collected in the bed of the specified utility vehicles. Any material that is not collected in the bed of the utility vehicle will be removed from ~~tesurface~~ using suitable methods such as vacuum or blower systems and/or hand raking using suitable hand tools such as leaf and spring back rakes.
- G. Once the bed of the utility vehicle is filled to a suitable level with material it is to be emptied off the Athletic Field, where material can be placed in container dumpsters and shipped off property.
- H. Upon completion of Fraise mowing a site meeting with the contractor, Owner and Athletic Field Consultant to agree on satisfactory completion of the operation.
- I. The Contractor is responsible for off-site disposal costs and haulage fees. Composting the organic material is preferable to landfilling.

3.08 DRAINAGE IMPROVEMENT – LINEAR AERATION AND SAND INJECTION:

- A. Identify gradient or elevation fall to the low point on the field. Sand

- Channeling direction ~~shall~~ be perpendicular to the natural fall of the field.
- B. Set an initial depth and make a pass perpendicular to elevation of the field. The correct forward speed of should be set, and the initial depth should start shallow and be lowered gradually until the desired depth is met.
 - C. After the desired depth and direction is confirmed and agreed upon with the Owner and Athletic Field Consultant, the contractor will work in the same direction until operation is completed.
 - D. While fully backfilling channels with approved sand, contractor must leave no turf surface disruption (except that which is usually associated with the operation).
 - E. On completion of the operation, any damage must be repaired by the contractor.
 - F. Upon completion of the operation a site meeting with the contractor, Owner and Athletic Field Consultant shall ascertain satisfactory completion of the operation.
- 3.09 RE – LOCATION OF THE IRRIGATION MAIN LINE AND VALVE BOXES (Shall be completed in parallel to the Linear Sand Injection)
- A. The Contractor shall provide all labor, materials, equipment, and incidentals required to construct and finalize the irrigation
 - B. The Contractor or sub-contractor must submit irrigation system relocation plans to the Athletic Field Consultant for approval prior to award. System shall meet minimum flow requirements noted.
 - C. The Contractor must have at least 5 years of experience in work of this type and size required by this section and which is acceptable to District 8.
 - D. The Contractor must supply five (5) references for work of this type (Athletic Fields) with their bid including names and phone numbers of Contacts.
 - E. The Contractor shall maintain an accurate and complete record drawing of the relocation as built and specify any changes of location or installation procedures which deviate from original plan and specifications. All valve box locations shall be recorded with reference to a minimum of two permanent locations.
 - F. Upon completion, the Contractor shall supply the as-built plan as a clean and clear document as well as all product manuals and warranties to the district 8 for review and approval prior to acceptance and payment.
 - G. All materials to be used in the system shall be new and without flaws or defects and of quality and performance as specified to meet the requirements of the system.
 - H. PVC irrigation pipe shall be Class 200 Type 1120 SDR 21 Solvent-Weld PVC conforming to ASTM No. D2241 and D3036 as manufactured by Crestline or approved equal. PVC irrigation fittings except nipples shall be schedule 40 solvent weld fittings as

manufactured by Spears or equal. All threaded PVC nipples shall be schedule 80 fittings as manufactured by Spears or equal. All PVC cement shall be IPS/weld-on used in conjunction with the appropriate primer or equal.

- I. Electric control valves shall be Hunter ICV series diaphragm type fiberglass body plastic valves equipped with P/N 458 200 DC latching solenoid at locations as indicated on Sheet 3. Electric control valves shall be manufactured by Hunter Industries or equal. Valve boxes for electric valves shall be 12-inch standard valve box as manufactured by Carson or equal.
- J. Valve control wire shall be minimum #14 single conductor direct burial UL – and UF – approved and meet all state and local codes for this service. Individual wires must be used for each zone. Common wire shall be white; zone power wires shall be red. All wire shall be manufactured by Paige Electric or equal.
- K. Installation: Prior to the installation of the rootzone, the Contractor must coordinate the installation of the irrigation service lines which are located within the boundaries of the area of reconstruction. This is necessary to prevent disruption of the finished grade surface, which shall be installed after all other work within the area has been completed.
- L. All irrigation piping and components shall be bedded and backfilled with clean and stone/rock free material. In the event of on-site soil materials not being suitable for this purpose, clean Rootzone material or sand shall be imported and used for bedding and backfill. All valves both isolation and electric require a firm foundation of a 4" base layer of 3/8" drainage stone for valve and valve box support and cleanliness for future access.

Note: Upon completion of the installation of the irrigation system the site shall be inspected by the Owner or Athletic Field Consultant, or a designee for approval and acceptance of the irrigation installation. System Testing and Final Assembly
- M. At the completion of finish rootzone grading and compaction, the irrigation system will be activated and be tested zone by zone to ensure proper function, coverage, adjustment, and soil saturation limits.
- N. The entire system shall be used for hydraulic saturation and settling of the root zone profile prior to the final preparations for seeding.

3.10 CORE AERATION:

- A. Carry out core aeration at two (2") x two (2") inch spacing pattern, to the Athletic field using a ride on vertical action aerator with three-quarter (3/4") inch ~~and~~ tines able to penetrate to a depth of at least four (4") inches.
- B. Cores should be collected using a core collection system or by hand and removed to a designated composting area or site. Cores should be recycled into the surface using a drag brush or mat system.
- C. Core aeration must not occur when the soil is excessively wet, excessively dry, or frozen. The soil should be moist, defined as having received 1" of rain or irrigation in the previous 48 hours.
- D. The core aeration holes remaining after the cores are recycled, shall be filled

by top dressing.

3.11 SEEDING:

- A. The Contractor is to provide the correct quantity of specified seed.
- B. Load and transport seed from designated storage area, contractor transport and storage ~~will~~ use turf tractor to the field using ONLY LGP equipment. Non-LGP equipment is NOT to be allowed on the field surface.
- C. The Contractor must apply the seed using the seeding implement specified in the equipment list.
- D. Evenly Apply the Seed Mix #1 Kentucky Bluegrass at a rate of 5 lbs./1000 sq. ft. in one direction utilizing a disc seeding implement (as per the equipment specification) at 3 in. disc spacing towed behind an LPG turf tractor or equal.
- E. Evenly Apply the Seed Mix #2 Perennial Ryegrass at a rate of 5 lbs./1000 sq. ft. in two directions (2.5 lbs./1000 sq. ft. each direction) utilizing a disc seeding implement (as per the equipment specification) towed behind an LPG turf tractor or equal.
- F. Upon completion of the operation a site meeting with the contractor, Owner and Athletic Field Consultant will ascertain satisfactory completion of the operation.

3.12 TOP DRESSING:

- A. The Contractor is to provide the correct quantity of specified sand material.
- B. Load and transport sand material from designated stockpile to the field utilizing LGP dump trailers attached to LGP turf tractor. Non-LGP equipment shall NOT be allowed on the field surface.
- C. The Contractor must apply the topdressing using a topdressing implement specified in the equipment list.
- D. Upon completion of the operation a site meeting with the contractor, Owner and Athletic Field Consultant to ascertain satisfactory completion of the operation.

3.13 APPLICATION OF AMENDMENTS AND NUTRIENTS:

- A. The Contractor must utilize a LGP turf tractor mounted with a Vicon pendulum action broadcast spreader or equivalent, to evenly broadcast nutrients and soil amendments at the proper rates.

- B. Contactor must make sure that application does not excessively overlap, and an even application has been achieved.
- C. Upon completion of the finished application process the site must be inspected by the Athletic Field Consultant for approval, acceptance, and permission for finished installation of irrigation heads, valve boxes, quick couplers.
- D. The system will be tested, required adjustments and corrective procedures will be performed as needed.

3.14 SITE CLEAN UP

- A. Upon completion of all work the Contractor MUST clean and remove all debris, excess soils and related items from the project site.
- B. The Contractor is responsible for the restoration of all surrounding grounds and features, back to their original condition before the start of the project. This will be subject to inspection by the Athletic Field Consultant

3.15 TURF MAINTENANCE (GROW IN AND ESTABLISHMENT)

- A. Maintain and establish turf, immediately after surface rehabilitation is complete, for a minimum of Three (3) calendar months from project completion.
- B. Utilizing proper irrigation, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf.
- C. Replanting of bare or eroded areas with the goal of producing a uniformly smooth turfgrass surface. Provide materials and installation practices consistent with those used in the original installation.
- D. Fill-in as necessary any soil subsidence that may have occurred, with a rootzone mix that is consistent with the existing materials.
- E. Apply treatments as required to keep turf and soil free of pests, including surface and subsurface insects, weeds, and all turf and soil disease pathogens. Using integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

3.16 IRRIGATION: CARRIED OUT BY THE RHAM HIGH SCHOOL ATHLETICS GROUNDS TEAM

- A. Schedule irrigation to prevent wilting, puddling, erosion, and displacement of seed.
- B. Irrigate turf with a fine spray at a minimum rate of 1/8 in. at 4 am, 8 am,

11am, 2 pm, 5pm, and 10 pm, unless rainfall precipitation is adequate.

Two times per week the Contractor MUST monitor Volumetric Water Content (VWC) using a moisture probe such as a PoGo ProPlus or equivalent to assure that the rootzone maintains a VWC of 30 - 40 percent.

END OF DOCUMENT

Section 334000
STORM DRAINAGE SYSTEMS

PART 1 - GENERAL

1.1 WORK TO BE PERFORMED

- A. Work under this Section includes furnishing all plant labor, equipment, appliances and materials, and performing all operations in connection with the construction of stormwater collection systems at the locations and to the lines and grades indicated on contract drawings and/or directed.
- B. Any manufacturer's names and/or model numbers identified herein are intended to assist in establishing a general level of quality, configuration, functionality, and appearance required. This is NOT a proprietary specification and it should be noted that "Or equal" applies to all products denoted herein. It is understood that all manufactures will have minor variations in configuration, appearance, and product specifications and such minor variations shall not eliminate such manufacturers as an equal". It is the intent of this specification to encourage open and competitive involvement from multiple manufacturers that are able to supply similar products.
- C. This Section includes geomembrane liners for ponds and reservoirs.
 - 1. Related Sections:
 - a. Division 31 Section 31 00 00 – Earthwork, for excavating, compacting, and grading the subgrade; for excavating and backfilling the anchor trench; for protecting the earthwork; for adding requirements for the earth cover; and for the filter fabric and other geotextiles.
 - b.

1.2 DEFINITIONS

- A. Plastic Terminology: See ASTM D 1600 for definitions of abbreviated terms for plastics not otherwise defined in this section.
- B. EPDM: Ethylene-propylene-diene terpolymer

1.3 REFERENCES

- A. All work specified in this Section shall conform to the standard requirements to the State of Connecticut Standard Specifications for Highway and Bridges, latest revision, herein referred to as "State Standards" and the Town of Hebron Standards.
- B. ASTM C891, Standard Practice for Installation of Underground Pre-cast Utility Structures.

1.4 SUBMITTALS

- A. The Contractor shall submit for approval, manufacturer's printed recommendations for the storage, protection, handling, installation and testing of trench drain, fittings and appurtenances, which shall be strictly adhered to by the Contractor.
- B. Manufacturer testing results indicating compliance with the specifications herein.
- C. Licenses required by the municipality or state government to install storm drainage

systems shall be submitted prior to the commencement of any work on the storm water collection system.

- D. It is required to have the Installer maintain an experienced full-time supervisor on Project site when earthwork is in progress.
- E. Submit shop drawings including plans, sections, and testing documentation for all products.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Pipes shall be handled with care and in strict accordance with manufacturer's recommendations.
- B. Materials and equipment shall be progressively delivered at the site so that there will be neither delay in the progress of the work nor an accumulation of materials that is not to be used within a reasonable time. Materials shall be so stored as to assure the preservation of their quality and fitness for the work.
- C. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located so as to facilitate their prompt inspection.
- D. Private property shall not be used for storage purposes without written permission of the owner or lessee, and if requested by the Architect copies of such written permission shall be furnished to him/her. All storage sites shall be restored to their original condition by the Contractor at his expense.
- E. Care shall be taken during transportation of the pipe such that it is not damaged.
- F. Pipes shall be stored on level ground, preferably turf or sand, free of sharp objects, which could damage the pipe.
- G. Prevent damage to the interior and exterior walls of the pipe. Raising pipes with hooks, dropping or placing large stones against pipe, rolling over stones or sharp objects/edges and dropping pipe are prohibited. All damaged pipe and fitting shall be removed from the project site and replaced at no additional expense to the Architect.

1.6 GUARANTEE/WARRANTY

- A. Material Guaranty: Before any contract is awarded, the Bidder may be required to furnish without expense to the owner complete statement of the origin, composition and manufacture of any or all materials proposed to be used in the construction of the work, together with samples, which may be subjected to the tests required by the owner to determine the quality and fitness of the material.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All products as specified herein shall be new, unused and purchased specifically for this Contract.

2.2 HIGH DENSITY POLYETHYLENE PIPE (HDPE):

- A. High-Density Polyethylene Pipe and fittings shall be ADS N-12 IB ST Smooth Interior

Pipe, ADS N-12 IB ST High Capacity Large Diameter Pipe or approved equivalent. Joints shall be soil-tight and include a rubber gasket on the spigot end of the pipe. When installed into the bell end, the joint shall be sealed.

- B. Pipe shall conform to AASHTO M294 (Type 'S') for the specified diameters and strength classes.
- C. Pipe shall be rated to withstand H-20 Loading Criteria with 18" of cover.
- D. 8" Round Grate surface drains, as manufactured by NDS (part no. 20), or equal shall be installed on a 8" N-12 Dual Wall – HDPE pipe riser which connects to the 8" main drainage perimeter pipe, connected with 8" to 8" T joint manufactured by Advanced Drainage Systems, Inc. or approved equivalent. The 8" surface drain shall be placed in 10" Round Carson TrussT Valve boxes or equivalent at the corners of the field as indicated on the Grading and Drainage Plan .
- E. 4" Round Grate surface drains, as manufactured by NDS (part no. 13), or equal shall be installed on a 4" N-12 Dual Wall – HDPE pipe riser which connects to the 8" main drainage perimeter pipe, connected with 4" "Inserta TEE" (see Appendix D – Drainage and Irrigation) or approved equivalent. The 4" surface drain shall be placed in 6" Round Carson TrussT Valve boxes or equivalent on 70' centers along the north and south limits the field as indicated on the Grading and Drainage Plan.
- F. The joint tightness shall conform to ASTM D3212 for joints or drain and sewer plastic pipe using flexible elastomeric seals.

2.3 PVC PIPE AND FITTINGS

- A. PVC Profile Gravity Sewer Pipe and Fittings: ASTM F 794 pipe, with bell-and-spigot ends; ASTM D 3034 fittings, with bell ends.
- B. The pipe and fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusion or other injurious defects. The pipe shall be as uniform as commercially practical in color, capacity, density and other physical properties.
- C. Joints shall be bell and spigot. For SDR-35 PVC pipe, the bell shall consist of an integral wall section with a solid cross section rubber ring factory-assembled, securely locked in place to prevent displacement. Joints shall conform to ASTM Standard D 3212. For SCH 40 PVC piping, joints shall be glued with PVC cement approved by the manufacturer.
- D. All fittings and accessories shall have dimensions as recommended by the manufacturer and have bell and/or spigot configurations compatible with that of the pipe.
- E. Pipe shall pass impact resistance test in accordance with ASTM D 2444 and minimum pipe stiffness test at 5% deflection in accordance with ASTM D 2412.
- F. The normal length of 12-inch size and smaller pipe shall be 12.5 feet.
- G. Pipe and fittings shall be manufactured in the United States of America and shall be accompanied by the manufacturer's certificate of compliance, in addition to meeting the performance tests specified hereinafter.

- H. PVC pipe shall be SCH 40 where pipe has less than 2 feet of cover or as indicated on the plans.
- I. PVC perforated pipe shall conform to ASTM/ANSI D 2759 or ASTM F 810. Perforations shall be 5/8" holes on 5" centers.

2.12 TRENCH DRAINS

- A. Acceptable products for this application include Poly drain by ABT Inc., ACO, Duraslope by NDS, or Approved Equivalent.

2.15 MISCELLANEOUS MATERIALS

- A. Adhesives: Provide types of adhesive primers, compounds, solvents, and tapes recommended in writing by geomembrane liner manufacturer for bonding to structures (if required), for sealing of seams in geomembrane liner, and for sealing penetrations through geomembrane liner.
- C. Penetration Assemblies: Provide manufacturer's standard factory-fabricated assemblies for sealing penetrations. Include joint sealant recommended in writing by geomembrane liner manufacturer and compatible with geomembrane liner, containment conditions, and materials.
- D. Battens: Long-length strips of material indicated, size as shown on Drawings. Fabricate battens with sharp projections removed and edges eased and then predrilled or punched for anchors. Provide anchors, or other type of attachment, of type and spacing recommended in writing by geomembrane liner manufacturer for attaching geomembrane liner system to substrate and as indicated.
 - 1. Batten Material: Liner manufacturer's standard system.
 - 2. Batten Material: Aluminum; with stainless-steel anchors, complete with gasket and sealant compatible with geomembrane liner, containment conditions, and materials.
 - 3. Batten Material: Stainless steel; with stainless-steel anchors, complete with gasket and sealant compatible with geomembrane liner, containment conditions, and materials.
 - 4. Batten Material: Plastic compatible with geomembrane liner, cast in place or fastened with stainless-steel anchors, designed to continuously seal geomembrane liner to batten.
- D. Backfill Around Pipe: A sample of the athletic field gravel will be collected at its source for each 700 tons to be delivered to the site and a sieve analysis run on the sample to check its particle size using ASTM D-422 Standard Method (Section IV–Soil tests 2). The results of the tests are to be submitted to the Owner for approval.

- 1. The gravel shall meet the following gradation (particle size)

Percent Passing by Weight:

2"	100
1"	85-100
3/4"	20-40

1/2" 10-20
5/64" 0-10

E.

PART 3 - EXECUTION

3.1 GENERAL

- A. The installation of all pipes of various materials, structures, and connections to existing pipes/structures shall be made at the locations and elevations as shown on the drawings.
- B. All materials and each part of detail of the work shall be subject to inspection by the Architect. The Architect shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the contractor as is required to make a complete and detailed inspection, (such assistance may include furnishing labor, tools and equipment at no expense to Architect.)
- C. If the Architect so requests, the Contractor, at any time before acceptance of the work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standard required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be paid for as extra work; but should the work so exposed or examined prove unacceptable, the uncovering or the removing and the replacing of the covering or making good of the parts removed, will be at the Contractor's expense.
- D. Any work done or materials used without authorization by the Architect may be ordered removed and replaced at the Contractor's expense. The Contractor shall furnish written information to the Architect stating the original sources of supply of all materials manufactured away from the actual site of the work. In order to insure a proper time sequence for required inspection and approval this information shall be furnished at least two weeks in advance of the incorporation in the work of any such materials.
- E. The Contractor shall give prior notice to the Architect when work on the various items is to be performed by him or his Subcontractors. If work is suspended on any item, prior notice shall be given to the Architect before resumption of such work.

3.2 TRENCH EXCAVATION AND BACKFILL

- A. Excavation and backfill of piping shall be performed as specified in Section 31 00 00, EARTHWORK.
- B. Pipe bedding shall be placed as specified in Section 31 00 00, EARTHWORK.

3.3 PIPE INSTALLATION

- A. Use only nylon-protected slings to handle pipe. The use of hooks or bare cables will not be permitted.
- B. PVC Piping: No machinery shall directly contact the PVC pipe to push the pipe into place. The pipe shall be pushed into place by hand. The use of a hammer or mallet is permitted, with the use of a board to shield the end of the pipe being struck by the hammer. The pipe shall not be directly contacted with a hammer or mallet. Any pipe damaged while being pushed into place or while being laid in the trench shall be

removed from the site and replaced at the expense of the Contractor.

- C. HDPE Piping: An elastomeric rubber gasket supplied by the manufacturer shall be installed at each HDPE pipe joint to ensure that each joint is silt tight.
- D. Pipe shall be inspected before any backfill is placed. Any pipe determined by the Engineer to be out of alignment, unduly settled, or damaged shall be taken up and re-laid or replaced at no additional cost to Owner.
- E. General Locations and Arrangements: Drawing plans and details indicate location and arrangement of underground storm drainage piping. Install piping as indicated, following piping manufacturer's written instructions.
- F. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- G. If conflicts between utilities, the Contractor shall stop work on the utilities, contact the Engineer, and await direction from the Engineer.
- H. Install piping with 36-inch minimum cover unless otherwise specified on the Drawings.
- I. Install piping with a minimum slope as specified on Drawings.
- J. Install PVC piping according to ASTM D 2321, ASTM F 1668, and manufacturer's recommendations.

3.4 TRENCH DRAIN SYSTEM INSTALLATION

- A. Install Trench Drain System at elevations indicated.
- B. Install Trench Drain System according to manufacturer's requirements and specifications.
- C. Set tops of grating frames and grates flush with finished surface, unless otherwise indicated.

3.8 Field Quality Control:

- 1. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
 - 2. Nondestructive Testing: Visually inspect seams and patches. Comply with ASTM D 4437 for Air Lance Test, Vacuum Box Testing, or Ultrasonic (High Frequency) Pulse Echo Testing or with GRI Test Method GM6, as applicable to geomembrane liner and seam construction. Record locations of failed seams and patches. Individually number and date occurrences and details of leak and remedial action. Repair leaking seams and patches.
 - 3. Prepare test and inspection reports.
- A. Disinfection:
 - 1. Disinfect the complete installation according to procedures in AWWA C652.
 - B. Protection:

1. Protect installed geomembrane liner according to manufacturer's written instructions. Repair or replace areas of geomembrane liner damaged by scuffing, punctures, traffic, rough subgrade, or other unacceptable conditions.
2. Before initial filling of pond or placement of earth cover, inspect seams and patched areas to ensure tight, continuously bonded installation. Repair damaged geomembrane and seams and reinspect repaired work.

End of Section