

PROJECT MANUAL  
INCLUDING CONTRACT and SPECIFICATIONS  
for the  
**BRIDGE AND SIDEWALK REPLACEMENT**  
at  
**Region 10 Technical School**  
Brunswick, Maine

OWNER:  
Region 10 Technical School  
68 Church Road,  
Brunswick, ME 04011

Prepared By:  
Lincoln/Haney Engineering Associates, Inc.  
14 Maine Street, suite 301, Box 7  
Brunswick, Maine 04011

And  
Sebago Technics, Inc.  
75 John Roberts Rd., Suite 4A  
South Portland, Maine 04106

June 12, 2024

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## **SECTION 1-B**

### **INSTRUCTION TO BIDDERS**

- 1) Before submitting a bid, each bidder shall examine the Project Manual carefully and shall have attended the mandatory Pre-Bid Conference at 1 p.m. on June 26, 2024. Each bidder shall inform themselves prior to bidding as to existing conditions and limitations under which the work is to be performed, and shall include in their bid a sum to cover the cost of items necessary to perform the work as set forth in the Project Manual. No allowance will be made to a bidder because of lack of such examination or knowledge. The submission of a bid will be considered as conclusive evidence that the bidder has made such an examination.
- 2) A bidder may be required to furnish evidence satisfactory to the OWNER that they and their proposed SUBCONTRACTORS have sufficient means and experience in the types of work called for to assure completion of the contract in the time required and in a satisfactory manner.
- 3) If any person contemplating submitting a bid for construction of the work is in doubt as to the true meaning of any part of the Project Manual, or finds discrepancies in or omissions from any part of the Project Manual, they may submit to the OWNER's representative a written request for interpretation thereof not later than three (3) days before bids will be opened.
- 4) Interpretation or correction to the Project Manual will be made only by addendum and will be mailed, faxed, emailed, or delivered to each plan holder on record not or interpretation shall not relieve the bidder from any obligations under the contract.
- 5) The CONTRACTOR shall provide all labor, equipment, and materials to perform the work unless specified herein to be provided by the OWNER. The CONTRACTOR will be responsible for providing toilet facilities.
- 6) The OWNER will supply electricity and water, unless those utilities are required to be shut off for the construction under this contract. CONTRACTOR is responsible for hooking up/connecting to electricity and water as necessary to perform the work, and will coordinate with the OWNER in doing so.
- 7) The CONTRACTOR shall obtain the Building Permit and any other necessary permits unless specifically identified as provided by others within this Project Manual.
- 8) The CONTRACTOR shall comply with all applicable rules, regulations, and laws and in particular all OSHA standards for such work.
- 9) Contracts developed from this bid shall not be assigned, sublet, or transferred without the written consent of the OWNER.
- 10) The OWNER reserves the right to accept or reject any or all bids as may best serve the interest of the OWNER.

- 11) The OWNER is exempt from the payment of Federal Excise Taxes and Federal Transportation Tax on all shipments, as well as Maine State Sales and Use Taxes on items "...physically incorporated in real property ...". The bidder shall not include these taxes in their bid.
- 12) Each bid shall be submitted on the forms provided in the Bid Documents.
- 13) A bid that contains an escalation clause is considered invalid.
- 14) Each bid shall be valid for a period of thirty calendar days following the project bid opening date and time.
- 15) Bidders shall include a Bid Bond or other approved bid security with the bid form submitted to the OWNER when the bid form indicates such bid security is required. The bond value shall be 5% of the bid amount.
- 16) Bidders shall include the cost of Performance and Payment Bonds in the bid amount. Pursuant to 14 M.R.S.A., Section 871, Public Works CONTRACTORS' Surety Bond Law of 1971, subsection 3, the selected CONTRACTOR is required to provide these bonds before a contract can be executed.
- 17) Bidders shall acknowledge on the bid form all addenda issued in a timely manner. Addenda affecting bidders shall not be issued less than 72 hours prior to the bid closing time. Addenda shall be issued to all companies who are registered holders of Bid Documents.

**END OF SECTION**

## SECTION 2-A

### NOTICE TO CONTRACTORS

Notice is hereby given that Region 10 Technical High School will accept sealed proposals for the Region 10 Bridge & Sidewalk Replacement at 68 Church Road, Brunswick, Maine in accordance with Drawings and Specifications prepared by Lincoln/Haney Engineering Associates, Inc & Sebago Technics Inc., and described in general as:

#### **Bridge and Sidewalk Replacement at Region 10 Technical High School in Brunswick, Maine**

Sealed bids will be received at the office of Mr. Shawn Chabot, Superintendent/Director, Region 10 Technical High School, 68 Church Road, Brunswick, Maine, 04011, until **1:00 p.m. on July 19, 2024**, at which time and place bids will be opened and read aloud. Bids received after that time will not be accepted. Bids shall be submitted in sealed envelopes, plainly marked with the title of the project. Interested parties are invited to attend.

**A MANDATORY PRE-BID conference will be held at Region 10 Technical High School, 68 Church Road, Brunswick, Maine at 1 p.m. on June 26, 2024.**

Bid documents, in PDF form, may be obtained by email on June 12, 2024 from Lincoln/Haney Engineering Associates, Inc. Send requests to [tgabryszewski@lincolnhaney.com](mailto:tgabryszewski@lincolnhaney.com).

Scope of work: Remove an existing 52' x 10' wide bridge, approximately 510 sq-ft of concrete stairs and landings, and approximately 26' x 12' exterior wall and guard rails. Replace the bridge with a pre-fabricated aluminum bridge, replace the stairs, landings, and exterior wall with new cast in place concrete elements. Provide Code Complaint handrails, guard rails, and wall assemblies.

A bid security is required for this project.

Performance and Payment Bonds are required for this project.

The CONTRACTOR must be prepared to substantially complete the project by July 17, 2025, and complete the entire project no later than July 31, 2025.

The School reserves the right to reject any or all bids, to waive any irregularity in the bids and in the bidding, to accept any Bid that it may deem to be in its best interest, to negotiate the contract price with any bidder and to omit any item or items deemed advisable for its best interest.

**END OF SECTION**

**SECTION 2-B1  
BID FORM**

To: Region 10 Technical High School, hereinafter called "OWNER"

- A. The undersigned, having carefully examined the Project Manual, including the Contract, General Conditions, Plans and Specifications dated June 12, 2024 prepared by Lincoln/Haney Engineering Associates, Inc. and Sebago Technics, Inc., titled:

**Bridge and Sidewalk Replacement at Region 10 Technical High School in Brunswick, Maine** and having visited the site and examined the conditions affecting the work, hereby proposes and agrees to furnish all labor, materials, and equipment necessary for and reasonably incidental to the construction and completion of the work for the sums stated below:

- B. BASE BID: Construction as delineated in contract documents:

\_\_\_\_\_ DOLLARS (\$\_\_\_\_\_).

- C. The undersigned agrees, if awarded the Contract, to complete the entire work provided to be done under the Contract on or before July 31, 2025 with Substantial Completion on or before July 17, 2025.
- a. For each calendar day after July 31, 2025 that the project remains uncompleted, \$500.00 shall be charged as liquidated damages.
- D. Bid security is required on this project. The Bidder shall include a satisfactory Bid Bond or a certified or cashier's check for 5% of the bid amount with this completed bid form submitted to the OWNER.
- E. The undersigned understands and agrees to comply with and be bound by Instructions to Bidders issued for this Work.
- F. The undersigned acknowledges receipt of Addenda numbers: \_\_\_\_\_.
- G. The undersigned acknowledges that it is a condition of a responsive bid that it reviews the Contract and Standard General Conditions and identify in writing any term or condition which, in its present form, is unacceptable, and state the respect in which such term or condition requires modification in order to become acceptable.
- H. The undersigned agrees, if this Proposal is accepted, to sign a Contract and deliver it, along with Affidavits of all insurance specified, within twelve (12) days after the date of notification of such acceptance, except if the 12th day falls on a holiday, a Saturday or Sunday, then the conditions will be fulfilled if the required documents are received before 12:00 o'clock noon on the day following the holiday, or the Monday following the Saturday or Sunday.

BIDDER: \_\_\_\_\_

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

(CORPORATE SEAL)

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

\_\_\_\_\_

Bid dated this \_\_\_\_\_ day of \_\_\_\_\_ 2024

**SECTION 2-C1**

**CONTRACTOR BID BOND**

WE, THE UNDERSIGNED, (1)\_\_\_\_\_ -

\_\_\_\_\_

\_\_\_\_\_, (2)\_\_\_\_\_

AS PRINCIPAL, AND (3)\_\_\_\_\_

AS SURETY, ARE HEREBY HELD AND FIRMLY BOUND UNTO MSAD 49 IN THE PENAL SUM

OF (4) \_\_\_\_\_ FOR THE PAYMENT OF WHICH, WELL

AND TRULY TO BE MADE, WE HEREBY JOINTLY AND SEVERALLY BIND OURSELVES, OUR

HEIRS, EXECUTORS, ADMINISTRATORS, SUCCESSORS AND ASSIGNS, SIGNED THIS

(5)\_\_\_\_\_ DAY OF \_\_\_\_\_ 20\_\_\_\_\_.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT WHEREAS THE  
PRINCIPAL HAS SUBMITTED TO (6) OWNER\_\_\_\_\_

\_\_\_\_\_ TO A CERTAIN PROPOSAL, ATTACHED HERETO AND HEREBY MADE A PART HEREOF,

TO ENTER INTO A CONTRACT IN WRITING, FOR THE CONSTRUCTION OF (7)\_\_\_\_\_

\_\_\_\_\_

NOW THEREFORE:

(a) IF SAID PROPOSAL SHALL BE REJECTED, OR, IN THE ALTERNATE,

(b) IF SAID PROPOSAL SHALL BE ACCEPTED AND THE PRINCIPAL SHALL

EXECUTE AND DELIVER A CONTRACT IN THE FORM OF CONTRACT ATTACHED HERETO

(PROPERLY COMPLETED IN ACCORDANCE WITH SAID PROPOSAL) AND SHALL FURNISH

A BOND FOR HIS FAITHFUL PERFORMANCE OF SAID CONTRACT, AND FOR THE

PAYMENT OF ALL PERSONS PERFORMING LABOR OR FURNISHING MATERIAL IN

CONNECTION THEREWITH, AND SHALL IN ALL OTHER RESPECTS PERFORM THE

AGREEMENT CREATED BY THE ACCEPTANCE OF SAID PROPOSAL, THEN THIS

OBLIGATION SHALL BE VOID. OTHERWISE THE SAME SHALL REMAIN IN FORCE AND

EFFECT: IT BEING EXPRESSLY UNDERSTOOD AND AGREED THAT THE LIABILITY OF

THE SURETY FOR ANY AND ALL CLAIMS HEREUNDER SHALL, IN NO EVENT, EXCEED



THE PENAL AMOUNT OF THIS OBLIGATION AS HEREIN STATED.

THE SURETY, FOR VALUE RECEIVED HEREBY STIPULATES AND AGREES THAT THE OBLIGATION OF SAID SURETY AND ITS BONDS SHALL BE IN NO WAY IMPAIRED OR AFFECTED BY ANY EXTENSION OF THE TIME WITHIN WHICH THE PRINCIPAL MAY ACCEPT SUCH PROPOSAL AND SAID SURETY DOES HEREBY WAIVE NOTICE OF ANY SUCH EXTENSION.

IN WITNESS WHEREOF, THE PRINCIPAL AND THE SURETY HAVE HEREUNTO SET THEIR HANDS AND SEALS, AND SUCH OF THEM AS ARE CORPORATIONS HAVE CAUSED THEIR CORPORATE SEALS TO BE HERETO AFFIXED AND THESE PRESENTS TO BE SIGNED BY THEIR PROPER OFFICERS, THE DAY AND YEAR FIRST SET ABOVE.

SIGNED AND SEALED THIS (5)\_\_\_\_\_ DAY OF \_\_\_\_\_ 20\_\_\_\_\_.

CONTRACTOR: (8)\_\_\_\_\_

(9)\_\_\_\_\_

(1)\_\_\_\_\_

(10)\_\_\_\_\_

SURETY: (8)\_\_\_\_\_

(9)\_\_\_\_\_

(3)\_\_\_\_\_

(10)\_\_\_\_\_

Legend

- (1) Name of CONTRACTOR.
- (2) A corporation, a partnership, or an individual, as the case may be.
- (3) Name of surety.
- (4) 5% of the bid amount
- (5) Same date as that of contract.
- (6) OWNER shall be Region 10 Technical School.
- (7) Name of project as designated in the contract documents.
- (8) Signature
- (9) Printed name and title
- (10) Company address

If CONTRACTOR is partnership, all partners should execute bond. A power of attorney document together with a statement that it still is in full force and effect shall be provided by the person executing this bond. Bond must be countersigned by a resident Maine agent.

**SECTION 2-C2**

**CONTRACTOR PERFORMANCE BOND**

WE, THE UNDERSIGNED, (1) \_\_\_\_\_

\_\_\_\_\_, (2) \_\_\_\_\_

OF (3) \_\_\_\_\_ AND STATE OF \_\_\_\_\_

AS PRINCIPAL, AND (4) \_\_\_\_\_

A CORPORATION DULY ORGANIZED UNDER THE LAWS OF THE STATE OF \_\_\_\_\_

AND HAVING A USUAL PLACE OF BUSINESS IN \_\_\_\_\_ AS SURETY,

ARE HELD AND FIRMLY BOUND UNTO (5) REGION 10 TECHNICAL SCHOOL

IN THE SUM OF (6) \_\_\_\_\_ DOLLARS

(\$ \_\_\_\_\_), TO BE PAID SAID (5) \_\_\_\_\_

OR HIS SUCCESSORS IN OFFICE, FOR WHICH PAYMENT WELL AND TRULY TO BE

MADE, PRINCIPAL AND SURETY BIND THEMSELVES, THEIR HEIRS, EXECUTORS AND

ADMINISTRATORS, SUCCESSORS AND ASSIGNS, JOINTLY AND SEVERALLY BY THESE

PRESENTS.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT IF THE PRINCIPAL SHALL

PROMPTLY AND FAITHFULLY PERFORM THE CONTRACT ENTERED INTO ON THE

(7) \_\_\_\_\_ DAY OF \_\_\_\_\_ 20\_\_\_\_ FOR THE CONSTRUCTION OF

(8) \_\_\_\_\_

THEN THIS OBLIGATION SHALL BE NULL AND VOID. OTHERWISE, IT SHALL REMAIN

IN FULL FORCE AND EFFECT, IT BEING EXPRESSLY UNDERSTOOD AND AGREED THAT

THE LIABILITY OF THE SURETY FOR ANY AND ALL CLAIMS HEREUNDER SHALL, IN NO

EVENT, EXCEED THE AMOUNT OF THIS OBLIGATION AS HEREIN STATED.

THE SURETY, FOR VALUE RECEIVED HEREBY STIPULATES AND AGREES THAT

OBLIGATION OF SAID SURETY AND ITS BONDS SHALL BE IN NO WAY IMPAIRED OR

AFFECTED BY ANY EXTENSION OF THE TIME WHICH (5)\_\_\_\_\_

\_\_\_\_\_ MAY ACCEPT DURING THE PERFORMANCE OF THE  
CONTRACT AND SAID SURETY DOES HEREBY WAIVE NOTICE OF ANY SUCH EXTENSION.

SIGNED AND SEALED THIS (7)\_\_\_\_\_ DAY OF \_\_\_\_\_ 20\_\_\_\_\_.

CONTRACTOR: (9)\_\_\_\_\_

(10)\_\_\_\_\_

(1)\_\_\_\_\_

(11)\_\_\_\_\_

SURETY:(9)\_\_\_\_\_

(10)\_\_\_\_\_

(4)\_\_\_\_\_

(11)\_\_\_\_\_

Legend

- (1) CONTRACTOR company name.
- (2) A corporation, a partnership, or an individual, as the case may be.
- (3) Municipality.
- (4) Name of surety.
- (5) Region 10 Technical School
- (6) Contract price.
- (7) Same date as that of contract.
- (8) Name of project as designated in the contract documents.
- (9) Signature
- (10) Printed name and title.
- (11) Company address

If CONTRACTOR is partnership, all partners should execute bond. A power of attorney document, together with a statement that it still is in full force and effect shall be provided by the person executing this bond.

SECTION 2-C3

**CONTRACTOR PAYMENT BOND**

WE, THE UNDERSIGNED, (1)\_\_\_\_\_

\_\_\_\_\_ (2)\_\_\_\_\_

OF (3)\_\_\_\_\_ AND STATE OF \_\_\_\_\_

AS PRINCIPAL AND (4)\_\_\_\_\_

A CORPORATION DULY ORGANIZED UNDER THE LAWS OF THE STATE OF \_\_\_\_\_

AND HAVING A USUAL PLACE OF BUSINESS IN \_\_\_\_\_ AS SURETY, ARE

HELD AND FIRMLY BOUND UNTO (5) TOWN OF FARMINGTON IN THE SUM

OF (6)\_\_\_\_\_ DOLLARS, (\$ \_\_\_\_\_) FOR THE USE

AND BENEFIT OF CLAIMANTS\* AS HEREIN BELOW DEFINED, FOR THE PAYMENT WHEREOF PRINCIPAL AND SURETY BIND THEMSELVES, THEIR HEIRS, EXECUTORS AND ADMINISTRATORS, SUCCESSORS AND ASSIGNS, JOINTLY AND SEVERALLY BY THESE PRESENTS.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT IF THE PRINCIPAL SHALL PROMPTLY SATISFY ALL CLAIMS AND DEMANDS INCURRED FOR ALL LABOR AND MATERIALS, USED OR REQUIRED BY THE PRINCIPAL IN CONNECTION WITH THE WORK DESCRIBED IN THE CONTRACT ENTERED INTO ON THE (7)\_\_\_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_\_ FOR THE CONSTRUCTION OF (8)\_\_\_\_\_

SAID OBLIGEE MAY INCUR IN MAKING GOOD ANY DEFAULT OF SAID PRINCIPAL, THEN THIS OBLIGATION SHALL BE NULL AND VOID. OTHERWISE, IT SHALL REMAIN IN FULL FORCE AND EFFECT, IT BEING EXPRESSLY UNDERSTOOD AND AGREED THAT THE LIABILITY OF THE SURETY FOR ANY AND ALL CLAIMS HEREUNDER SHALL, IN NO EVENT, EXCEED THE AMOUNT OF THIS OBLIGATION AS HEREIN STATED.

THE SURETY, FOR VALUE RECEIVED HEREBY STIPULATES AND AGREES THAT THE OBLIGATION OF SAID SURETY SHALL BE IN NO WAY IMPAIRED OR AFFECTED BY ANY EXTENSION OF THE TIME WHICH THE OBLIGEE MAY ACCEPT DURING THE PERFORMANCE OF THE CONTRACT AND SAID SURETY DOES HEREBY WAIVE NOTICE OF ANY SUCH EXTENSION.

SIGNED AND SEALED THIS (7) \_\_\_\_\_ DAY OF \_\_\_\_\_ 20 \_\_\_\_.

CONTRACTOR: (9) \_\_\_\_\_

(10) \_\_\_\_\_

(1) \_\_\_\_\_

(11) \_\_\_\_\_

SURETY:(9) \_\_\_\_\_

(10) \_\_\_\_\_

(4) \_\_\_\_\_

(11) \_\_\_\_\_

Legend

- (1) Name of CONTRACTOR.
- (2) A corporation, a partnership, or an individual, as the case may be.
- (3) Municipality.
- (4) Name of surety.
- (5) Region 10 Technical School
- (6) Contract price.
- (7) Same date as that of contract.
- (8) Name of project as designated in the contract documents.
- (9) Signature.
- (10) Printed name and title.
- (11) Company address.

If CONTRACTOR is partnership, all partners should execute bond. A power of attorney document, together with a statement that it still is in full force and effect shall be provided by the person executing this bond. Bond must be countersigned by a Resident Maine Agent.

\* A claimant is defined as one having a direct contract with the principal or with a SUBCONTRACTOR of the principal for labor, material, or both, used or reasonably required for use in the performance of the contract.

**SECTION 2-E**

**CONTRACT**

THIS CONTRACT is made as of the \_\_\_\_\_ day of \_\_\_\_\_ in the year Two Thousand and Twenty-Four by and between Region 10 Technical High School, with principal office at 68 Church Road, Brunswick, Maine, hereinafter called the “OWNER” and \_\_\_\_\_ doing business as a corporation, with principal office at \_\_\_\_\_, hereinafter called the “CONTRACTOR”.

**WITNESSETH:**

That for and in consideration of the payments and agreements hereinafter mentioned:

1. The CONTRACTOR will commence and complete construction of the following project:

**BRIDGE AND SIDEWALK REPLACEMENT AT  
REGION 10 TECHNICAL HIGH SCHOOL, BRUNSWICK, MAINE**

2. The CONTRACTOR will furnish all of the material, supplies, tools, equipment, labor and other services necessary for the construction and completion of the project described herein. The CONTRACTOR warrants to the OWNER that in performing work under this contract the CONTRACTOR will employ a standard of care consistent with that generally applied by CONTRACTORS engaged in work comparable to the project in the place where the project is located.
3. The CONTRACTOR will commence the work required by the contract documents after issuance of the NOTICE TO PROCEED and will substantially complete the project on or before **July 17, 2025** and will fully complete the project by **July 31, 2025**. 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 the OWNER can occupy or utilize the work for its intended use, subject only to the completion of minor punch list items, the absence of completion of which does not interfere with the OWNER’s intended use of the project.
  - a) Time is of the essence of this contract. For each calendar day after **July 31, 2025** that the project remains uncompleted **\$500.00** shall be charged as liquidated damages. This liquidated damages provision represents negotiated amounts on the basis of losses to OWNER in the event of failure to achieve full completion of the project by **July 31, 2025** and shall not be deemed or construed as a penalty. The said amount is fixed and agreed on by and between the CONTRACTOR and the OWNER because of the impracticability and extreme difficulty of fixing and ascertaining the true value of the damages which the OWNER will sustain by failure of the CONTRACTOR to complete the project on time. Said amount is agreed to be a reasonable estimate of the amount of damages which the OWNER will sustain and said amount shall be deducted from any monies due or that may become to the CONTRACTOR, and if said monies are insufficient to cover said damages, then the CONTRACTOR shall pay the amount of the difference.

4. The OWNER agrees to pay the CONTRACTOR for the completion of the WORK as defined by the “contract documents”, subject to additions and deductions provided by approved Change Orders, as follows:

( \_\_\_\_\_ ).

5. The CONTRACTOR shall furnish the OWNER the required contract bonds at in the amount of 100% of the contract amount.
6. The term “contract documents” means and includes the following:
  - a) Project Manual prepared by Lincoln/Haney Engineering Associates
  - b) Proposal Form completed by the Bidder
  - c) Drawings & specifications prepared by Lincoln Haney Engineering Associates
  - d) Drawings & specifications prepared by Sebago Technics, Inc.
  - e) All addenda issued
  - f) Notice of Award/Notice to Proceed
  - g) Approved Change Orders
7. To the fullest extent permitted by law, the CONTRACTOR shall indemnify, defend, and hold harmless the OWNER and its agents, SUBCONTRACTORS, and employees from and against all claims, demands, causes of action, damages, liabilities, losses, and expenses, including but not limited to attorneys’ fees and expenses, arising out of or resulting from the performance of the project or in whole or in part from the negligent or wrongful acts or omissions of the CONTRACTOR, any SUBCONTRACTOR, or of anyone for whose actions any of them may be liable, regardless of whether or not it is alleged to have been caused in part by a party indemnified hereunder. This obligation shall survive the expiration or termination of the contract for any reason.
8. In any and all claims against the OWNER or any of its agents or employees by any employee of the CONTRACTOR, any one directly or indirectly employed by them, or anyone for whose actions any of them may be liable, the indemnification obligation under this contract shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the CONTRACTOR or SUBCONTRACTOR under Worker’s Compensation Acts, Disability Benefits Acts, or other employee benefit acts and, exclusively for purposes of the indemnity under Paragraph 7, and only to the extent that this waiver does not affect the CONTRACTOR’s statutory immunity against claims by its own employees, CONTRACTOR hereby waives any immunities to which it may be entitled under worker’s compensation laws, and assumes potential liability for actions brought by its employees. The obligations of the CONTRACTOR under this contract shall not extend to the liability of the Engineer its agents or employees, arising out of:
  - a) the preparation and approval of maps, drawings, opinions, reports, services, change orders, designs or specification, or,
  - b) the giving of or the failure to give instructions by the Engineer, its agents or employees, provided such giving or failure to give is the primary cause of such injury or damage.
9. The obligation of the CONTRACTOR to indemnify shall be covered by an appropriate insurance policy as required in Article 27 of the Standard General Conditions.

10. The OWNER shall make payments on account of the contract as provided as follows: each month 95% of the value, based on contract prices of labor and materials incorporated in the work and of materials suitably stored at the site from the first day of that month, as certified by the Engineer.
11. Final payment shall be due 30 days after completion and acceptance of the work, provided the CONTRACTOR has submitted required warranties and evidence satisfactory to the OWNER that all payrolls, material bills and other indebtedness connected with the work has been paid.
12. Execution of the contract by the CONTRACTOR is a representation that the CONTRACTOR has visited and evaluated the site, become familiar with local conditions under which the work is to be performed, identified any limitations upon the work or special requirements, the labor supply needed and its cost, the availability and cost of materials, tools, and equipment, and other similar issues, and correlated personal observations with requirements of the contract documents. CONTRACTOR represents that work on the site will comply with all applicable laws, ordinances, and regulations. Additional costs incurred in connection with any breach of these representations shall not be cause for an increase in the duration or cost of the work.
13. This contract, which includes the attached Standard General Conditions and the contract documents, represents the entire and integrated agreement between the parties, and can only be amended in a writing signed by both parties. In the event of any conflict between this contract and the contract documents, the terms of the contract shall prevail.

The parties hereby consent to the use of electronic signatures in connection with the execution of this contract. Facsimile, electronic, and digital copies of this document, including properly executed PDF versions of this document, are regarded as original instruments by the parties, and electronic signatures to this contract shall be legally binding with the same force and effect as manually executed signatures. This contract may be executed in two or more counterparts, each of which shall be deemed an original but all of which together shall constitute one and the same instrument.



**SECTION 2-E**

The OWNER and the CONTRACTOR hereby agree to the full performance of the covenants herein.

IN WITNESS WHEREOF the parties hereby execute this contract the day and year first above written.

\_\_\_\_\_  
(Print name and Title)

WITNESS:

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

Region 10 Technical High School

\_\_\_\_\_  
(Print name and Title)

WITNESS:

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

## SECTION 3-A

### STANDARD GENERAL CONDITIONS

#### INDEX TO ARTICLES OF GENERAL CONDITIONS

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## SECTION 3-A

### ARTICLE 1. DEFINITIONS

Whenever the following terms are used in these specifications or the contract, the intent and meaning shall be interpreted as follows:

Architect: The project architect and/or engineer whose name appears on the plans and/or specifications for the project, acting directly or through an authorized representative.

Bid Security: The security designated in the proposal, furnished by bidders as a guaranty of good faith to enter into a contract with the OWNER, should a contract be awarded to that bidder.

Bidder: Any individual, partnership, or corporation submitting a proposal for the performance of the work described under the terms of the contract, acting directly or through a duly authorized representative.

Calendar Days: Consecutive days, as occurring on a calendar, taking into account the day of the week, month, year, and any religious, national, or local holidays.

Change Order: A written agreement between the OWNER and the CONTRACTOR, operating as a supplement to the contract, covering correction of: omissions, errors, and discrepancies between the plans and the proposal or estimates; or any alterations in the plans; or additional requirements; work, materials, and incidentals required to complete the construction of the project in an acceptable manner, and setting forth the basis of compensation for that supplemental work, if any. Before any change order modifies or becomes a part of the work, it must be duly signed by the CONTRACTOR, and the OWNER, and approved by the architect.

Contract: A written agreement between the OWNER and the successful bidder, by which the CONTRACTOR is bound to perform the work specified, in accordance with plans, specifications, general conditions, and special provisions, that are a part of the contract documents, together with all supplemental agreements by which the OWNER is bound to compensate the CONTRACTOR at mutually established and accepted rates or prices.

Contract Bond: The approved forms of security furnished by the CONTRACTOR and his surety, or sureties, which guarantee the faithful performance of all the terms of the contract and the payment of all bills for labor, materials, and equipment by the CONTRACTOR.

Contract Documents: The contract documents consist of the contract, general conditions, special provisions, the plans and specifications including all addenda and all other modifications thereof, that were incorporated in the documents prior to their execution.

CONTRACTOR: The individual, partnership, or corporation undertaking the execution of the general contract work under the terms of the contract with the OWNER, acting directly or through a duly authorized representative.

OWNER: Region 10 Technical High School, acting through its duly authorized representative.

Plans: All official drawings or reproductions of drawings pertaining to the work provided for in the contract and such working plans as may be furnished or approved by the OWNER or architect from time to time.

## SECTION 3-A

Project: The entire improvement proposed by the OWNER to be constructed in part or in whole pursuant to these specifications and contract documents. Where the word “Job” appears, it shall mean the project.

Proposal or Bid: The written offer of the bidder, on a form prescribed to perform the work specified.

Provide: The word “provide” shall mean “furnish and install,” including connections to services if required, unless specified otherwise.

Clerk of the Works: The authorized representative of the Architect.

SUBCONTRACTOR: The individual, the firm or corporation undertaking the execution of any part of the work under the terms of the contract by virtue of a written agreement between itself and the CONTRACTOR.

Superintendent: The representative of the CONTRACTOR, authorized by the CONTRACTOR to receive and fulfill instructions from the architect.

Supplemental Agreement: A supplemental agreement is any agreement entered into between the CONTRACTOR and the OWNER with the approval of the OWNER and the architect subsequent to the execution of the contract.

Surety: The individual, partnership, or corporation which is bound jointly and severally with the CONTRACTOR and SUBCONTRACTOR to insure his faithful performance of the contract and for his payment of the bills for labor, materials and equipment by the CONTRACTOR and SUBCONTRACTORS.

## ARTICLE 2. PRECONSTRUCTION CONFERENCE

The CONTRACTOR shall, upon acceptance of a contract and prior to commencing work, schedule a preconstruction conference with the OWNER and architect. The purpose of this conference is to:

1. Introduce all parties who have a significant role in the project, including:
  - a. Architect
  - b. Consultants
  - c. Clerk-of-the-works
  - d. CONTRACTOR (GC)
  - e. CONTRACTOR’s superintendent
  - f. SUBCONTRACTORS
  - g. OWNER’s representative
  - h. Construction testing company
  - i. Special inspector
2. Review the responsibilities of each party.
3. Review any previously-identified special provisions of this project.
4. Review the Schedule of the Work calendar submitted by the CONTRACTOR to be approved by the OWNER and architect.
5. Review the Schedule of Values form submitted by the CONTRACTOR to be approved by the OWNER and architect.
6. Establish a protocol for submittal approval, approval of substitution requests, contract changes, requisitions, and other aspects of the contract as deemed appropriate.

7. Discuss jobsite issues.
8. Discuss project close-out issues.
9. Discuss aspects of the contract documents that may clarification.
10. Establish a schedule for meetings during progress of the work.

### **ARTICLE 3. INTENT, CORRELATION AND EXECUTION OF DOCUMENTS**

The intent of the contract document is to prescribe a complete work or improvement defined as “the project”. The plans, including all revisions, general conditions for contract work, special provisions, instructions to bidders, proposal, contract, contract bond, and all other sections of the specifications, including all addenda, prior to the time set for receiving proposals as prepared by the architect, shall each become a part of the contract documents, and all proposals must be based on a full compliance therewith. Any supplemental agreements entered into subsequent to the contract will become a part of said contract.

The contract documents are complementary, and what is called for by any one shall be binding as if called for by all. The CONTRACTOR shall furnish all labor, materials, equipment, items, articles, tools, transportation, insurance, services, necessary supplies, operations or methods necessary for and reasonably incidental to, the construction and completion of the project. Any deviations from the plans which may be required by the exigencies of the construction, or because of inconsistencies within the contract documents, will be determined by the architect, and authorized in writing subject to approval by the OWNER prior to execution. Materials or work described in words which, so applied, have a well-known technical or trade meaning shall be held to refer to such recognized standards. The CONTRACTOR shall be responsible for requesting clarifying information where the intent of the contract documents is uncertain.

The CONTRACTOR shall not utilize any apparent error or omission in the contract documents to the disadvantage of the OWNER. The CONTRACTOR shall promptly notify the architect in writing of such errors and omissions. Inconsistencies in the contract documents are to be reported before proposals are received, whenever found. The architect shall be permitted to make such corrections and interpretations as may be deemed necessary for the fulfillment of the intent of the contract documents.

The CONTRACTOR shall conduct a Preconstruction meeting on site as described in Article 2. During the further progress of work, regular meetings will be held at time intervals appropriate in the judgment of the architect to review the work progress schedule, general project progress and any other questions which might affect the execution of the contract.

### **ARTICLE 4: DETAIL DRAWINGS AND INSTRUCTIONS**

The architect shall furnish, with reasonable promptness, additional instructions by means of drawings or otherwise, that are necessary for the proper execution of the work. All such drawings and instructions shall be consistent with the contract documents, shall be true developments thereof, and shall be reasonably inferable therefrom. The CONTRACTOR shall not proceed with affected portions of the work before obtaining such amendments to the contract documents required for proper execution of the work.

Immediately after being awarded the contract, the CONTRACTOR shall prepare an estimated progress schedule and submit same for architect’s approval. It shall indicate the dates for starting and completion of the various stages of construction.

### **ARTICLE 5: COPIES FURNISHED**

Unless otherwise provided in the contract documents, the CONTRACTOR will be furnished, free of charge, copies of all drawings and specifications reasonably necessary for the execution of the work.

## ARTICLE 6: SUBMITTALS

General: The CONTRACTOR shall administer submittals prepared by the CONTRACTOR, SUBCONTRACTORS, suppliers, or others to conform to the approved Schedule of the Work. Submittals shall consist of all product data, shop drawings, samples, or other documents to be provided by the CONTRACTOR as identified within the technical portion of this project manual or elsewhere within the contract documents. The CONTRACTOR shall provide a Schedule of Submittals at least one week prior to the first submission with dates identified for the initial submission of all submittals. The Schedule of Submittals shall include reasonable time for the review by the architect and OWNER with consideration of obtaining required components in keeping with the approved project schedule. The CONTRACTOR shall, under no condition, deliver or install items identified for submittal without obtaining approval for installation. Such approval may be taken from a notation of “approved” or “no exceptions taken”. Submittals returned with the notation of “make corrections noted” may be considered “approved” after indicated aspects receive the corrections indicated. The OWNER will be under no obligation to compensate the CONTRACTOR for installation of items prior to “approval” as defined above.

The CONTRACTOR shall check and verify all field measurements and shall submit with such promptness as to cause no delay in the CONTRACTOR’S own work or in that of any other CONTRACTOR, adequate copies, checked and approved by the CONTRACTORS of all submittals required for the work of the various trades. All submittals shall bear a seal or other approved documentation of the CONTRACTOR’S review and acceptance of responsibility for correctness. The architect shall check and approve, with reasonable promptness, such submittals only for conformance with the design concept of the project and compliance with the information given in the contract documents. The CONTRACTOR shall make any corrections required by the architect, and shall file with the architect two corrected copies, and shall furnish such other copies as may be needed. The architect’s approval of such drawings or schedules shall not relieve the CONTRACTOR from responsibility for deviations from drawings or specifications, unless the CONTRACTOR has, in writing, called the architect’s attention to such deviations at the time of submission and secured the architect’s written approval; nor shall it relieve the CONTRACTOR from responsibility for errors in shop drawings or schedules.

The CONTRACTOR shall provide monthly updated logs containing requests for information, information bulletins, supplemental instructions, supplemental sketches, change order proposals, change orders, submittals, testing, and inspections.

The CONTRACTOR shall maintain records of submittals in their final form on site. Records shall include markings by the architect, CONTRACTOR, or OWNER where approval is conditional to making further corrections. Records of submittals shall be accessible to the clerk-of-the-works, the architect, inspectors, or other representatives of the OWNER.

Shop Drawings: The CONTRACTOR shall provide drawings as required to define the scope of work for shop preparation and installation of items as defined in technical specifications or as indicated elsewhere within the contract documents. Where requirements stated within the contract documents are more comprehensive than industry practice, the contract documents shall govern. Under no circumstance shall standard practice documents by any agency be taken to override the contract documents of the Project. The CONTRACTOR shall provide shop drawings of such quantity to for the architect to retain 2 copies. Only one copy of shop drawings will be returned to the contactor for dissemination.

Product Data: The contactor shall submit product information as required to verify compliance with technical specifications and other requirements stated within the contract documents. Where technical aspects of the item require engineering verification, include testing data or other information to permit verification of compliance. Identify range of colors and other aspects of the item where selection is required.

If an item specified describes a proprietary product, or uses the name of a manufacturer, the term “or an approved equal” shall be implied if it is not included in the text. The item specified establishes a minimum standard for the general design, level of quality, type, function, durability, efficiency, reliability, compatibility, warranty coverage, installation factors, and required maintenance. The product identification shall not be construed to exclude other manufacturers’ products of comparable design, quality, or efficiency.

Samples: The CONTRACTOR shall submit samples as directed by the architect. Samples will not be returned to the CONTRACTOR. The disposition of approval will be provided through the return of a memo. Where a selection is required between samples, that memo will identify the selected item. Installed items shall be consistent with selected samples.

Substitutions: The CONTRACTOR shall furnish items and materials described within the contract documents unless otherwise approved in writing as a substitution. Substitutions may consist of alternative items specified or details or a combination of the two. The CONTRACTOR may submit requests for substitutions subject the following conditions:

1. Substitution requests shall contain detailed information of the proposed substitution to the architect for consideration. Submittals of substitution requests shall contain all necessary documentation required for thorough evaluation. Approval of a substitution based on incomplete submission may be rescinded upon obtaining further information that identifies deficiencies rendering the item or detail inferior to the specified item or detail in some respect.
2. Submission of a substitution request shall allow an adequate period for evaluation. The architect will review the substitution request promptly with consideration of the complexity of the request and the schedule of the project. Under no condition shall a substituted item or detail be utilized prior to approval.
3. The architect may request additional information about the proposed substitution. The approval or the rejection of a proposed substitution may be based on the timeliness of the request, source of the information, the considerations of the minimum standards described within the construction documents, or other considerations. The architect shall briefly state the basis of rejection or any limitations on acceptance in a written response.
4. Where the substitution request includes alteration of details included within the contract documents, drawings shall be provided by the CONTRACTOR that clearly indicate the extent of the requested changes. If field changes to prefabricated items are necessary or advantageous, the requested changes shall be treated as a substitution request as described herein.
5. Where there is engineering design involved to prepare a substitution request, the architect may require that the documentation include the Maine stamp of the engineer responsible for the design.
6. The architect’s decision regarding acceptance or conditional acceptance of the proposed substitution shall be final.
7. The duration of the substitution evaluation process cannot be the basis for a claim for delay in the Schedule of Work.

#### **ARTICLE 7: DRAWINGS AND SPECIFICATIONS**

The CONTRACTOR shall keep, in good order, one copy of all drawings and specifications on site, which will be made available to the architect and to his representative.

#### **ARTICLE 8: OWNERSHIP OF DOCUMENTS**

All drawings, sketches, specifications and copies thereof furnished by the architect are the property of the OWNER.

## ARTICLE 9: MATERIALS, APPLIANCE, EMPLOYEES

Unless otherwise stipulated, the CONTRACTOR shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation, and facilities necessary for the execution and completion of the work.

Materials and models of items which the CONTRACTOR alleges to be equal to the materials and methods of items named in the specifications, shall be subject to the written approval by the architect/engineer. If the alleged equals are to receive consideration in the bid award, written approval shall be received from the architect/engineer at least ten days prior to the established bid opening dates. The use of alternate items will not be permitted without the approval of the OWNER and architect. All approved substitutions shall be in writing and approved by the architect. The CONTRACTOR shall not be relieved of the responsibility to furnish articles or materials equal in quality, design, and efficiency to those specified because of the approval of such alternate items by the architect. The architect's approval or rejection of a proposed substitution may be based on any of the previous considerations, and his decision may or may not express reasons for rejection and shall be final. Requests for substitutions shall originate and be submitted by the CONTRACTOR, not a SUBCONTRACTOR. The materials or equipment shall be sufficiently described to enable the architect to easily identify salient features.

Any material or products not specified in the bidding documents but being worthy of consideration may be introduced by the CONTRACTOR, or SUBCONTRACTOR. The CONTRACTOR's submission shall include a cost comparison with the specified material and the reason for the suggested substitution. The basic proposal shall be as specified.

It shall be understood by the general CONTRACTOR or SUBCONTRACTOR that the attached letter describing the proposed changes will not be used in determining the low general CONTRACTOR or SUBCONTRACTOR proposal submitted, unless the general CONTRACTOR or SUBCONTRACTOR has submitted its list to the architect/engineer 10 days prior to the date set for the receipt of their respective proposals and has received written approval by the architect/engineer five days prior to the opening of the bid.

The CONTRACTOR shall guarantee his work against any defects in workmanship and materials for a period of one year from the date of the written acceptance of the project.

Materials and equipment shall be new, free from defects, perfect and complete, unless otherwise stipulated. Materials or equipment specified or shown on the drawings shall be applied or installed according to the directions with the manufacturer, or the recommendations of an association dealing primarily with the material, unless specifically designated otherwise. The scope of the direction furnished shall include the application of experienced personnel to each trade involved. In no case shall the installation be below the standard recommended by the manufacturer or association.

The CONTRACTOR shall be responsible to the OWNER for the suitability of materials and equipment furnished and for full compliance with the specification.

The CONTRACTOR shall promptly pay all his employees when their pay is due, shall promptly pay when due all bills for materials, supplies and services going into the work, and all bills for insurance, worker's compensation coverage, federal and state unemployment compensation, and Social Security charges applicable to said project. Before final settlement is made, the CONTRACTOR shall furnish to the OWNER affidavits that all said payments have been made.

The CONTRACTOR shall at all times enforce strict discipline and good order among his employees, and shall not employ on the work any unfit person or anyone not skilled in the work assigned to him.



## **ARTICLE 10: ROYALTIES AND PATENTS**

The CONTRACTOR shall, for all time, secure to the OWNER the free and undisputed right to the use of any and all patented articles or methods used in the work. The expense of defending any suits for infringement or alleged infringement of such patents shall be borne by the CONTRACTOR. Awards made regarding patent suits shall be paid by the CONTRACTOR. The CONTRACTOR shall hold the OWNER harmless regarding patent suits that may arise as a result of installations made by the CONTRACTOR, and to any awards made as a result of such suits.

Any royalty payments related to the work done by the CONTRACTOR for the project shall be borne by the CONTRACTOR. The CONTRACTOR shall hold the OWNER harmless regarding any royalty payments that may arise due to installations made by the CONTRACTOR.

## **ARTICLE 11: SURVEYS AND LAYOUT OF THE WORK**

The OWNER shall furnish all property surveys unless otherwise specified.

The CONTRACTOR is responsible for correctly staking out the work on the site. The CONTRACTOR shall employ a competent surveyor to position all construction on the site. The surveyor shall run the axis lines, establish correct datum points, and check each line and point on the site to ensure accuracy. All such lines and points shall be carefully preserved throughout the construction.

The CONTRACTOR shall lay out all work from dimensions given on the drawings. The CONTRACTOR shall take measurements and verify dimensions of any existing work that affects the work or to which the work is to be fitted. The CONTRACTOR is solely responsible for the accuracy of all measurements. The CONTRACTOR shall verify all grades, lines, elevations, and dimensions shown on the drawings and report any errors or inconsistencies to the architect prior to commencing with affected portions of the work.

## **ARTICLE 12: PERMITS, LAWS, AND REGULATIONS**

The CONTRACTOR is responsible for obtaining and paying for all permits and licenses necessary for the implementation of the work. The CONTRACTOR shall notify the OWNER of any delays, variances, or restrictions that may result from issuing of permits and licenses.

The CONTRACTOR shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the implementation of the work. This includes, without limitation, complying with all dig safe requirements. If the CONTRACTOR observes that the drawings and specifications are at variance with any ordinances, laws, rules, or regulations, the CONTRACTOR shall promptly notify the architect in writing. Any necessary changes shall be adjusted as provided in the contract for changes in the work. If the CONTRACTOR performs any work knowing it to be contrary to such laws, ordinances, rules and regulations and without such notice to the architect, the CONTRACTOR shall bear all costs arising therefrom.

The CONTRACTOR shall comply with all local, state, and federal regulations regarding construction safety and all other aspects of the work.

## **Article 13: TAXES**

The OWNER is exempt from the payment of Federal Excise Taxes on articles not for resale and from the Federal Transportation Tax on all shipments. All quotes from the CONTRACTOR and SUBCONTRACTORS shall be free of these taxes. The OWNER is exempt from the payment of Maine

State Sales and Use Taxes. All quotes from the CONTRACTOR and SUBCONTRACTORS shall be free of these taxes.

#### **ARTICLE 14: LABOR AND WAGES**

All CONTRACTORS and SUBCONTRACTORS shall conform to the labor laws of the State of Maine, and all other laws, ordinances, and legal requirements affecting the work in Maine. This includes, without limitation, compliance with the Maine Department of Labor (MDOL) Prevailing Wage Rates.

All CONTRACTORS and SUBCONTRACTORS shall enforce strict discipline and good order among their employees at all times, and shall not employ any person unfit or unskilled to do the work assigned to them.

All CONTRACTORS and SUBCONTRACTORS shall promptly pay all employees when their compensation is due, shall promptly pay all others who have billed and are due for materials, supplies, and services used in the work and shall promptly pay all others who have billed and are due for insurance, workers' compensation insurance coverage, federal and state compensation, and Social Security charges relating to this project.

#### **ARTICLE 15: MANAGEMENT OF THE PREMISES**

The CONTRACTOR shall place equipment and materials, and conduct activities on the premises in a manner that does not unreasonably hinder site circulation, environmental stability, or any long-term effect. Likewise, the architect's directions shall not cause the use of the premises to be impeded for the CONTRACTOR or the OWNER.

The CONTRACTOR shall not use the premises for any purpose other than that which is directly related to the scope of work. The OWNER shall not use the premises for any purpose incompatible with the proposed work simultaneous to the work of the CONTRACTOR. Vehicular access to school facilities by buses, parent/student vehicles, and emergency vehicles must not be hindered by CONTRACTOR or any SUBCONTRACTORS or any work at any time except as expressly agreed to by OWNER. CONTRACTOR and SUBCONTRACTOR employees and suppliers may park vehicles, personal or otherwise, only in spaces designated by OWNER. Lay down areas for materials for the project shall be as agreed upon by OWNER and CONTRACTOR. Access to interior school facilities by workers shall occur only as necessary for purposes of the project and only at time agreed upon by OWNER and CONTRACTOR. If interior school supplies or materials are required to be moved for purposes of the project for any reason, the OWNER will take responsibility for doing so.

The CONTRACTOR shall enforce the architect's instructions regarding information posted on the premises such as signage and advertisements, as well as activities conducted on the premises such as fires and smoking.

The OWNER may occupy any part of the project that is completed with the written consent of the CONTRACTOR, and without prejudice to any of the rights of the OWNER or CONTRACTOR. Such use or occupancy shall not, in and of itself, be construed as a final acceptance of any work or materials.

CONTRACTOR must provide portable bathrooms for use by its workers and SUBCONTRACTORS. CONTRACTOR and such individuals will not be permitted to use school bathroom facilities.

All construction workers must comply with all OWNER'S school policies including without limitation those related to no smoking, no alcohol or drug use, no profanity, and no fraternization with students. All construction workers are expected to work collaboratively with minimal disruption to school operations.

#### **ARTICLE 16: SAFETY, SECURITY, AND PROTECTION OF THE PREMISES**

The CONTRACTOR shall continuously maintain adequate security protection on the premises and protect from unreasonable occasion of injury all people authorized to be on the site. The CONTRACTOR shall also effectively protect the property and adjacent properties from damage or loss.

The CONTRACTOR shall take all necessary precautions for the safety of workers and others on, and adjacent to, the site, abiding by all local, state, and federal safety regulations. The CONTRACTOR shall erect and continuously maintain safeguards and barriers for the protection of workers and others, and shall post signs and other warnings regarding hazards associated with the construction process, such as (but not limited to) protruding fasteners, moving equipment, trenches and holes, scaffolding, window, door, and stair openings, and falling materials.

The CONTRACTOR shall designate, and make known to the architect and OWNER, a safety officer, whose duty is the prevention of accidents on the site.

The CONTRACTOR shall restore the premises to conditions that existed prior to the start of the project at areas intended to be altered according to the Contract Documents. The CONTRACTOR shall protect all existing buildings, structures, or other features from damage by any operation in connection with the project. Utilities encountered shall be protected and maintained in service until removed or abandoned. The CONTRACTOR shall exercise care when working around such utilities as may be shown on the plot plan or otherwise found. Such utilities are not to be removed, replaced or abandoned.

The CONTRACTOR shall protect existing trees, and other aspects of the site which will remain a permanent part of the site from damage during grading, excavation, filling, trucking, etc. If necessary, tree trunks shall be boxed, and barricades set up at sufficient distance to prevent damage to tree branches or roots.

Damage to the work, including that which is reasonably protected, shall be repaired or replaced by the party who caused the damage at no expense to the OWNER.

The CONTRACTOR shall not load, or allow to be loaded, any part of the Project with a force which imperils personal or structural safety. The architect may consult with the CONTRACTOR on such means and methods of construction. Any opinions offered or suggestions made in this regard shall not be construed as directives. The CONTRACTOR shall remain solely responsible for the means and methods used to fulfill the contract.

The CONTRACTOR shall not jeopardize any work in place with subsequent construction activities such as blasting, drilling, excavating, cutting, patching or altering work. The architect must approve altering any structural component of the project. The CONTRACTOR shall supervise all construction activities carried out by others on site to ensure that the work is neatly done and in a manner that will not endanger the structure or the component parts.

The CONTRACTOR may act with their sole discretion in emergency an emergency situation that potentially affect health, life, or serious damage to the premises or adjacent properties, to prevent such potential loss or injury. The CONTRACTOR may negotiate with the OWNER for compensation for expenses due to such emergency work.

The CONTRACTOR shall keep the premises free of any unsafe accumulation of waste materials caused by the work. The CONTRACTOR shall regularly keep the premises “broom clean”. Refer to the Close-out of the Work provisions in this section regarding cleaning at the completion of the project.

At its own expense, CONTRACTOR shall obtain background checks on all its employees, SUBCONTRACTORS, and SUBCONTRACTOR employees who will be working on the project site, and submit to OWNER a listing of such approved workers, prior to such employee, SUBCONTRACTOR, or SUBCONTRACTOR employee commencing work on the project site. Any employee, SUBCONTRACTOR, or SUBCONTRACTOR employee who fails to satisfactorily complete the check will not be permitted to perform services for OWNER at the project site. Failure to satisfactorily complete the check means that the individual has a conviction for a felony level violent crime or sex offense, or a conviction related to any inappropriate conduct with a minor.

#### **ARTICLE 17: SUPERVISION OF THE WORK**

The CONTRACTOR shall have, during all stages of the work, a competent superintendent and any necessary assistants, overseeing the project. The superintendent shall not be changed except with the consent of the OWNER unless a superintendent ceases to be employed by the CONTRACTOR due to unsatisfactory performance. The superintendent shall represent the CONTRACTOR on the jobsite. Directives given to the superintendent by the architect or OWNER shall be as binding as if given directly to the CONTRACTOR’S main office. Important directives shall be confirmed in writing to the CONTRACTOR. The architect and OWNER shall not be responsible for the acts or omissions of the superintendent or his assistants.

The CONTRACTOR shall provide supervision of the work equal to the industry’s highest standard of care. The CONTRACTOR shall carefully study and compare all Contract Documents and promptly report any error, inconsistency, or omission which he may discover to the architect. The CONTRACTOR may not necessarily be held liable for damages resulting directly from any error, inconsistency, or omission in the contract documents or other instructions by the architect that was not revealed by the superintendent in a timely way.

#### **ARTICLE 18: OBSERVATION OF WORK**

The CONTRACTOR shall allow the architect and his representatives and the OWNER continuous access to the site for the purpose of observation of the progress of the work. All necessary safeguards and accommodations for such observations shall be provided by the CONTRACTOR.

The CONTRACTOR shall coordinate all required testing, approval, or demonstration of the work. The CONTRACTOR shall give sufficient notice to the appropriate parties of readiness for testing, inspection, or

examination.

The CONTRACTOR shall schedule inspections and obtain all required certificates of inspection for inspections by a party other than the architect. Inspection certificates and other documentation shall be made available to the architect or OWNER upon request.

Where items are identified for Special Inspections per chapter 17 of the Building Code, the CONTRACTOR shall coordinate the progress of the work with the Special Inspector. Where “continuous” inspection is required, the CONTRACTOR shall not proceed with the work without the inspector present. Where “periodic” inspection is required, the CONTRACTOR shall coordinate the activity with the special inspector to ensure that inspection at appropriate intervals will occur. Under no circumstances is the

CONTRACTOR permitted to conceal items requiring inspection until the Special Inspector approves the installation. If such items are concealed, the CONTRACTOR shall be responsible for removing obstructions to permit the necessary inspections at no cost to the OWNER and without delay of the project completion.

Observations by the architect shall be made within reasonable promptness, prior to work being concealed or buried by the CONTRACTOR. If approval of the work is required by the architect, the CONTRACTOR shall notify the architect of the construction schedule in this regard. Work concealed or buried prior to the architect's approval may need to be uncovered at the CONTRACTOR's expense. Additional work and time required to expose items requiring approval shall not justify claims for additional compensation or an extension of the project schedule.

Reexamination of questioned work may be ordered by the architect, and, if so ordered, the work must be uncovered by the CONTRACTOR. If such work be found in accordance with the contract documents, the OWNER shall pay the cost of the reexamination and replacement. If such work be found not in accordance with the contract documents, the CONTRACTOR shall pay such cost, unless it be found that the defect in the work was caused by a CONTRACTOR employed as provided in Article 32, and in that event the OWNER shall pay such cost.

#### **ARTICLE 19: CHANGES IN THE WORK**

The OWNER may change the scope of work of the project without invalidating the contract. The OWNER shall notify the CONTRACTOR of a change of the scope of work for the OWNER'S CONTRACTORS, which may affect the work of this CONTRACTOR, without invalidating the contract. Change Orders for extension of the time caused by such changes shall be developed at the time of directing the change in scope of work.

The architect may order minor changes in the work, not involving extra cost, which are consistent with the intent of the design or project.

The CONTRACTOR shall immediately give written notification to the architect of latent conditions discovered at the site which materially differ from those represented in the contract documents, and which may eventually result in a change in the scope of work. The CONTRACTOR shall suspend work until receiving direction from the architect. The architect shall promptly investigate the conditions and respond to the CONTRACTOR's notice with direction that avoids any unnecessary delay of the work. The architect shall determine if the discovered conditions warrant a Change Order.

The CONTRACTOR shall, within ten calendar days of receipt of the information, give written notification to the architect if the CONTRACTOR claims that instructions by the architect will constitute extra cost not accounted for by Change Order or otherwise under the contract. The architect shall promptly respond to the CONTRACTOR'S notice with direction that avoids any unnecessary delay of the work. The architect shall determine if the CONTRACTOR'S claim warrants a Change Order.

The CONTRACTOR shall not proceed with extra work without an approved Change Order or Construction Change Directive. A Change Order which has been properly signed by all parties shall become a part of the contract.

A Change Order is the usual document for directing changes in the work. In certain circumstances, however, the OWNER may utilize a Construction Change Directive to direct the CONTRACTOR to perform changes in the work that are generally consistent with the scope of the project. The OWNER shall use a Construction Change Directive only when the normal process for approving changes to the work has failed to the detriment of the project, or when agreement on the

terms of a Change Order cannot be met, or when an urgent situation requires, in the OWNER'S judgment, prompt action by the CONTRACTOR.

The architect shall prepare the Construction Change Directive representing a complete scope of work, with proposed contract price and contract time revisions, if any, clearly stated.

The CONTRACTOR shall promptly carry out a Construction Change Directive which has been signed by the OWNER and the architect. Work thus completed by the CONTRACTOR constitutes the basis for a Change Order. Changes in the contract price and contract time shall be as defined in the Construction Change Directive unless subsequently negotiated with some other terms.

The method of determining the dollar value of extra work shall be by:

- an estimate of the CONTRACTOR accepted by OWNER as a lump sum, or
- unit prices named in the contract or subsequently agreed upon, or
- cost plus a designated percentage, or
- cost plus a fixed fee.

The CONTRACTOR shall determine the dollar value of the extra work for both the lump sum and cost, plus designated percentage methods using the following rates. The rates include all overhead and profit expenses.

- CONTRACTOR - for any work performed by the CONTRACTOR's own forces, 20% of the cost;
- SUBCONTRACTOR - for work performed by SUBCONTRACTOR's own forces, 20% of the cost;
- CONTRACTOR - for work performed by CONTRACTOR's SUBCONTRACTOR, 10% of the amount due the SUBCONTRACTOR.

The CONTRACTOR shall keep and provide records as needed or directed for the cost, plus designated percentage method. The architect shall review and certify the appropriate amount which includes the CONTRACTOR'S overhead and profit. The OWNER shall make payments based on the architect's certificate.

Cost reflected in Change Orders shall be limited to the following: cost of materials, cost of delivery, cost of labor (including Social Security, pension, Workers' Compensation insurance, and unemployment insurance), and cost of rental of power tools and equipment. Labor cost may include a pro-ratio share of a foreman's time only in the case of an extension of contract time granted due to the Change Order.

Overhead reflected in Change Orders shall be limited to the following: bond premium, supervision, wages of clerks, time keepers, and watchmen, small tools, incidental expenses, general office expenses, and all other overhead expenses directly related to the Change Order.

The CONTRACTOR shall provide credit to the OWNER for labor, materials, equipment and other costs but not overhead and profit expenses for those Change Order items that result in a net value of credit to the contract.

## **ARTICLE 20: DELAYS AND EXTENSION OF TIME**

If the CONTRACTOR is delayed at any time in the progress of the work by an act or neglect of the OWNER or the architect, or of any employee of either, or by any separate CONTRACTOR employed by the OWNER, or by changes ordered in the work or by strikes, lockouts, fire, unusual delay in transportation, unavoidable casualties or by causes beyond the CONTRACTOR'S control, or by any cause

which the architect shall decide to justify the delay, then the completion date shall be extended for such reasonable time as the architect may decide.

The project schedule shall be based upon purchasing and delivery of materials after approval of relevant submittals. Late processing of submittals by the architect or OWNER cannot serve as a basis of a claim for delay unless submittals are provided to the architect in timing consistent with the CONTRACTOR'S Submittal Schedule, the timing of the returned submittal is beyond that established in Article 6, and the CONTRACTOR can produce proof that the late submittals were critical path items that caused delay to the overall progress of the work.

The CONTRACTOR shall submit a claim for delay to the architect in writing within seven calendar days of the occurrence of the cause for delay. Any claim for delay submitted after seven days beyond the occurrence causing delay will be rejected. In case of a continuing cause of delay, only one claim is necessary.

The contract shall not be extended due to failure of the architect to furnish drawings if no schedule or agreement is made between the CONTRACTOR and the architect indicating the dates which drawings shall be furnished and fourteen calendar days has passed after said date for such drawings.

This article does not exclude the recovery of damages for delay by either party under other provisions in the contract document.

#### **ARTICLE 21: CORRECTION OF WORK**

The CONTRACTOR shall promptly remove from the premises all work that the architect declares is nonconforming to the contract. The CONTRACTOR shall promptly replace the work properly without expense to the OWNER. The CONTRACTOR shall bear the expense of making good all work of other CONTRACTORS destroyed or damaged by such removal or replacement.

If the CONTRACTOR does not remove such non-conforming work within a reasonable time, fixed by written notice from the architect, the OWNER may remove it and may store the material at the expense of the CONTRACTOR. The OWNER may, upon ten days written notice, dispose of materials which the CONTRACTOR does not remove. The OWNER may sell such materials and apply the net proceeds, after deducting all expenses, to the costs that should have been borne by the CONTRACTOR.

The CONTRACTOR shall remedy any defects due to faulty materials or workmanship and pay for any damage to other work, which appears within a period of one year from the date of substantial completion, and in accord with the terms of any guarantees provided in the contract. The OWNER shall give notice to the CONTRACTOR and architect of observed defects with reasonable promptness. The architect shall determine the status of all claimed defects.

The architect may authorize, after a reasonable notification to the CONTRACTOR, an equitable deduction from the contract amount in lieu of the CONTRACTOR correcting non-conforming or defective work.

#### **ARTICLE 22: OWNERS RIGHT TO DO WORK**

The OWNER may, using other CONTRACTORS, correct deficiencies attributable to the CONTRACTOR, or complete unfinished work. Such action shall take place only after giving the CONTRACTOR three days written notice, and provided the architect approves of the proposed course of action as an appropriate remedy. The OWNER may then deduct the cost of the remedial work from the amount due the CONTRACTOR.

The OWNER may act with their sole discretion when the CONTRACTOR is unable to take action in emergency situations that potentially effect health, life or serious damage to the premises or adjacent properties, to prevent such potential loss or injury. The OWNER shall inform the CONTRACTOR of the emergency work performed, particularly where it may affect the work of the CONTRACTOR.

#### **ARTICLE 23: OWNERS RIGHT TO TERMINATE CONTRACT**

The OWNER may, without prejudice to any other right or remedy and after giving the CONTRACTOR and the CONTRACTOR'S surety seven days written notice, terminate the employment of the CONTRACTOR for cause. At that time the OWNER may take possession of the premises and of all materials, tools and appliances on the premises and finish the work by whatever method the OWNER may deem expedient. Cause for such action by the OWNER includes: if the CONTRACTOR is adjudged bankrupt, or makes a general assignment for the benefit of its creditors, or if a receiver is appointed due to the CONTRACTOR's insolvency, or if the CONTRACTOR refuses or fails to provide enough properly skilled workers or proper materials, or if the CONTRACTOR fails to make prompt payment to SUBCONTRACTORS or material or labor suppliers, or if the CONTRACTOR disregards laws, ordinances or the instructions of the architect, or is otherwise found guilty of a substantial violation of a provision of the Contract Documents.

The CONTRACTOR is not entitled, as a consequence of the termination of the employment of the CONTRACTOR as described above, to receive any further payment until the work is finished. If the unpaid balance of the contract amount exceeds the expense of finishing the work, including compensation for additional architectural, managerial, and administrative services, such balance shall be paid to the CONTRACTOR. If the expense of finishing the work exceeds the unpaid balance, the CONTRACTOR shall pay the difference to the OWNER. The architect shall certify the expense incurred by the CONTRACTOR'S default. This obligation for payment shall continue to exist after termination of the contract.

In addition, 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. In such event the contract sum and contract time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption. Adjustment of the contract sum shall include profit, but only on the increased cost of performance. No adjustment shall be made to the extent (a) that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the CONTRACTOR is responsible; or (b) that an equitable adjustment is made or denied under another provision of the contract.

At any time, terminate the contract for the OWNER'S convenience and without cause. Upon receipt of notice from the OWNER of such termination for the OWNER's convenience, the CONTRACTOR shall (a) cease operations as directed by the OWNER in the notice; (b) take actions necessary, or that the OWNER may direct, for the protection and preservation of the work; and (c) 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. In case of such termination for the OWNER'S convenience, the OWNER shall pay the CONTRACTOR for work properly executed; and costs documented to have been incurred by CONTRACTOR by reason of the termination, including costs attributable to termination of subcontracts.

#### **ARTICLE 24: THE CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE CONTRACT**

If the work is stopped under an order of any court, or other public authority, for a period of thirty consecutive days, through no act or fault of the CONTRACTOR or of anyone employed by the



CONTRACTOR, then the CONTRACTOR, may, upon seven days written notice to the OWNER and the architect, terminate this contract and recover from the OWNER, payment for all work executed and any proven loss and reasonable profit and damage.

If the architect fails to issue a certificate for payment within seven days after the CONTRACTOR'S formal request for payment, through no fault of the CONTRACTOR, or if the OWNER fails to pay to the CONTRACTOR within 30 days after submission of any sum certified by the architect, then the CONTRACTOR may, upon seven days written notice to the OWNER and the architect, stop the work or terminate this contract as set out in the preceding paragraph.

#### **ARTICLE 25: PAYMENTS TO THE CONTRACTOR**

At least ten calendar days before the *Preconstruction Conference*, as defined in Article 2, the CONTRACTOR shall submit a Schedule of Values form for approval by the OWNER and architect. The Schedule of Values shall include an itemized list of tasks and materials to be utilized on the project with a cost for each entry and total equal to the contract price. The architect may direct the CONTRACTOR to provide evidence that supports the correctness of the form. The approved Schedule of Values shall be used as a basis for

payments. The OWNER will make no payments for materials purchased by the CONTRACTOR before approval of the Schedule of Values.

The CONTRACTOR shall submit to the architect an application for each payment on the latest revision of the "Requisition for Payment" form and, if required, receipts or other vouchers, showing his payments of materials and labor, including payments to SUBCONTRACTORS.

The CONTRACTOR shall submit Requisitions for Payment as the work progresses not more frequently than once each month, unless the OWNER approves a more frequent interval due to unusual circumstances. The Requisition for Payment is based on the proportionate quantities of the various classes of work completed or incorporated in the work, in agreement with the actual progress of the work and the dollar value indicated in the Schedule of Values.

The architect shall verify and certify each Requisition for Payment which appears to be complete and correct prior to payment being made by the OWNER. The architect may certify an appropriate amount for materials not incorporated in the work which have been delivered and suitably stored at the site. The CONTRACTOR shall submit bills of sale, insurance certificates, or other such documents that will adequately protect the OWNER'S interests prior to payments being certified.

The CONTRACTOR may request certification of an appropriate dollar amount for materials not incorporated in the work which have been delivered and suitably stored away from the site. The CONTRACTOR shall submit bills of sale, insurance certificates, right-of-entry documents or other such documents that will adequately protect the OWNER'S interests. The architect shall determine if the CONTRACTOR'S documentation for the materials is complete and specifically designated for the project. The OWNER may allow certification of such payments.

In the event any materials are delivered but not yet incorporated in the work, have been included in a certified Requisition for Payment with payment made, and said materials thereafter are damaged, deteriorated, or destroyed or for any reason whatsoever become unsuitable or unavailable for use in the work, then the full amount previously allowed, shall be deducted from subsequent payments or final payment unless the CONTRACTOR satisfactorily replaces said material.

SUBCONTRACTORS may request, and shall receive from the Architect, copies of approved Requisitions for Payment showing the amounts certified in the Schedule of Values.

No certificate issued nor payment made to the CONTRACTOR, nor partial or entire use of occupancy of the work by the OWNER, shall be an acceptance of any work or materials that does not conform to the contract documents. In no event does the making and acceptance of the final payment constitute a waiver of any claims by the OWNER arising from unsettled liens, from faulty work or materials appearing within one year from final payment, or from requirements of the drawings and specifications, nor does it constitute a waiver of claims by the CONTRACTOR, except those previously made in writing and identified by CONTRACTOR as still unsettled at the time of final application for payment.

The OWNER shall retain five percent of each payment due the CONTRACTOR as part security for the fulfillment of the contract by the CONTRACTOR. The OWNER may make payment of a portion of this “retainage” to the CONTRACTOR temporarily or permanently during the progress of the work. The OWNER may thereafter withhold further payments until the full amount of the five percent is reestablished.

#### **ARTICLE 26. PAYMENTS WITHHELD**

The architect may withhold or nullify the whole or a portion of any Requisitions for Payment submitted by the CONTRACTOR in the amount that may be necessary, in his reasonable opinion, to protect the OWNER from loss due to any of the following:

- A. Defective work not remedied.
- B. Claims filed or reasonable evidence indicating probably filing of claims.
- C. Failure of the CONTRACTOR to make payments properly to SUBCONTRACTORS or suppliers.
- D. A reasonable doubt that the contract can be completed for the balance then unpaid.
- E. Liability for damage to another CONTRACTOR.

When the above circumstances are removed, the OWNER shall make payment to the CONTRACTOR in the amount withheld.

#### **ARTICLE 27: CONTRACTOR’S INSURANCE REQUIREMENTS**

The CONTRACTOR shall not commence work under this contract until the CONTRACTOR has obtained all insurance required under this article and such insurance has been approved by the OWNER, nor shall the CONTRACTOR allow any SUBCONTRACTOR to commence work on a subcontract until all similar insurance required of the SUBCONTRACTOR has been so obtained and approved.

The OWNER does not warrant or represent that the insurance required under this paragraph constitutes an insurance portfolio which adequately addresses all risks faced by the CONTRACTOR or its SUBCONTRACTORS. The CONTRACTOR and SUBCONTRACTORS of every tier shall satisfy themselves as to the existence, extent and adequacy of insurance prior to commencement of work.

The CONTRACTOR and any SUBCONTRACTOR shall procure and maintain for the duration of the project insurance of the types and limits set forth under this paragraph and such insurance as will protect themselves from claims which may arise out of or result from the CONTRACTOR’S or SUBCONTRACTOR’S execution of the work, whether such execution be by themselves or by anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable. The insurance coverage provided by the CONTRACTOR and any SUBCONTRACTOR will be primary coverage.

##### **A. Workers’ Compensation Insurance**

Worker’s compensation insurance for all employees on site in accordance with the Workers’ Compensation law of the State of Maine.

Minimum acceptable limits for Employer's Liability are:

Bodily Injury by Accident	\$1,000,000
Bodily Injury by Disease	\$1,000,000 Each Employee
Bodily Injury by Disease	\$1,000,000 Policy Limit.

## **B. Liability Insurance**

### **1. General Liability Insurance**

General liability insurance shall be on a form providing coverage not less than that of the 1996 occurrence version of the Insurance Services Office (ISO) Commercial General Liability Policy. This insurance shall cover bodily injury and property damage liability for all hazards of the Project including premise and operations, products and completed operations, contractual, and personal injury liabilities. It shall include collapse and underground coverage - as well as explosion coverage if explosion hazards exist. Aggregate limits shall apply on a per-location or project basis.

Minimum acceptable limits are:

General aggregate limit:	\$2,000,000
Products and completed operations aggregate:	\$1,000,000
Each occurrence limit:	\$1,000,000
Personal injury aggregate:	\$1,000,000

### **2. Automobile Liability Insurance**

Automobile liability insurance against claims for bodily injury, death or property damage resulting from the maintenance, ownership or use of all owned, non-owned and hired automobiles, trucks and trailers.

Minimum acceptable limit is \$1,000,000 any one accident or loss.

### **3. OWNERS Protective Liability**

For Contracts exceeding \$50,000 in total Contract amount, CONTRACTOR shall secure an OWNERS Protective Liability policy naming the OWNER as the Named Insured.

Minimum acceptable limits are:

General aggregate limit:	\$2,000,000
Each occurrence limit:	\$1,000,000

### **4. Pollution Liability**

In the event that any disruption, handling, abatement, remediation, encapsulation, removal, transport, or disposal of contaminated or hazardous material is required, the CONTRACTOR or its SUBCONTRACTOR shall secure a pollution liability policy in addition to any other coverages contained in this section. The insurance shall be provided on an occurrence based policy and shall remain in effect for the duration of the Project.

Minimum acceptable limit is \$1,000,000 per occurrence.

## **C. Property Insurance**

### **1. New Construction**

The CONTRACTOR shall procure and maintain Builder's Risk insurance naming the OWNER, CONTRACTOR and any SUBCONTRACTOR as insureds as their interest may appear. Covered causes of loss form shall be all Risks of Direct Physical Loss, endorsed to include flood, earthquake, transit and sprinkler leakage where sprinkler coverage is applicable. Unless specifically authorized in writing by the

OWNER, the limit of insurance shall not be less than the initial contract amount and coverage shall apply during the entire contract period and until the work is accepted by the OWNER.

## **2. Renovations and/or Additions within Existing Buildings**

Insurance shall be provided by the OWNER. Said insurance coverage shall cover the interests of the CONTRACTOR and SUBCONTRACTOR, as their interests may appear. Covered causes of loss form shall be Risks of Direct Physical Loss, endorsed to include flood, earthquake, transit and sprinkler leakage. Theft coverage is not included. Exclusions common to commercial property policies are applicable. The \$500 per occurrence deductible is the responsibility of the CONTRACTOR. Should the CONTRACTOR or SUBCONTRACTOR desire coverage in excess of that maintained by the OWNER, it must be acquired by the CONTRACTOR and at CONTRACTOR expense. A certificate of insurance will be furnished to the CONTRACTOR upon request.

### **D. Certificates of Insurance**

The CONTRACTOR shall provide four original copies of all certificates of insurance in a form, and issued by, companies acceptable to the OWNER shall be provided to the architect prior to commencement of work. The certificates shall name the OWNER as certificate holder and shall contain a provision that coverage afforded under the insurance policies will not be canceled or materially changed unless at least thirty (30) days prior written notice by registered letter has been given to the OWNER.

## **ARTICLE 28: CONTRACT BONDS**

When noted as required in the Contract Documents, the CONTRACTOR shall provide to the OWNER, a Performance Bond and a Payment bond, or “contract bonds”, upon execution of the contract. Each bond value shall be for the full amount of the contract and issued by a surety company authorized to do business in the State of Maine as approved by the OWNER. The bonds shall be in accordance with and executed on the forms furnished in the Contract Documents. The bonds shall allow for any addition or deductions of the contract.

The contract bonds shall continue in effect for one year after final acceptance of each contract to protect the OWNER’s interest in connection with the one year guarantee of workmanship and materials and to assure settlement of claims, for the payment of all bills for labor, materials and equipment by the CONTRACTOR.

## **ARTICLE 29: N/A**

## **ARTICLE 30: LIENS**

Each application for payment submitted by CONTRACTOR shall include a duly executed lien waiver, in the form agreed to by OWNER, from CONTRACTOR and all SUBCONTRACTORS regarding the portion of the work completed. Each such application shall be supported by all data substantiating the CONTRACTOR’S right to payment that the OWNER or architect require, including without limitation copies of requisitions, invoices, releases and waivers of liens from SUBCONTRACTORS and suppliers, and any other such data substantiating the right to payment as the OWNER or architect may require, and shall reflect retainage if provided for in the contract documents. Alternately, the CONTRACTOR, in the event any SUBCONTRACTOR or supplier refuses to furnish a release of lien in full, may furnish a bond satisfactory to the OWNER, to indemnify the OWNER against any lien.

If any SUBCONTRACTOR, supplier, or other person other than CONTRACTOR or any of them makes, records, or files, or maintains any action on or respecting a claim of mechanic's lien,

stop notice, equitable lien, payment or performance bond, or a lis pendens relating to the work, the CONTRACTOR shall immediately and at its own expense procure, furnish, and record appropriate statutory release bonds, which will extinguish or expunge said lien, claim, stop-notice, or lis pendens. In the event any lien remains unsatisfied after all payments to the CONTRACTOR are made by the OWNER, the CONTRACTOR shall refund to the OWNER all money that the latter may be compelled to pay in discharging such lien, including all cost and reasonable attorneys' fees.

#### **ARTICLE 31: ASSIGNMENT OF CONTRACT**

The CONTRACTOR shall not assign or sublet the contract as a whole without the written consent of the OWNER. The CONTRACTOR shall not assign any money due to the CONTRACTOR without the written consent

of the OWNER.

#### **ARTICLE 32: SEPARATE CONTRACTS**

The OWNER reserves the right to let other contracts in connection with this work under similar general conditions. The CONTRACTOR shall allow the OWNER'S other CONTRACTORS reasonable opportunity for the delivery and storage of their materials and the execution of their work. The CONTRACTOR shall properly connect and coordinate the work of all CONTRACTORS.

The CONTRACTOR shall promptly report to the Architect and OWNER any apparent deficiencies in work of the OWNER'S other CONTRACTORS that impacts the proper execution or results of the CONTRACTOR. The CONTRACTOR'S failure so to inspect and report shall constitute an acceptance of the other CONTRACTOR'S work as suitable for the interface of the CONTRACTOR'S work, except for latent deficiencies in the OWNER'S other CONTRACTOR'S work. Similarly, the CONTRACTOR shall promptly report to the Architect and OWNER any apparent deficiencies in their own work that would impact the proper execution or results of the OWNER'S other CONTRACTORS.

The CONTRACTOR shall report to the Architect and OWNER any conflicts or claims for damages with the OWNER'S other CONTRACTORS and settle such conflicts or claims for damages by mutual agreement or arbitration, if necessary, at no expense to the OWNER.

In the event the OWNER'S other CONTRACTORS sue the OWNER regarding any damage alleged to have been caused by the CONTRACTOR, the OWNER shall notify the CONTRACTOR, who shall defend such proceedings at the CONTRACTOR'S expense. The CONTRACTOR shall pay or satisfy any judgment that may arise against the OWNER, and pay all other costs incurred.

#### **ARTICLE 33: SUBCONTRACTS**

The CONTRACTOR shall not sublet any part of this contract without the written permission of the OWNER.

The CONTRACTOR shall submit a complete list of the named SUBCONTRACTORS and material suppliers to the architect and OWNER for approval by the OWNER prior to commencing the work. The SUBCONTRACTORS named shall be reputable firms of recognized standings with a record of satisfactory work. The CONTRACTOR shall not employ any SUBCONTRACTOR or use any material until they have been approved, or where there is reason to believe the work will not be accomplished in accordance with the contract documents.

The CONTRACTOR agrees that he is as fully responsible for the acts and omissions of his SUBCONTRACTORS and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by the SUBCONTRACTOR, as he is for the acts and omissions of persons directly employed by the CONTRACTOR.

Neither the Contract Documents nor any CONTRACTOR-SUBCONTRACTOR contract shall indicate, infer, or create any direct contractual relationship between any SUBCONTRACTOR and the OWNER.

#### **ARTICLE 34: CONTRACTOR-SUBCONTRACTOR RELATIONSHIP**

The CONTRACTOR shall be bound to the SUBCONTRACTOR by all the obligations in the contract documents that bind the CONTRACTOR to the OWNER.

The CONTRACTOR shall pay the SUBCONTRACTOR, in proportion to the dollar value of the work completed by the SUBCONTRACTOR, the dollar amount allowed to the CONTRACTOR at the time each CONTRACTOR'S Requisition for Payment is approved by the OWNER.

The CONTRACTOR shall pay the SUBCONTRACTOR accordingly if the contract documents or the subcontract provide for earlier or larger payments than described in the provision above.

The CONTRACTOR shall pay the SUBCONTRACTOR on demand for subcontract work or materials as far as executed and fixed in place, less retainage, at the time the CONTRACTOR'S Requisition for Payment is approved by the OWNER, even if the architect fails to certify a portion of the Requisition for Payment for a cause not the fault of the SUBCONTRACTOR.

The CONTRACTOR shall not make a claim for liquidated damages or penalty for delay in any amount in excess of amounts that are specified by the subcontract.

The CONTRACTOR shall not make a claim for services rendered or materials furnished by the SUBCONTRACTOR unless written notice is given by the CONTRACTOR to the SUBCONTRACTOR within ten calendar days of the day in which the claim originated.

The CONTRACTOR shall give the SUBCONTRACTOR an opportunity to present and to submit evidence in any progress conference or disputes involving subcontract work.

The CONTRACTOR shall pay the SUBCONTRACTOR a just share of any fire insurance payment received by the CONTRACTOR.

The SUBCONTRACTOR shall be bound to the CONTRACTOR by the terms of the Contract Documents and assumes toward the CONTRACTOR all the obligations and responsibilities that the CONTRACTOR, by those documents, assumes toward the OWNER.

The SUBCONTRACTOR shall submit applications for payment to the CONTRACTOR in such reasonable time as to enable the CONTRACTOR to apply for payment as specified.

The SUBCONTRACTOR shall make any claims for extra cost, extensions of time or damages, to the CONTRACTOR in the manner provided in these General Conditions for like claims by the CONTRACTOR to the OWNER, except that the time for the SUBCONTRACTOR to make claims for extra cost is seven calendar days after the receipt of architect's instruction.

### **ARTICLE 35: ARCHITECT'S STATUS**

The architect represents the OWNER during the construction period, and observes the work in progress on behalf of the OWNER. He shall have authority to act on behalf of the OWNER only to the extent expressly provided in the contract documents or otherwise in writing, which shall be shown to the CONTRACTOR.

The architect is the interpreter of the conditions of the contract and the judge of its performance. The architect shall favor neither the OWNER nor with the CONTRACTOR, but shall use the architect's powers under the contract to enforce faithful performance by both parties.

In event of the termination of the employment of the architect on the project prior to the completion of the work, the OWNER shall appoint a capable and reputable replacement. The status of the replacement relative to this contract shall be that of the former architect.

### **ARTICLE 36: ALLOWANCES**

The contract price shall include all allowances described in the contract documents. The CONTRACTOR shall include all overhead and profit necessary to implement each allowance in their contract price.

The CONTRACTOR shall not be required to employ parties for allowance work against whom the CONTRACTOR has a reasonable objection. In such a case, the CONTRACTOR shall notify the OWNER in writing of their position and shall propose an alternative party to complete the work of the allowance.

### **ARTICLE 37: CUTTING, PATCHING AND DIGGING**

The CONTRACTOR shall do all cutting, fitting, patching, and placing of work in such a manner to allow subsequent work to fit properly, whether that subsequent work be by the CONTRACTOR, the OWNER's other CONTRACTORS, or others. The OWNER or architect may advise the CONTRACTOR regarding subsequent work. Notwithstanding the notification or knowledge of such subsequent work, the CONTRACTOR may be directed to comply with this standard of compatible construction by the Architect at the CONTRACTOR'S expense.

Any cost caused by defective or ill-timed work shall be borne by the party responsible thereof. The CONTRACTOR shall not endanger any work by cutting, excavating or otherwise, and shall not cut or alter the work of any other CONTRACTOR except with the consent of the architect. Cutting, drilling, or patching work of CONTRACTORS other than the general CONTRACTOR shall be done only with the permission and instruction of the general CONTRACTOR and architect. Cutting of structural members must be approved by the architect. All cutting, patching, and digging of other constructors in or about the building shall be done under the supervision of the general CONTRACTOR who shall be responsible to see that the work is neatly done, and in a manner that will not endanger the structure or harm the component parts, and that patching and backfilling shall be done to restore the structure and surfaces to its original condition.

### **ARTICLE 38: WORKMANSHIP**

The CONTRACTOR shall provide materials, equipment, and installed work equal to or better than the quality specified in the Contract Documents and approved in submittal and sample. The installation methods shall be of the highest standards, and the best obtainable from the respective trades. The Architect's decision on the quality of work shall be final.

The CONTRACTOR shall know local labor conditions for skilled and unskilled labor in order to apply the labor appropriately to the work. All labor shall be performed by individuals skilled in their respective trades.

The CONTRACTOR shall request clarification or revision of any design work by the architect, prior to commencing that work, in a circumstance where the CONTRACTOR believes the work cannot feasibly be completed at the highest quality, or as indicated in the contract documents. The architect shall respond to such requests in a timely way, providing clarifying information, a feasible revision, or instruction allowing a reduced quality of work. The CONTRACTOR shall follow the direction of the architect regarding the required request for information.

The CONTRACTOR shall guarantee the work against any defects in workmanship and materials for a period of one year commencing with the date of the Certificate of Substantial Completion, unless specified otherwise for specific elements of the project. The work may also be subdivided in mutually agreed upon components, each defined by a Certificate of Substantial Completion.

#### **ARTICLE 39: CLOSE-OUT OF THE WORK**

The CONTRACTOR shall remove from the premises all waste materials caused by the work. The CONTRACTOR shall make the spaces "broom clean" unless a more exact cleaning is specified. The CONTRACTOR shall wash all windows and glass immediately prior to the final inspection, unless otherwise directed.

The OWNER may conduct the cleaning of the premises where the CONTRACTOR, duly notified by the architect, fails to adequately complete the task. The expense of this cleaning may be deducted from the sum due to the CONTRACTOR.

The CONTRACTOR shall participate in all final inspections and acknowledge the documentation of unsatisfactory work, generally called the "punch list", to be corrected by the CONTRACTOR. The architect shall document the successful completion of the work in a dated Certificate of Substantial Completion, to be signed by OWNER, architect, and CONTRACTOR.

The CONTRACTOR shall not call for final inspection of any portion of the work that is not complete and permanent installed. The CONTRACTOR may be found liable for the expenses of individuals called to final inspection meetings prematurely.

The CONTRACTOR and all major SUBCONTRACTORS shall participate in the end-of-warranty-period conference, typically scheduled close to one year after the Substantial Completion date.

#### **ARTICLE 40: DATE OF COMPLETION AND LIQUIDATED DAMAGES**

The CONTRACTOR may make a written request to the OWNER for an extension or reduction of time, if necessary. The request shall include the reasons the CONTRACTOR believes justifies the proposed completion date. The OWNER may grant the revision of the contract completion date if the work was delayed due to conditions beyond the control and the responsibility of the CONTRACTOR. The CONTRACTOR shall not conduct unauthorized accelerated work or file delay claims to recover alleged damages for unauthorized early completion.

The CONTRACTOR shall vigorously pursue the completion of the work and notify the OWNER of any factors that have, may, or will affect the approved Schedule of the Work. The



CONTRACTOR may be found responsible for expenses of the OWNER or architect if the CONTRACTOR fails to make notification of project delays.

The project is planned to be done in an orderly fashion which allows for an iterative submittal review process, construction administration including minor changes in the work and some bad weather. The CONTRACTOR shall not file delay claims to recover alleged damages on work the architect determines has followed the expected rate of progress.

The architect shall prepare the Certificate of Substantial Completion which, when signed by the OWNER and the CONTRACTOR, documents the date of Substantial Completion of the work or a designated portion of the work. The OWNER shall not consider the issuance of a Certificate of Occupancy by an outside authority a prerequisite for Substantial Completion if the Certificate of Occupancy cannot be obtained due to factors beyond the CONTRACTOR'S control.

Time is of the essence of the Contract. For each calendar day that the CONTRACTOR fails to achieve full completion of the project, subject to extensions of time to which it is entitled, CONTRACTOR shall be liable to OWNER for liquidated damages of \$500 per day as provided in Paragraph 3.a. of the Contract.

#### **ARTICLE 41: DISPUTE RESOLUTION**

##### Arbitration

1. If any dispute cannot be promptly resolved by the parties, the dispute shall be settled by arbitration. The arbitration shall be conducted before a panel of three arbitrators. Each party shall select one arbitrator; the third arbitrator shall be appointed by the arbitrators selected by the parties. The arbitration shall be conducted in accordance with the Maine Uniform Arbitration Act ("MUAA"), except as otherwise provided in this section.
2. The decision of the arbitrators shall be final and binding upon all parties. The decision may be entered in court as provided in the MUAA.
3. The costs of the arbitration, including the arbitrators' fees shall be borne equally by the parties to the arbitration, unless the arbitrator orders otherwise.
4. In any arbitration between the OWNER and the architect, the OWNER has the right to consolidate related claims between OWNER and CONTRACTOR.

In no event does this Article 41 preclude a party from seeking provisional remedies in aid of arbitration from a court of appropriate jurisdiction.

**SECTION 3-C**

**NOTICE OF AWARD**

XX XX, 2024

TO: xxxxxx

### xxx xxx xxx

Town, Maine 04XXX

Inasmuch as you were the low responsible Bidder, in the amount of \$XX,XXX, for construction of work entitled: Bridge and Sidewalk Replacement at Region 10 Technical High School in Brunswick, Maine, you are hereby notified that, upon compliance with the following requirements, the OWNER will sign and deliver a contract to you for the aforesaid project.

Attached are the contract documents for your signature. Please return signed contract in their entirety with the following items, within 12 days of the date of this Notice of Award, to Thad Gabryszewski, Project Manager, Lincoln Haney Engineering Associates, Inc. 14 Maine Street, Box 7, Brunswick, Maine 04011 for further processing:

- Certificate(s) of Insurance;
- Payment and Performance Bonds (contract bond date shall match the date of this letter);
- SUBCONTRACTOR and Supplier List;
- Schedule of Values;
- Project Schedule.

Approval of the contract is subject to successful submission and validation of the items listed above. If the SUBCONTRACTOR and Supplier List is not yet finalized, it should at a minimum show all categories and all known entities. If the Project Schedule needs further refinement, it should at a minimum indicate the critical path and start and end dates.

Please advise your surety agent that the bonds should carry the same date as this Notice of Award and that it will be necessary for the agent to supply, with the bonds, a properly executed Power of Attorney.

We do wish to alert you that you should make no financial commitments until the contract document has been fully executed.

Lincoln/Haney Engineering Associates, Inc. 14  
Maine Street, Suite 301, Box 7  
Brunswick, Maine 04011

By: Thad Gabryszewski, PE, SE

**SECTION 3-D**

**NOTICE TO PROCEED**

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Date

TO:

Inasmuch as a formal contract has been signed for construction of work entitled: **Bridge and Sidewalk Replacement at Region 10 Technical High School in Brunswick, Maine**, you are hereby notified to proceed with the work, together with all necessary appurtenances, and to diligently prosecute the work.

You are instructed to take the necessary steps to commence the work within ten (10) calendar days from the date of this Notice to Proceed. Completion for the work will be **July 31, 2025 with Substantial Completion by July 17, 2025.**

Lincoln/Haney Engineering Associates, Inc.  
14 Maine Street, Suite 301, Box 7  
Brunswick, Maine 04011

By:

**SECTION 3-E**

**DRAWING INDEX**

<u>DRAWING NUMBER</u>	<u>DRAWING TITLE</u>
SHEET 1 OF 8	COVER SHEET
SHEET 2 OF 8	NOTES & LEGEND
SHEET 3 OF 8	DEMOLITION PLAN
SHEET 4 OF 8	SITE PLAN
SHEET 5 OF 8	GRADING AND DRAINAGE PLAN
SHEET 6 OF 8	EROSION CONTROL NOTES
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S0.1	GENERAL NOTES
S1.1	DEMOLITION PLANS & ELEVATIONS
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S5.2	SECTIONS AND DETAILS

**SECTION 01 00 00**  
**GENERAL REQUIREMENTS**

1.1 SUMMARY OF WORK

- A. Contract Documents indicate the work of the Contract and related provisions of the Project.
- B. This Project will be performed at the Region 10 Technical High School in Brunswick, Maine. The project is scheduled for substantial completion on **July 17, 2025**. Final completion is required on or before **July 31, 2025**. Construction operations on site may begin on **August 1, 2024**. The school building will be occupied throughout the construction period. The CONTRACTOR shall coordinate all operations and storage of equipment and materials with the OWNER's authorized representative. On-site storage of materials is acceptable prior to the commencement of construction operations. All construction operations must be approved by an OWNER's representative before commencing that part of the job. The CONTRACTOR will be required to submit a detailed project approach before beginning any aspect of the work. The approach shall identify the schedule for performing all aspects of the work, means of protection of existing finishes from damage, and protection of exterior finishes and plantings. The CONTRACTOR will be required to coordinate construction activities with the OWNER'S designated representative to ensure that construction activities do not interfere with the operations of the building occupants and that safety protocols are maintained. All construction materials shall be secured in a place acceptable to the designated representative.
- C. Base Bid work involves the removal of existing materials and replacement of existing structure and site features. The CONTRACTOR shall include in their scope all incidental construction required to perform the entire scope of work indicated in the construction documents. The scope includes the following tasks.
1. Establishment and maintenance of lighted and safely protected egress paths from the school.
  2. Removal a of steel and concrete bridge, removal of site concrete, site grubbing, temporary removal and replacement of site features.
  3. Demolition of a portion of a portion of the school's exterior wall
  4. Removal of guardrails throughout the project area, including at the bridge, stairs, landings, and upper balcony.
  5. Protection of all finishes
  6. Site re-grading, including new fill, removal of fill, etc.
  7. Construction of new foundations, bridge abutments, site stairs, site landings.
  8. New guardrails and handrails throughout the project site.
  9. Careful removal and preservation of all electrical circuits. Protection & storage of site lighting. Installation of new wiring and conduit, attaching to existing circuits. Reinstallation of site lighting.
  10. Protection of interior spaces during construction
  11. Installation of a new concrete wall, damp proofing existing concrete, installation of new insulation, metal studs, masonry course, and parge coating.
  12. Installation of replacement louvers and ducts.
  13. Rust removal and painting of interior steel above the mezzanine area.
  14. Procurement of engineering, fabrication, and delivery of a prefabricated aluminum bridge. Installation of the bridge.
  15. New landscape features and plantings.
  16. Cleaning the area for removal of construction debris.

**SECTION 01 00 00**  
**GENERAL REQUIREMENTS**

- D. Work of this Contract includes coordinating the work with the daily operations of the OWNER to avoid interference with the OWNER'S operations.

1.2 SCHEDULING AND PHASING OF WORK

- A. Substantial Completion: Work of the Contract must be Substantially Completed by July 17, 2025 with final completion by July 31, 2025.
  - 1. Except as otherwise specified, Substantial Completion is hereby defined to mean a stage of completion sufficient for the OWNER to have full beneficial use and occupancy of the structure involved, less only minor corrections and repairs that can be performed without undue annoyance to building occupants which shall be documented on the "punch list" as specified hereinafter. Beneficial use and occupancy means removal of all debris, interior and exterior scaffolding, surplus equipment and material and cleaning as required under the Contract completed.
- B. Building Operations: The building will be occupied throughout the construction period. The CONTRACTOR will have access to the site for construction operations from August 1, 2024 to July 31, 2025. The CONTRACTOR'S operations may be constrained to avoid interference with the OWNER's activities. There will be area available for storage of materials or equipment on site, which may be utilized prior to initiation of construction operations. The locations of storage areas will not be in any place that will interfere with activities of the building occupants nor compromise the safety of the users of the building. Any areas permitted for the CONTRACTOR'S use shall be made secure and maintained for the safety of the users of the building. The CONTRACTOR will need to coordinate construction activities with the OWNER's operations throughout the construction period.
- C. It will be the CONTRACTOR'S sole responsibility to protect the interior of the building from damage during construction due to weather or construction operations. Damaged items will require replacement in kind at the CONTRACTOR'S expense. This includes items scheduled for removal and reinstallation of equipment or other incidental aspects of the Work.
- D. Within five (5) working days following issuance of a Notice to Proceed, and notwithstanding any delay in execution of a formal Contract Agreement, the CONTRACTOR shall prepare a proposed Phasing and Progress Schedule. The final Construction Schedule, approved by the OWNER, shall be submitted within five (5) working days from the receipt of review comments by the Architect and OWNER.

1.3 CONTRACT SITE; USE OF PREMISES

- A. The Contract Site shall include the following:
  - 1. Building roof areas where work is specified.
  - 2. Areas assigned to the CONTRACTOR by the OWNER for storage, staging and other temporary uses.
- B. The CONTRACTOR shall have control over areas of the Contract Site only to the extent as is agreed by the OWNER'S designated representative when scheduled work is ongoing. The CONTRACTOR'S control over the site area is relinquished at the end of each workday. Work outside of the Contract Site area shall be subject to the control of the OWNER.

**SECTION 01 00 00  
GENERAL REQUIREMENTS**

C. The CONTRACTOR shall be responsible for security on the Contract Site area at times during his control as described above. The CONTRACTOR is responsible for leaving the project site free of any unsafe conditions and weathertight throughout the construction period.

D. Smoking will not be permitted on the premises.

1.4 COORDINATION

A. Work of this Contract includes coordination of the entire work of the Project.

B. A building permit for this project will be obtained by the CONTRACTOR.

C. Coordinate work with all utilities. Interruption of services shall be coordinated with the OWNER's representative.

D. Coordinate the work of equipment and material suppliers and SUBCONTRACTORS.

E. Make arrangements for the timely delivery of materials and supplies to the job site and for their temporary storage on site.

F. Maintain the project site in a neat condition.

G. Assist the Architect & Engineer as required in the review of construction.

H. Maintain up-to-date progress records and as-built drawings.

1.5 CONFLICTS

A. CONTRACTOR shall notify Engineer/ Architect in writing of any real or apparent conflicts in the Contract Documents and, except in cases of emergency, await Engineer's/Architect's determination before proceeding.

B. Conflicts that arise during construction shall be resolved by the Engineer/ Architect.

C. If two or more solutions are indicated in the Contract Documents, the CONTRACTOR shall assume the cost of the more expensive solution unless otherwise directed by the Engineer/Architect.

1.6 SUBMITTALS

A. Refer to Section 3-A, General Conditions, Article 6, for requirements.

B. The CONTRACTOR shall submit product data and shop drawings electronically by email to the Engineer/ Architect for review. Reviewed submittals will be returned electronically by email.

C. Within ten (10) working days following issuance of a Notice of Award, the CONTRACTOR shall submit a Schedule of Values indicating the cost of various materials and tasks anticipated for the project. The CONTRACTOR shall use this Schedule as the basis for monthly Applications for Payment.

**SECTION 01 00 00  
GENERAL REQUIREMENTS**

- D. Within five (5) working days following issuance of a Notice to Proceed, the CONTRACTOR shall submit a proposed Phasing and Progress Schedule (refer to Section 1.2D). The schedule will be reviewed by the OWNER and the Engineer/ Architect. Comments will be provided within five (5) working days. A final Construction Schedule, with modifications in accordance with review comments, shall be submitted within five (5) working days of receiving review comments.
- E. At least one (1) week prior to sending any submittal, the CONTRACTOR shall provide a submittal schedule, identifying the list of submittals with dates that each will be delivered to the Engineer/ Architect. The CONTRACTOR shall expect delays in returning submittals when not submitted in accordance with dates identified on the submittal schedule.

**1.7 QUALITY ASSURANCE; SUBSTITUTIONS**

- A. Substitutions of materials without advanced approval of the Engineer / Architect shall not be permitted.
- B. Proposed substitutions of materials or details shall be separated from submittals or, if included within the submittal, shall be clearly identified as substitution requests.
- C. Do not assume that "or Equal" or terms of similar meaning indicate automatic approval of substituted products.

**1.8 TEMPORARY FACILITIES**

- A. The OWNER will supply the following for the CONTRACTOR'S use:
  - 1. Electrical Power: The CONTRACTOR may use the existing electrical service at the building. None of the outlets available can serve 220 volt power. The CONTRACTOR will be responsible for any modifications, temporary services, cables and lighting fixtures necessary to use the provided power and for any damage to the existing electrical system caused by the CONTRACTOR.
  - 2. On-site parking: The CONTRACTOR shall coordinate parking needs with the OWNER's authorized representative.
- B. The CONTRACTOR will provide:
  - 1. Temporary barricades as required to separate the Contract Site areas from the public.
  - 2. Their own on-site telephone if so required for the conduct of their business.
  - 3. Sanitary facilities.
  - 4. Protected storage.



**SECTION 01 00 00  
GENERAL REQUIREMENTS**

1.9 PROTECTION AND RESTORATION

- A. The OWNER will be responsible for moving all existing equipment, furnishings, supplies, etc. from the Contract Site where indicated within the contract documents or where such removals are incidental to other requirements.
- B. The CONTRACTOR shall be responsible for all damages to existing construction, including finished surfaces within the facility and finished surfaces outside the building, caused by any work on or related to this Contract.
- C. The CONTRACTOR shall protect paved areas, lawns and other plantings around the Building from damage associated with the construction. Costs to repair major damage to paved areas and landscaping will be deducted from CONTRACTOR'S final payment to cover OWNER's expenses to repair damage. The Engineer/ Architect will determine if damages are minor or major.

1.10 CLEANING

- A. Throughout the construction period the CONTRACTOR shall be responsible for maintaining building and site areas affected by the work in a standard of cleanliness.
  - 1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing protection of materials.
  - 2. Completely remove all scrap, debris, waste material and other items not required for construction from the site at least once a week.
  - 3. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.
- B. Clean the area above the ceiling prior to reinstalling roof deck by removal of debris and vacuuming with a shop-vac.
- C. Conduct daily inspections, more often if necessary, to verify that requirements for cleanliness are being satisfied.
- D. Provide required personnel, equipment and materials needed to maintain the specified standard of cleanliness.
- E. Use only those cleaning materials and equipment that are compatible with the surface being cleaned, as recommended by the manufacturer of the material.
- F. Upon completion of the Project:
  - 1. Broom clean paved areas and rake disturbed lawns adjacent to the Building and completely remove resultant debris.
  - 2. Visually inspect all exterior and interior surfaces and areas affected by the construction and remove all traces of soil, waste materials, foreign matter, etc. Hose down if necessary.

**SECTION 01 00 00  
GENERAL REQUIREMENTS**

1.11 REMOVALS

- A. Materials to be removed, including all components and accessories, become property of the CONTRACTOR and shall be promptly removed from the Contract Site and legally disposed of at CONTRACTOR'S expense.
- B. Remove all debris, rubbish, surplus materials and equipment immediately from the Project Site and legally dispose of at the CONTRACTOR'S expense.
  - 1. Note: Do not assume that local landfill facilities will accept construction debris, even if paid for.
- C. Materials identified for removal and reuse shall be handled with care. Remove and store at a secure location. Reinstall in a manner equal to what existed prior to removal unless otherwise indicated or approved. For items requiring operation, reinstall to be fully operational. The CONTRACTOR shall be responsible for any repairs of damages to items specified to be reinstalled.
- D. In consultation with OWNER, the flagpole located near worksite shall be moved to a temporary location while work is ongoing and moved to fixed location once work nears completion.

1.12 FINE CUTTING, PATCHING, FINISHING; GENERAL

- A. Perform removal and cutting work as required for the completion of work under this Contract.
- B. Removal and cutting shall be done in a manner to avoid damage to adjacent work that is to remain.

1.13 PROJECT CLOSEOUT

- A. Substantial Completion: The Engineer/ Architect will conduct an Inspection of Substantial Completion when the CONTRACTOR submits the following:
  - 1. Confirmation that conditions of Substantial Completion (paragraph 1.2) have been satisfied.
  - 2. A list of remaining items of work to be completed or corrected (“punch list”).
- B. Substantial Completion Inspection Procedure: Upon receiving the CONTRACTOR'S request for a Substantial Completion Inspection, the Engineer/ Architect will schedule an inspection of the work to check and supplement the "punch list" as applicable and either (1) endorse and date the Request for Substantial Completion or (2) advise the CONTRACTOR of work remaining to be performed before an inspection of final completion and acceptance will be performed.
  - 1. In the event that the conditions outlined in paragraph 1.2.A are not satisfied in the opinion of the Engineer, the CONTRACTOR will be advised of remaining work to be done before the OWNER will use the facility. The CONTRACTOR shall proceed with to fulfill the requirements as soon as possible. Under no circumstances shall it be permitted for Substantial Completion to be delayed past **July 17, 2025**.

**SECTION 01 00 00  
GENERAL REQUIREMENTS**

- C. Final Completion and Acceptance: The Engineer/ Architect will conduct an Inspection of Final Completion and Acceptance when the CONTRACTOR submits the following:
  - 1. Final payment request.
  - 2. Copies of warranties and guarantees as specified in the appropriate sections of the specifications.
  - 3. Copy of Engineer's/ Architect's final punch list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, endorsed and dated by the Engineer/ Architect.
  - 4. As-built drawings. These drawings may take the form of full-sized contract drawings with mark-ups in ink identifying any adjustments to the specified construction.
  
- D. Final Completion and Acceptance Inspection Procedure: Upon receiving the CONTRACTOR'S request for a Final Completion and Acceptance Inspection, the Engineer/ Architect will schedule an inspection of the work to reinspect the work. Upon completion of the reinspection the Engineer will either recommend final acceptance and final payment or advise the CONTRACTOR of work not completed or obligations not fulfilled as required for final acceptance. If necessary, this procedure will be repeated as an additional inspection(s) until all work has been satisfactorily completed.
  
- E. Additional Inspections: The Engineer/ Architect will conduct a total of two site visits for the purpose of inspecting for "Substantial Completion" and "Final Completion and Acceptance."

Additional visits required by reason of prerequisites not completed, excessive "punch list" items and "punch list" items not properly corrected at visit for Final Completion, shall be reimbursed to the Engineer/ Architect by the CONTRACTOR at Engineer's standard billing rates for personnel involved.

1.14 ACBM (ASBESTOS CONTAINING BUILDING MATLS) NOT ALLOWED

- A. Materials containing asbestos in any manner or quantity are not allowed on this Project. If such materials are installed they shall be removed and replaced at no additional cost to the OWNER.

**END OF SECTION 01 00 00**

**SECTION 024113  
SELECTIVE SITE DEMOLITION**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. This Section includes the following:
  - 1. Demolition and removal of site improvements.
  - 2. Removing below-grade construction.
  - 3. Disconnecting, capping or sealing, and abandoning in-place site utilities as indicated.
  - 4. Disconnecting, capping or sealing, and removing site utilities as indicated.
  - 5. Salvaging items for reuse by OWNER.
  
- B. Related Sections include the following:
  - 1. Division 31 Section "Site Clearing" for site clearing and removal of above-grade site improvements not part of site demolition.

1.2 DEFINITIONS

- A. Demolish: Completely remove and legally dispose of off-site.
- B. Recycle: Recovery of demolition waste for subsequent processing in preparation for reuse.
- C. Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to OWNER ready for reuse. Include fasteners or brackets needed for reattachment elsewhere.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of CONTRACTOR.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to OWNER that may be uncovered during demolition remain the property of OWNER.
  - 1. Carefully salvage in a manner to prevent damage and promptly return to OWNER.
- C. All items indicated on the drawings to be "Salvage" shall remain the property of the OWNER and stored and delivered per direction of OWNER'S Representative.

1.4 SUBMITTALS

- A. Schedule of Site Demolition Activities: Indicate the following:
  - 1. Detailed sequence of demolition work, with starting and ending dates for each activity.
  - 2. Temporary interruption of utility services.
  - 3. Shutoff and capping of utility services.

**SECTION 024113  
SELECTIVE SITE DEMOLITION**

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI A10.6 and NFPA 241.

1.6 PROJECT CONDITIONS

- A. Conduct site demolition so operations of adjacent occupied buildings will not be disrupted.
  - 1. Provide not less than 72 hours' notice of activities that will affect operations of adjacent buildings or facilities.
  - 2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings.
    - a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.
- B. OWNER assumes no responsibility for building structures and utilities to be demolished.
  - 1. Conditions existing at time of inspection for bidding purpose will be maintained by OWNER as far as practical.
  - 2. Before site demolition, OWNER will remove wanted items.
- C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
  - 1. If materials suspected of containing hazardous materials are encountered by the CONTRACTOR, do not disturb; immediately notify the OWNER'S Representative for review of situation and development of remedial action required.
- D. On-site storage of removed items or materials is not permitted without the permission of the OWNER'S Representative.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting demolition operations.
- B. Review Project Record Documents of existing construction provided by OWNER. OWNER does not guarantee that existing conditions are same as those indicated in Project Record Documents.

**SECTION 024113  
SELECTIVE SITE DEMOLITION**

- C. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.

**3.2 PREPARATION**

- A. Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities serving structures, and utilities to be demolished.
  - 1. OWNER will arrange to shut off indicated utilities when requested by CONTRACTOR.
  - 2. Arrange to shut off indicated utilities with utility companies.
  - 3. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
  - 4. Cut off pipe or conduit a minimum of 24 inches (610 mm) below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.
- B. Existing Utilities: Refer to Divisions 22 and 26 Sections for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.
- C. Salvaged Items: Comply with the following:
  - 1. Clean salvaged items of dirt and demolition debris.
  - 2. Pack or crate items after cleaning. Identify contents of containers.
  - 3. Transport items to storage area indicated on Drawings or as directed by the OWNER'S Representative.
  - 4. Protect items from damage during transport and storage.

**3.3 PROTECTION**

- A. Existing Facilities: Protect adjacent walkways, building entries, and other building facilities during demolition operations. Restrict access to and from building within direct work area.
- B. Existing Utilities: Maintain utility services to remain and protect from damage during demolition operations.
  - 1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by OWNER'S Representative and authorities having jurisdiction.
  - 2. Provide temporary services during interruptions to existing utilities, as acceptable to OWNER'S Representative and authorities having jurisdiction.
    - a. Provide at least 72 hours' notice to occupants of affected buildings if shutdown of service is required during changeover.
- C. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Division 01 Section "Temporary Facilities and Controls."
  - 1. Protect adjacent buildings and facilities from damage due to demolition activities.

**SECTION 024113  
SELECTIVE SITE DEMOLITION**

2. Protect existing site improvements, appurtenances, and landscaping to remain.
  3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
  4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  5. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
  6. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
  7. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings.
- D. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

3.4 DEMOLITION, GENERAL

- A. General: Demolish indicated site structures, and site improvements completely or to the limits indicated on the drawings. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
  2. Maintain fire watch during and for at least 8 hours after flame cutting operations.
  3. Maintain adequate ventilation when using cutting torches.
  4. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- B. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from OWNER and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
  2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- C. Explosives: Use of explosives is not permitted.

3.5 DEMOLITION BY MECHANICAL MEANS

- A. Proceed with demolition of structural members systematically, from higher to lower level. Complete demolition operations above each floor or tier before disturbing supporting members on the next lower level.

**SECTION 024113  
SELECTIVE SITE DEMOLITION**

- B. Salvage: Items to be salvaged are indicated on Drawings.
- C. Below-Grade Construction: Demolish foundation walls and other below-grade construction that are within footprint of new construction and extending 5 feet outside footprint indicated for new construction. Abandon below-grade construction outside this area.
  - 1. Remove below-grade construction, including foundation walls and footings, in its entirety to not affect new construction.
- D. Existing Utilities: Remove existing utilities. as indicated on drawings

3.6 SITE RESTORATION

- A. Below-Grade Areas: Rough grade below-grade areas ready for further excavation or new construction.
- B. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations with satisfactory soil materials according to backfill requirements in Division 31 Section "Earth Moving."
- C. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

3.7 REPAIRS

- A. Promptly repair damage to adjacent buildings caused by demolition operations.

3.8 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site.
- B. Remove demolition waste materials from Project site and legally dispose of them in an EPA-approved landfill acceptable to authorities having jurisdiction.
  - 1. Do not allow demolished materials to accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- C. Do not burn demolished materials.

3.9 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing before building demolition operations began.

**END OF SECTION 0241113**



**SECTION 024116  
STRUCTURE DEMOLITION**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
  - 1. Demolition and removal of structures and site improvements.
  - 2. Removing below-grade construction.
  - 3. Disconnecting, capping or sealing, and removing site utilities.
  - 4. Salvaging items for reuse by OWNER.
- B. Related Sections include the following:
  - 1. Division 02 Section "Selective Site Demolition" for partial demolition of structures and site improvements.
  - 2. Division 26 Sections for demolishing or relocating site electrical items.
  - 3. Division 31 Section "Site Clearing" for site clearing and removal of above- and below-grade site improvements not part of structure demolition.

1.3 DEFINITIONS

- A. Demolish: Completely remove and legally dispose of off-site.
- B. Recycle: Recovery of demolition waste for subsequent processing in preparation for reuse.
- C. Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to OWNER ready for reuse. Include fasteners or brackets needed for reattachment elsewhere.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of CONTRACTOR.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to OWNER that may be uncovered during demolition remain the property of OWNER.
  - 1. Carefully salvage in a manner to prevent damage and promptly return to OWNER.

**SECTION 024116  
STRUCTURE DEMOLITION**

1.5 SUBMITTALS

- A. Proposed Protection Measures: Submit informational report, including drawings, that indicates the measures proposed for protecting individuals and property, for dust control. Indicate proposed locations and construction of barriers.
  - 1. Adjacent Buildings: Detail special measures proposed to protect adjacent buildings to remain.
  
- B. Schedule of Structure Demolition Activities: Indicate the following:
  - 1. Detailed sequence of demolition work, with starting and ending dates for each activity.
  - 2. Temporary interruption of utility services.
  - 3. Shutoff and capping of utility services.
  
- C. Building Demolition Plans: Drawings indicating the following:
  - 1. Locations of temporary protection and means of egress for adjacent occupied buildings.
  
- D. Inventory: Submit a list of items to be removed and salvaged and deliver to OWNER prior to start of demolition.
  
  
- E. Pre-demolition Photographs or Video: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by building demolition operations. Submit before the work begins.

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
  
- B. Standards: Comply with ANSI A10.6 and NFPA 241.
  
- C. Pre-demolition Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to building demolition including, but not limited to, the following:
  - 1. Inspect and discuss condition of construction to be demolished.
  - 2. Review structural load limitations of existing structures.
  - 3. Review and finalize demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
  - 4. Review and finalize protection requirements.
  - 5. Review procedures for dust control.
  - 6. Review procedures for protection of adjacent buildings.
  - 7. Review items to be salvaged and returned to OWNER.

1.7 PROJECT CONDITIONS

- A. Buildings immediately adjacent to demolition area will be occupied. Conduct demolition and debris-removal operations so operations of occupied buildings will not be disrupted.

**SECTION 024116  
STRUCTURE DEMOLITION**

1. Provide not less than 72 hours' notice of activities that will affect operations of adjacent occupied buildings.
2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings.
  - a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.

1.7 PROJECT CONDITIONS

- A. Buildings immediately adjacent to demolition area will be occupied. Conduct demolition and debris-removal operations so operations of occupied buildings will not be disrupted.
  3. Provide not less than 72 hours' notice of activities that will affect operations of adjacent occupied buildings.
  4. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings.
    - a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.
- B. OWNER assumes no responsibility for buildings and structures to be demolished.
  1. Conditions existing at time of inspection for bidding purpose will be maintained by OWNER as far as practical.
- C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
  1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and OWNER. Hazardous materials will be removed by OWNER under a separate contract.
- D. On-site storage or sale of removed items or materials is not permitted.

1.8 COORDINATION

- A. Arrange demolition schedule so as not to interfere with operations of adjacent occupied buildings.

**PART 2 - PRODUCTS (Not Used)**

2.1 SOIL MATERIALS

- A. Satisfactory Soils: Comply with requirements in Division 31 Section "Earth Moving."

**SECTION 024116  
STRUCTURE DEMOLITION**

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting demolition operations.
- B. Review Project Record Documents of existing construction provided by OWNER. OWNER does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

3.2 PREPARATION

- A. Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities serving structures to be demolished.
  - 1. OWNER will arrange to shut off indicated utilities when requested by CONTRACTOR.
  - 2. Arrange to shut off indicated utilities with utility companies.
  - 3. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
- B. Existing Utilities: Refer to Divisions 26 Sections for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.
- C. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
  - 1. Strengthen or add new supports when required during progress of demolition.
- D. Salvaged Items: Comply with the following:
  - 1. Clean salvaged items of dirt and demolition debris.
  - 2. Pack or crate items after cleaning. Identify contents of containers.
  - 3. Store items in a secure area until delivery to OWNER.
  - 4. Transport items to storage area indicated on Drawings.
  - 5. Protect items from damage during transport and storage.

3.3 PROTECTION

- A. Existing Facilities: Protect adjacent walkways, building entries, and other building facilities during demolition operations. Restrict access to and from building within direct work area.
- B. Existing Utilities: Maintain utility services to remain and protect from damage during demolition operations.

**SECTION 024116  
STRUCTURE DEMOLITION**

1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by OWNER and authorities having jurisdiction.
  2. Provide temporary services during interruptions to existing utilities, as acceptable to OWNER and authorities having jurisdiction.
    - a. Provide at least 72 hours' notice to occupants of affected buildings if shutdown of service is required during changeover.
- C. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated.
1. Protect adjacent buildings and facilities from damage due to demolition activities.
  2. Protect existing site improvements, appurtenances, and landscaping to remain.
  3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
  4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  5. Provide protection to ensure safe passage of people around demolition area.
  6. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
  7. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings.
- D. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

3.4 DEMOLITION, GENERAL

- A. General: Demolish indicated existing structures and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
  2. Maintain fire watch during and for at least 1 hour after flame cutting operations.
  3. Maintain adequate ventilation when using cutting torches.
  4. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- B. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from OWNER and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

**SECTION 024116  
STRUCTURE DEMOLITION**

- 2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- C. Explosives: Use of explosives is not permitted.

**3.5 DEMOLITION BY MECHANICAL MEANS**

- A. Proceed with demolition of structural members systematically, from higher to lower level. Complete demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- B. Salvage: Items to be salvaged are indicated on Drawings.
- C. Below-Grade Construction: Demolish foundation walls and other below-grade construction that are within footprint of new construction and extending 5 feet outside footprint indicated for new construction. Abandon below-grade construction outside this area.
  - 1. Remove below-grade construction, including foundation walls and footings, in its entirety to not affect new construction.
- D. Existing Utilities: Remove existing utilities. as indicated on drawings.

**3.6 SITE RESTORATION**

- A. Below-Grade Areas: Rough grade below-grade areas ready for further excavation or new construction.
- B. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations with satisfactory soil materials according to backfill requirements in Division 31 Section "Earth Moving."
- C. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.
- D. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

**3.7 REPAIRS**

- A. Promptly repair damage to adjacent buildings caused by demolition operations.

**3.8 DISPOSAL OF DEMOLISHED MATERIALS**

- A. Remove demolition waste materials from Project site.

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STRUCTURE DEMOLITION**

- B. Remove demolition waste materials from Project site and legally dispose of them in an EPA-approved landfill acceptable to authorities having jurisdiction.
  - 1. Do not allow demolished materials to accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- C. Do not burn demolished materials.

3.9 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing before demolition operations began.

**END OF SECTION 024116**

**SECTION 033000  
CAST-IN-PLACE CONCRETE**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
  - 1. Footings.
  - 2. Foundation walls.
  - 3. Slabs-on-grade.
  - 4. Site stairs
- B. Related Sections include the following:
  - 1. Division 31 Section "Earth Moving" for drainage fill under slabs-on-grade.
  - 2. Division 32 Section "Concrete Paving" for concrete pavement and walks.
  - 3. Division 33 Section "Common Work Results for Utilities".

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 SUBMITTALS

- A. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, joint systems, curing compounds, vapor retarder, protective coating, sealer, integral coloring admixture, fiber reinforcement, and others if requested.
- B. Concrete Mix Design: Submit proposed design mixes for each different type and strength of concrete to be used. Provide separate mix designs for any change in ingredients. Include the following items:
  - 1. Mix proportions for all ingredients of the mix. Designate within the submittal where each mix is proposed to be used. Proportions shall be established by one of the following methods in accordance with ACI 301.
    - a. Field experience.
    - b. Trial batch
    - c. Water/cement ratios specified in this section.



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2. Cement type.
  3. Aggregate gradations taken within 3 months from the date of submission. Specify size of coarse aggregate in accordance with ASTM size numbers.
  4. Provide data for all proprietary items incorporated into the mix including, but not limited to admixtures.
  5. Compressive strength results from an independent testing laboratory for mixes designed in accordance with trial batch or field experience methods.
    - a. Trial batches shall be tested within 12 months from the date of submission.
    - b. Submit quantity of tests in accordance with ACI 301. Note that mix designs developed in accordance with the field experience method must include a minimum of 30 consecutive tests, with an allowance for 10 to 30 consecutive tests with a higher average strength required.
    - c. Slump and air content shall be consistent with specifications for this project within tolerances specified within ACI 301.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
1. Provide elevation view drawings for each wall.
- D. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
1. Aggregates
- E. Material Certificates: For each of the following, signed by manufacturers:
1. Cementitious materials.
  2. Admixtures.
  3. Form materials and form-release agents.
  4. Steel reinforcement and accessories.
  5. Bonding agents.
  6. Adhesives.
  7. Semirigid joint filler.
  8. Joint-filler strips.
  9. Repair materials.
- F. Field quality-control test and inspection reports.
- G. Manufacturer Certification: Submit verification of the certification of the concrete supplier for compliance with Manufacturer's Certification as specified under "Quality Assurance"
- H. Minutes of preinstallation conference.

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CAST-IN-PLACE CONCRETE**

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
  - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Testing Agency Qualifications: If the trial batch method is used to design concrete mixes, testing shall be performed by an independent agency, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
  - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
  - 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
- E. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code- Reinforcing Steel."
- F. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
  - 1. ACI 301, "Specification for Structural Concrete,"
  - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
  - 3. ACI 318, "Building Code Requirements for Structural Concrete."
  - 4. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice."
- G. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."
  - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
    - a. CONTRACTOR's superintendent.
    - b. Independent testing agency responsible for concrete design mixtures.
    - c. Ready-mix concrete manufacturer.

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- d. Concrete SUBCONTRACTOR.
  - e. Testing agency responsible for field quality control.
  - f. Structural Engineer of Record.
2. Review inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, anchor rod and anchorage device installation tolerances, steel reinforcement installation, concrete repair procedures, and concrete protection.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

2.2 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
  - 1. Plywood, metal, or other approved panel materials.
  - 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
    - a. High-density overlay, Class 1 or better.
    - b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
    - c. Structural 1, B-B or better; mill oiled and edge sealed.
    - d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 1/2 by 1/2 inch minimum.
- D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

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- E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
  - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
  - 1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
  - 2. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.

**2.3 STEEL REINFORCEMENT**

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
- C. Plain-Steel Wire: ASTM A 82, [as drawn] [galvanized].
- D. Deformed-Steel Wire: ASTM A 496.
- E. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.
- F. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.

**2.4 REINFORCEMENT ACCESSORIES**

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars, cut bars true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
  - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

**2.5 CONCRETE MATERIALS**

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

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1. Portland Cement: ASTM C 150, Type I/II gray. Supplement with the following:
  - a. Fly Ash: ASTM C 618, Class C
  - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source .
  1. Maximum Coarse-Aggregate Size: Comply with the size limits of ACI 301.
  2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M and potable

**2.6 ADMIXTURES**

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
  2. Retarding Admixture: ASTM C 494/C 494M, Type B.
  3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
  4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
  5. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- C. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.
- D. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

**2.7 VAPOR RETARDERS**

- A. Plastic Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.
- B. Plastic Vapor Retarder: ASTM E 1745, Class B. Include manufacturer's recommended adhesive or pressure-sensitive tape.

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- C. Bituminous Vapor Retarder: 110-mil- (2.8-mm-) thick, semiflexible, 7-ply sheet membrane consisting of reinforced core and carrier sheet with fortified asphalt layers, protective weathercoating, and removable plastic release liner. Furnish manufacturer's accessories including bonding asphalt, pointing mastics, and self-adhering joint tape.
- D. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, 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.
- E. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a 3/8-inch (9.5-mm) sieve, 10 to 30 percent passing a No. 100 (0.15-mm) sieve, and at least 5 percent passing No. 200 (0.075-mm) sieve; complying with deleterious substance limits of ASTM C 33 for fine.

2.8 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

2.9 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips:
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements.

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2.10 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
  - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
  - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
  - 4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.
  
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
  - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
  - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
  - 4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.11 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture, field test data, or default water-cement ratio given below, according to ACI 301.
  - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
  
- B. When acceptable data is not available for either field experience or trial batch design methods, provide normal weight concrete with the following properties:
  - 1. 5000 psi 28-day compressive strength; water-cement ratio, 0.44 maximum (non-air entrained), 0.35 maximum (air-entrained).
  
- C. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
  - 1. Fly Ash: 25 percent.
  - 2. Combined Fly Ash and Pozzolan: 25 percent.
  - 3. Ground Granulated Blast-Furnace Slag: 50 percent.
  - 4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.

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5. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
  6. Combined Fly Ash or Pozzolans, Ground Granulated Blast-Furnace Slag, and Silica Fume: 50 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- E. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
  2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
  4. Use high range water-reducing admixture in 5000 psi, air entrained concrete, unless otherwise approved in mix designs prepared by trial batch or field experience methods.
  5. Use air entraining admixture in perimeter foundations, exterior slabs, and other locations where concrete will be exposed to freeze-thaw cycles.
  6. Use corrosion-inhibiting admixture in concrete mixtures where indicated.
- F. Air Content: Add air-entraining admixture to concrete exposed to freeze-thaw conditions at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows within a tolerance of plus or minus 1.5 percent, unless otherwise indicated:
1. Air Content: 6 percent for 3/4-inch- (19-mm-) nominal maximum aggregate size.
- G. Do not air entrain normal-weight concrete to trowel-finished interior floors and suspended slabs. Do not allow entrapped air content to exceed 3 percent.

2.12 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings: Proportion normal-weight concrete mixture as follows:
1. as noted on drawings.
- B. Foundation Walls: Proportion normal-weight concrete mixture as follows:
1. as noted on drawings.
- C. Slabs-on-Grade, Suspended slabs, and Stair treads: Proportion normal-weight concrete mixture as follows:
1. as noted on drawings.

2.13 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."



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2.14 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M[ and ASTM C 1116], and furnish batch ticket information. Clearly indicate on the batch ticket the time the cement is added to the mix.
  - 1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
  - 2. Mixing time will be measured from the time the cement is added to the mix.

**PART 3 - EXECUTION**

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
  - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
  - 1. Install keyways, reglets, recesses, and the like, for easy removal.
  - 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.

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- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

**3.2 EMBEDDED ITEMS**

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
    - a. Secure anchor rods to templates before concrete placement. Do not force anchor rods into concrete after it has begun to set.
  - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
  - 3. Install dovetail anchor slots in concrete structures as indicated.
  - 4. Install angles and other metal fabrications with integral embedments in accordance with approved shop drawings. Secure to formwork prior to concrete placement.

**3.3 REMOVING AND REUSING FORMS**

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 36 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
  - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
  - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

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- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 SHORES AND RESHORES

- A. Comply with ACI 318 (ACI 318M) and ACI 301 for design, installation, and removal of shoring and reshoring.
- B. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
  - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.
  - 1. Support welded wire fabric on chairs or other approved methods. The use of lifting hooks to set the position of welded wire fabric is prohibited.
  - 2. The maximum spacing between welded wire fabric supports shall be 3'-0".

3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
  - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
  - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete. Width of keys shall be equal to 1/3 of the member thickness unless otherwise noted.

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3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
  4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
  5. Space vertical joints in walls as indicated on typical details on the drawings. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
    - a. Control joints may be substituted for construction joints unless otherwise noted.
  6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
  2. Sawed Joints: Form contraction joints with early entry power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks. Sawcuts must be made within 4 hours of concrete placement.
  3. Contraction joints may be used interchangeably with construction joints at the CONTRACTOR's option.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
  2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
  3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
  4. At isolation joints surrounding steel columns, omit joint filler strips. Break bond with an approved material and tool edges to permit installation of joint sealant.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.7 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

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- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
  - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Maintain a minimum of 2 working vibrators on the jobsite during each concrete placement.
- E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
  - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
  - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
  - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 2. Maintain reinforcement in position on chairs during concrete placement.
  - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 4. Slope surfaces uniformly to drains where required.
  - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- G. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  - 1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
  - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
  - 4. The use of high early strength concrete, if approved, will reduce heating time to 3 days.

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5. Protection of Footings against Freezing: Cover completed work at footing level with sufficient temporary or permanent cover as required to protect footings and adjacent subgrade against possibility of freezing; maintain cover for time period as necessary.
  
- H. Hot-Weather Placement: Comply with ACI 301 and as follows:
  1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is CONTRACTOR's option.
  2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.8 FINISHING FORMED SURFACES

- A. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  1. Apply to concrete surfaces exposed to public view, and to be covered with a coating or covering material applied directly to concrete.
  
- B. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
  1. Smooth-Rubbed Finish: Not later than one day after form removal, 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.
  2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
  3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.
  
- C. 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.

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3.9 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
  - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Engineer before application.

3.10 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

3.11 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

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- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
  2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
    - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project..
  3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
  4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.12 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
  1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.13 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.



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- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension in solid concrete, but not less than 1 inch (25 mm) in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
  3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  2. After concrete has cured at least 14 days, correct high areas by grinding.
  3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
  4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
  5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
  6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
  7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place

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patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

**3.14 FIELD QUALITY CONTROL**

- A. Testing and Inspecting: OWNER may engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
  - 1. Steel reinforcement placement.
  - 2. Anchor rods and studs.
  - 3. Verification of use of required design mixture.
  - 4. Concrete placement, including conveying and depositing.
  - 5. Curing procedures and maintenance of curing temperature.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
  - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
  - 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  - 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
    - a. Test concrete mixture for air content of all concrete mixtures, whether specified as "air entrained" or "non-air entrained."
  - 4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
  - 5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  - 6. Compression Test Specimens: ASTM C 31/C 31M.
    - a. Cast and laboratory cure one set of four standard cylinder specimens for each composite sample.
  - 7. Compressive-Strength Tests: ASTM C 39/C 39M; test one laboratory-cured specimen at 7 days two specimens at 28 days. Retain the fourth specimen for testing at 56 days in the event that the 28-day strength tests do not attain the specified strength.
    - a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

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8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, CONTRACTOR shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
10. Test results shall be reported in writing to Architect, concrete manufacturer, and CONTRACTOR within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
13. Additional testing and inspecting, at CONTRACTOR'S expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

**END OF SECTION 033000**

**SECTION 055213  
PIPE AND TUBE RAILINGS**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
  - 1. Steel pipe and tube railings.

1.3 PERFORMANCE REQUIREMENTS

- A. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
  - 1. Steel: 72 percent of minimum yield strength.

- B. Structural Performance: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

- 1. Handrails:
  - a. Uniform load of 50 lbf/ ft. applied in any direction.
  - b. Concentrated load of 200 lbf applied in any direction.
  - c. Uniform and concentrated loads need not be assumed to act concurrently.

- C. Regulatory Requirements: Comply with the Americans with Disabilities Act (ADA) and with code provisions as adopted by authorities having jurisdiction.

- 1. Handrails: Provide handrails as required by accessibility regulations and requirements of authorities having jurisdiction. These include, but are not limited to, the following:
  - a. Size and Spacing of Handrails:
    - 1) Handrail Diameter: 1-1/4 to 2 inches.
    - 2) Either round ends of handrails or return ends of handrails smoothly to floor, wall or post.
    - 3) Handrails shall not rotate within their fittings.
  - b. Locations of Handrails:
    - 1) Provide handrails at both sides of stairs.
    - 2) Provide continuous inside handrail on switchback or dogleg stairs.
    - 3) Provide continuous handrails on both sides of the stair. When handrails are not continuous, extend handrails at least 12 inches beyond the top riser and at least the width of one tread beyond the bottom riser. At the top, the extension shall be parallel with the floor or ground surface. At the bottom,

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continue the handrail to slope for a distance of the width of one tread from the bottom riser.

- 4) Mount the top of handrail gripping surface between 34 and 38 inches above stair nosing or ramp surface.
- c. Structural Strength of Handrails: Refer to article in this section “Performance Requirements”.
2. Notify Engineer of details or specifications not conforming to code.
- D. Thermal Movements: Provide exterior railings that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- E. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.4 SUBMITTALS

- A. Product Data: For the following:
1. Manufacturer's product lines of mechanically connected railings.
  2. Grout and anchoring cement.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Samples for Initial Selection: For products involving selection of color, texture, or design.
- D. Samples for Verification: For each type of exposed finish required.
1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
  2. Fittings and brackets.
  3. Assembled Sample of railing system, made from full-size components, including top rail, post, handrail, and infill. Sample need not be full height.
    - a. Show method of connecting members at intersections.
- E. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.
- F. Welding certificates.
- G. Qualification Data: For professional engineer testing agency.

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- H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of railing through one source from a single manufacturer.
- B. Welding: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1, "Structural Welding Code--Steel."

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.
  - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating railings without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
  - 2. Provide allowance for trimming and fitting at site.

1.7 COORDINATION AND SCHEDULING

- A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

**PART 2 - PRODUCTS**

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Steel Pipe and Tube Railings:
    - a. Pisor Industries, Inc.
    - b. Sharpe Products.
    - c. Wagner, R & B, Inc.; a division of the Wagner Companies.

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PIPE AND TUBE RAILINGS**

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.

2.3 STEEL AND IRON

- A. Tubing: ASTM A 500 (cold formed) or ASTM A 513, Type 5 (mandrel drawn).
- B. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
  - 1. Provide galvanized finish for exterior installations and where indicated.
- C. Plates, Shapes, and Bars: ASTM A 36/A 36M.
- D. Castings: Either gray or malleable iron, unless otherwise indicated.
  - 1. Gray Iron: ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.
  - 2. Malleable Iron: ASTM A 47/A 47M.

2.4 FASTENERS

- A. General: Provide the following:
  - 1. Steel Railings: Plated steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Anchors: Provide cast-in-place anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.
  - 1. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

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- C. Shop Primer for Galvanized Steel: Zinc-dust, zinc-oxide primer formulated for priming zinc-coated steel and for compatibility with finish paint systems indicated, and complying with SSPC-Paint 5.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

2.6 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with welded connections, unless otherwise indicated.
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove flux immediately.
  - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- I. Form changes in direction as follows:
  - 1. As detailed.
- J. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- K. Close exposed ends of railing members with prefabricated end fittings.
- L. Fittings, and Anchors: Provide miscellaneous fittings, and anchors to interconnect railing members to other work, unless otherwise indicated.



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- M. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- N. For railing posts set in concrete, provide steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with steel plate forming bottom closure.

2.7 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.8 STEEL AND IRON FINISHES

- A. Galvanized Railings:
  - 1. Hot-dip galvanize steel and iron railings, including hardware, after fabrication.
  - 2. Comply with ASTM A 123/A 123M for hot-dip galvanized railings.
  - 3. Comply with ASTM A 153/A 153M for hot-dip galvanized hardware.
- B. Fill vent and drain holes that will be exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
- C. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.
- D. Preparation for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic-phosphate process.
- E. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed railings:
  - 1. Exterior Railings (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- F. Apply shop primer to prepared surfaces of railings, unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.

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1. Do not apply primer to galvanized surfaces.
2. Stripe paint corners, crevices, bolts, welds, and sharp edges.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
  1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
  2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
  3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- C. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

- A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in Part 2 "Fabrication" Article whether welding is performed in the shop or in the field.
- B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to 1 side, and locate joint within 6 inches of post.

3.4 ANCHORING POSTS

- A. Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink,

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nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.

- B. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.
- C. Cover anchorage joint with flange of same metal as post, attached to post with set screws.
- D. Leave anchorage joint exposed; wipe off surplus anchoring material; and leave 1/8-inch buildup, sloped away from post.
- E. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
  - 1. For steel pipe railings, weld flanges to post and bolt to metal supporting surfaces.
- F. Install removable railing sections, where indicated, in slip-fit metal sockets cast in concrete.

**3.5 ANCHORING RAILING ENDS**

- A. Anchor railing ends to concrete and masonry with round flanges connected to railing ends and anchored to wall construction with anchors and bolts.

**3.6 ADJUSTING AND CLEANING**

- A. Clean aluminum and stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.
- B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

**3.7 PROTECTION**

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

**END OF SECTION 055213**

**SECTION 260543**  
**UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL**  
**SYSTEMS**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Metal conduits and fittings, including GRC and PVC-coated steel conduit.
  - 2. Flexible nonmetallic duct.
  - 3. Duct accessories.

1.3 DEFINITIONS

- A. Direct Buried: Duct or a duct bank that is buried in the ground, without any additional casing materials such as concrete.
- B. Duct: A single duct or multiple ducts. Duct may be either installed singly or as component of a duct bank.
- C. Duct Bank:
  - 1. Two or more ducts installed in parallel, with or without additional casing materials.
  - 2. Multiple duct banks.
- D. GRC: Galvanized rigid (steel) conduit.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include duct, conduits, and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
  - 2. Include underground-line warning tape.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: For duct. Show duct coordination with other utilities and underground structures.
  - 1. Drawings shall be signed and sealed by a qualified professional engineer.
- B. Source quality-control reports.
- C. Field quality-control reports.

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1.6 MAINTENANCE MATERIALS SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.

1.8 FIELD CONDITIONS

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by OWNER or others unless permitted under the following conditions, and then only after arranging to provide temporary electrical service according to requirements indicated:
  - 1. Notify OWNER no fewer than two days in advance of proposed interruption of electrical service.
  - 2. Do not proceed with interruption of electrical service without OWNER'S written permission.

**PART 2 - PRODUCTS**

2.1 METAL CONDUIT AND FITTINGS

- A. GRC: Comply with ANSI C80.1 and UL 6.
- B. Coated Steel Conduit: PVC-coated GRC.
  - 1. Comply with NEMA RN 1.
  - 2. Coating Thickness: 0.040 inch, minimum.
- C. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.

2.2 FLEXIBLE NONMETALLIC DUCTS

- A. HDPE Duct: Type EPEC-40 HDPE, complying with NEMA TC 7 and UL 651A.
  - 1. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.

2.3 DUCT ACCESSORIES

- A. Duct Spacers: Factory-fabricated, rigid, PVC interlocking spacers; sized for type and size of duct with which used, and selected to provide minimum duct spacing indicated while supporting duct during concreting or backfilling.

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- B. Underground-Line Warning Tape: Comply with requirements for underground-line warning tape specified in Section 330500 "Common Work Results for Utilities."

**PART 3 - EXECUTION**

3.1 PREPARATION

- A. Coordinate layout and installation of duct, with final arrangement of other utilities, site grading, and surface features as determined in the field. Notify Engineer if there is a conflict between areas of excavation and existing structures.
- B. Coordinate elevations of duct with final locations, as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations as required to suit field conditions and to ensure that duct and duct bank will drain to manholes and handholes, and as approved by Architect.
- C. Clear and grub vegetation to be removed, and protect vegetation to remain according to Section 311000 "Site Clearing." Remove and stockpile topsoil for reapplication according to Section 311000 "Site Clearing."

3.2 UNDERGROUND DUCT APPLICATION

- A. Duct for Electrical Feeders 600 V and Less: Type EPC-40-PVC RNC, direct-buried unless otherwise indicated.
- B. Duct for Electrical Branch Circuits: Type EPC-40-PVC RNC, direct-buried unless otherwise indicated.

3.3 EARTHWORK

- A. Excavation and Backfill: Comply with Section 312000 "Earth Moving," but do not use heavy-duty, hydraulic-operated, compaction equipment.
- B. Restoration: Replace area immediately after backfilling is completed.
- C. Restore surface features at areas disturbed by excavation, and re-establish original grades unless otherwise indicated. Replace removed sod immediately after backfilling is completed.
- D. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, and mulching. Comply with Section 329200 "Turf and Grasses" and Section 329300 "Plants."

3.4 DUCT INSTALLATION

- A. Where indicated on Drawings, install duct, spacers, and accessories shown.
- B. Install duct according to NEMA TCB 2.
- C. Slope: Pitch duct a minimum slope of 1:300 away from buildings and equipment.

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- D. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 48 inches, both horizontally and vertically, at other locations unless otherwise indicated.
  - 1. Duct shall have maximum of two 90 degree bends or the total of all bends shall be no more 180 degrees between pull points.
- E. Joints: Use solvent-cemented joints in duct and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent duct do not lie in same plane.
- F. Installation Adjacent to High-Temperature Steam Lines: Where duct is installed parallel to underground steam lines, perform calculations showing the duct will not be subject to environmental temperatures above 40 deg C. Where environmental temperatures are calculated to rise above 40 deg C, and anywhere the duct crosses above an underground steam line, install insulation blankets listed for direct burial to isolate the duct bank from the steam line.
- G. Sealing: Provide temporary closure at terminations of duct with pulled cables. Seal spare duct at terminations. Use sealing compound and plugs to withstand at least 15-psig hydrostatic pressure.
- H. Pulling Cord: Install 200-lbf-test nylon cord in empty ducts.
- I. Direct-Buried Duct:
  - 1. Excavate trench bottom to provide firm and uniform support for duct. Comply with requirements in Section 312000 "Earth Moving" for preparation of trench bottoms for pipes less than 6 inches in nominal diameter.
  - 2. Width: Excavate trench 3 inches wider than duct on each side.
  - 3. Depth: Install top of duct at least 30 inches below finished grade unless otherwise indicated.
  - 4. Set elevation of bottom of duct below frost line.
  - 5. Support ducts on duct spacers coordinated with duct size, duct spacing, and outdoor temperature.
  - 6. Spacer Installation: Place spacers close enough to prevent sagging and deforming of duct, with not less than four spacers per 20 feet of duct. Place spacers within 24 inches of duct ends. Stagger spacers approximately 6 inches between tiers. Secure spacers to earth and to ducts to prevent floating during concreting. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
  - 7. Elbows: Install manufactured duct elbows for stub-ups and at changes of direction in duct direction unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
  - 8. Install manufactured GRC elbows for stub-ups and at changes of direction in duct.
  - 9. After installing first tier of duct, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand place backfill to 4 inches over duct and hand tamp. Firmly tamp backfill around ducts to provide maximum supporting strength. Use hand

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tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction. Comply with requirements in Section 312000 "Earth Moving" for installation of backfill materials.

- a. Place minimum 3 inches of sand as a bed for duct. Place sand to a minimum of 6 inches above top level of duct.

**3.5 FIELD QUALITY CONTROL**

- A. Perform the following tests and inspections:
  1. Demonstrate capability and compliance with requirements on completion of installation of underground duct, duct bank, and utility structures.
  2. Pull solid aluminum or wood test mandrel through duct to prove joint integrity and adequate bend radii, and test for out-of-round duct. Provide a minimum 12-inch-long mandrel equal to duct size minus 1/4 inch. If obstructions are indicated, remove obstructions and retest.
- B. Correct deficiencies and retest as specified above to demonstrate compliance.
- C. Prepare test and inspection reports.

**3.6 CLEANING**

- A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of duct until duct cleaner indicates that duct is clear of dirt and debris. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.

**END OF SECTION 260543**



**SECTION 311000  
SITE CLEARING**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Protecting existing vegetation to remain.
  - 2. Removing existing vegetation.
  - 3. Clearing and grubbing.
  - 4. Stripping and stockpiling topsoil.
  - 5. Stripping and stockpiling rock.
  - 6. Removing above- and below-grade site improvements.
  - 7. Disconnecting, capping or sealing, and removing site utilities.
  - 8. Temporary erosion and sedimentation control.
- B. Related Requirements:
  - 1. Section 015000 "Temporary Facilities and Controls" for temporary erosion- and sedimentation-control measures.

1.3 DEFINITIONS

- A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow.
- D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.
- E. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings.
- F. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

## **SECTION 311000 SITE CLEARING**

### 1.5 MATERIAL OWNERSHIP

- A. Except for materials indicated to be stockpiled or otherwise remain OWNER's property, cleared materials shall become CONTRACTOR's property and shall be removed from Project site.

### 1.6 INFORMATIONAL SUBMITTALS

- A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
  - 1. Use sufficiently detailed photographs or video recordings.
  - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plant designated to remain.
- B. Topsoil stripping and stockpiling program.
- C. Rock stockpiling program.
- D. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

### 1.7 QUALITY ASSURANCE

- A. Topsoil Stripping and Stockpiling Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work. Include dimensioned diagrams for placement and protection of stockpiles.
- B. Rock Stockpiling Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work. Include dimensioned diagrams for placement and protection of stockpiles.

### 1.8 FIELD 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 OWNER and authorities having jurisdiction.
  - 2. Provide alternate routes around closed or obstructed trafficways if required by OWNER or authorities having jurisdiction.
- B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on OWNER's premises where indicated.
- C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

**SECTION 311000  
SITE CLEARING**

- D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.
- E. Tree- and Plant-Protection Zones: Protect according to requirements in Section 015639 "Temporary Tree and Plant Protection."
- F. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist.
- G. **PART 2 - PRODUCTS**
  - 2.1 MATERIALS
    - A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."
      - 1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

**PART 3 - EXECUTION**

- 3.1 PREPARATION
  - A. Protect and maintain benchmarks and survey control points from disturbance during construction.
  - B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed according to requirements in Section 015639 "Temporary Tree and Plant Protection."
  - C. Protect existing site improvements to remain from damage during construction.
    - 1. Restore damaged improvements to their original condition, as acceptable to OWNER.
- 3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL
  - A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
  - B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
  - C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
  - D. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

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SITE CLEARING**

3.3 TREE AND PLANT PROTECTION

- A. Protect trees and plants remaining on-site according to requirements in Section 015639 "Temporary Tree and Plant Protection."
- B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.4 EXISTING UTILITIES

- A. OWNER will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by CONTRACTOR.
  - 1. Verify that utilities have been disconnected and capped before proceeding with site clearing.
- B. Locate, identify, disconnect, and seal or cap utilities indicated to be removed.
  - 1. Arrange with utility companies to shut off indicated utilities.
  - 2. OWNER will arrange to shut off indicated utilities when requested by CONTRACTOR.
- C. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by OWNER or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  - 1. Notify OWNER not less than two days in advance of proposed utility interruptions.
  - 2. Do not proceed with utility interruptions without Engineer's written permission.
- D. Excavate for and remove underground utilities indicated to be removed.
- E. Removal of underground utilities is included in earthwork sections; in applicable electrical, communications, electronic safety and security, and utilities sections; and in Section 024116 "Structure Demolition" and Section 024119 "Selective Demolition."

3.5 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
  - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
  - 2. Grind down stumps and remove roots larger than 3 inches in diameter, obstructions, and debris to a depth of 18 inches below exposed subgrade.
  - 3. Use only hand methods or air spade for grubbing within protection zones.
  - 4. Chip removed tree branches and dispose of off-site.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
  - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.

**SECTION 311000  
SITE CLEARING**

- B. Strip topsoil to depth of 6 inches in a manner to prevent intermingling with underlying subsoil or other waste materials.
  - 1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
  - 1. Limit height of topsoil stockpiles to 72 inches.
  - 2. Do not stockpile topsoil within protection zones.
  - 3. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.
  - 4. Stockpile surplus topsoil to allow for respreading deeper topsoil.

**3.7 STOCKPILING ROCK**

- A. Remove from area indicated on Drawings
  - 1. Separate or wash off non-rock materials from rocks, including soil, clay lumps, gravel, and other objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
- B. Stockpile rock where indicated on Drawings without intermixing with other materials. Cover to prevent windblown debris from accumulating among rocks.
  - 1. Limit height of rock stockpiles to 36 inches.
  - 2. Do not stockpile rock within protection zones.

**3.8 SITE IMPROVEMENTS**

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.
- B. Remove concrete stairs, slabs, brick, and aggregate base as indicated.
  - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing brick walkway to remain before removing adjacent existing brick walkway. Saw-cut faces vertically.

**3.9 DISPOSAL OF SURPLUS AND WASTE MATERIALS**

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off OWNER'S property.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

**END OF SECTION 311000**

**SECTION 312000  
EARTH MOVING**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for slabs-on-grade walks turf and grasses and plants.
3. Excavating and backfilling for structures.
4. Subbase course for concrete.
5. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. Related Requirements:

1. Section 311000 "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
2. Section 315000 "Excavation Support and Protection" for shoring, bracing, and sheet piling of excavations.
3. Section 329200 "Turf and Grasses" for finish grading in turf and grass areas, including preparing and placing planting soil for turf areas.
4. Section 329300 "Plants" for finish grading in planting areas and tree and shrub pit excavation and planting.

1.3 UNIT PRICES

- A. Work of this Section is affected by unit prices for earth moving specified in Section 012200 "Unit Prices."
- B. Quantity allowances for earth moving are included in Section 012100 "Allowances."
- C. Rock Measurement: Volume of rock actually removed, measured in original position, but not to exceed the following. Unit prices for rock excavation include replacement with approved materials.
  1. 24 inches outside of concrete forms other than at footings.
  2. 12 inches outside of concrete forms at footings.
  3. 6 inches outside of minimum required dimensions of concrete cast against grade.
  4. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
  5. 6 inches beneath bottom of concrete slabs-on-grade.
  6. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

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1.4 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength 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: Aggregate layer placed between the subbase course and hot-mix asphalt paving.
- C. Bedding Course: Aggregate layer 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. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
  - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
  - 2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
  - 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.
- G. Fill: Soil materials used to raise existing grades.
- H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock-excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:
  - 1. Equipment for Footing, Trench, and Pit Excavation: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch-maximum-width, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,700 lbf and stick-crowd force of not less than 18,400 lbf with extra-long reach boom.
  - 2. Equipment for Bulk Excavation: Late-model, track-mounted loader; rated at not less than 230-hp flywheel power and developing a minimum of 47,992-lbf breakout force with a general-purpose bare bucket.
- I. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4 cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by a geotechnical testing agency, according to ASTM D1586.
- J. Structures: Footings, foundations, retaining walls, slabs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

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- K. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- L. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- M. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

**1.5 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct pre-excavation conference at Project site.
  - 1. Review methods and procedures related to earthmoving, including, but not limited to, the following:
    - a. Personnel and equipment needed to make progress and avoid delays.
    - b. Coordination of Work with utility locator service.
    - c. Coordination of Work and equipment movement with the locations of tree- and plant-protection zones.
    - d. Extent of trenching by hand or with air spade.
    - e. Field quality control.

**1.6 ACTION SUBMITTALS**

- A. Product Data: For each type of the following manufactured products required:
  - 1. Geotextiles.
  - 2. Controlled low-strength material, including design mixture.
  - 3. Warning tapes.
- B. Samples for Verification: For the following products, in sizes indicated below:
  - 1. Geotextile: 12 by 12 inches.
  - 2. Warning Tape: 12 inches long; of each color.

**1.7 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified testing agency.
- B. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:
  - 1. Classification according to ASTM D2487.
  - 2. Laboratory compaction curve according to ASTM D698.
- C. 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 earth-moving operations. Submit before earth moving begins.



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1.8 FIELD CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from OWNER and authorities having jurisdiction.
  - 2. Provide alternate routes around closed or obstructed traffic ways if required by OWNER or authorities having jurisdiction.
- B. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth-moving operations.
- C. Do not commence earth-moving operations until temporary site fencing and erosion- and sedimentation-control measures specified in Section 015000 "Temporary Facilities and Controls" and Section 311000 "Site Clearing" are in place.
- D. Do not commence earth-moving operations until plant-protection measures specified in Section 015639 "Temporary Tree and Plant Protection" are in place.

**PART 2 - PRODUCTS**

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D2487 Groups A-1, A-2-4, A-2-5, and A-3 according to AASHTO M 145, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D2487 Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145, or a combination of these groups.
  - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 90 percent passing a 1 1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 95 percent passing a 1 1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 90 percent passing a 1 1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

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- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- H. Sand: ASTM C33/C33M; fine aggregate.

**GEOTEXTILES**

- A. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
  - 1. Survivability: Class 2; AASHTO M 288.
  - 2. Survivability: As follows:
    - a. Grab Tensile Strength: 247 lbf; ASTM D4632.
    - b. Sewn Seam Strength: 222 lbf; ASTM D4632.
    - c. Tear Strength: 90 lbf; ASTM D4533.
    - d. Puncture Strength: 90 lbf; ASTM D4833.
  - 3. Apparent Opening Size: No. 60 sieve, maximum; ASTM D4751.
  - 4. Permittivity: 0.02 per second, minimum; ASTM D4491.
  - 5. UV Stability: 50 percent after 500 hours' exposure; ASTM D4355.

**2.3 ACCESSORIES**

- A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; 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 PREPARATION**

- A. Protect structures, utilities, sidewalks, walkways, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth-moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

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3.2 DEWATERING

- A. Provide dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.
- B. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- C. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
  - 1. Reroute surface water runoff away from excavated areas. Do not allow water accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
- D. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others.

3.3 EXPLOSIVES

- A. Explosives: Do not use explosives.

EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions.
  - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
- B. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock.
  - 1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; and soil, boulders, and other materials not classified as rock or unauthorized excavation.
    - a. Intermittent drilling; ram hammering; or ripping of material not classified as rock excavation is earth excavation.
  - 2. Rock excavation includes removal and disposal of rock. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction without exceeding the following dimensions:
    - a. 24 inches outside of concrete forms other than at footings.
    - b. 12 inches outside of concrete forms at footings.
    - c. 6 inches outside of minimum required dimensions of concrete cast against grade.
    - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
    - e. 6 inches beneath bottom of concrete slabs-on-grade.
    - f. 6 inches beneath pipe in trenches and the greater of 24 inches wider than pipe or 42 inches wide.

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3.5 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
  - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
  - 2. Pile Foundations: Stop excavations 6 to 12 inches above bottom of pile cap before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.
  
- B. Excavations at Edges of Tree- and Plant-Protection Zones:
  - 1. Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
  - 2. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

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

3.7 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. 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 higher than top of pipe or conduit unless otherwise indicated.
  - 1. Clearance: 12 inches each side of pipe or conduit.
  
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
  - 1. For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
  
- D. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.
  - 1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

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- E. Trenches in Tree- and Plant-Protection Zones:
  - 1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
  - 2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
  - 3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.8 SUBGRADE INSPECTION

- A. Notify Engineer when excavations have reached required subgrade.
- B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.9 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Engineer.
  - 1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Engineer.

3.10 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
  - 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
  - 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, bracing, and sheeting.

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

3.12 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course 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. Backfill voids with satisfactory soil while removing shoring and bracing.
- D. Initial Backfill:
  - 1. Soil Backfill: Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.
    - a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
  - 2. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 12 inches over the pipe or conduit. Coordinate backfilling with utilities testing.
- E. Final Backfill:
  - 1. Soil Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.
  - 2. Controlled Low-Strength Material: Place final backfill of controlled low-strength material to final subgrade elevation.
- F. Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.13 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.
- B. Place and compact fill material in layers to required elevations as follows:
  - 1. Under grass and planted areas, use satisfactory soil material.
  - 2. Under walkways, use satisfactory soil material.
  - 3. Under steps, use engineered fill.
  - 4. Under slabs, use engineered fill.
  - 5. Under footings and foundations, use engineered fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

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3.14 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 percent and is too wet to compact to specified dry unit weight.

3.15 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D698:
  - 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
  - 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
  - 3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
  - 4. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.

3.16 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.
  - 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.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:
  - 1. Turf or Unpaved Areas: Plus or minus 1 inch.
  - 2. Walks: Plus or minus 1 inch.

3.17 FIELD QUALITY CONTROL

- A. Special Inspections: OWNER will engage a qualified special inspector to perform the following special inspections:

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1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
  2. Determine that fill material classification and maximum lift thickness comply with requirements.
  3. Determine, during placement and compaction, that in-place density of compacted fill complies with requirements.
- B. Testing Agency: OWNER will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Engineer.
- E. Testing agency will test compaction of soils in place according to ASTM D1556, ASTM D2167, ASTM D2937, and ASTM D6938, as applicable. Tests will be performed at the following locations and frequencies:
1. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 100 feet or less of wall length but no fewer than two tests.
  2. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length but no fewer than two tests.
- F. 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 materials to depth required; recompact and retest until specified compaction is obtained.

### 3.18 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. 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.
1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.



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3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off OWNER'S property.
- B. Transport surplus satisfactory soil to designated storage areas on OWNER'S property. Stockpile or spread soil as directed by Engineer.
  - 1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off OWNER'S property.

**END OF SECTION 312000**

**SECTION 315000  
EXCAVATION SUPPORT AND PROTECTION**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes temporary excavation support and protection systems.
- B. Related Sections:
  - 1. Division 31 Section “Earth Moving” for excavating and backfilling, for controlling surface-water runoff and ponding, and for dewatering excavations.

1.3 PERFORMANCE REQUIREMENTS

- A. Design, furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed and construction loads.
  - 1. Delegated Design: Design excavation support and protection system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
  - 2. Prevent surface water from entering excavations by grading, dikes, or other means.
  - 3. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.
  - 4. Monitor vibrations, settlements, and movements.

1.4 SUBMITTALS

- A. Delegated-Design Submittal: For excavation support and protection system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review methods and procedures related to excavation support and protection system including, but not limited to, the following:
    - a. Existing utilities and subsurface conditions.
    - b. Proposed excavations.
    - c. Proposed equipment.
    - d. Monitoring of excavation support and protection system.
    - e. Working area location and stability.
    - f. Coordination with waterproofing.
    - g. Abandonment or removal of excavation support and protection system.

**SECTION 315000**  
**EXCAVATION SUPPORT AND PROTECTION**

1.6 PROJECT CONDITIONS

- A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by OWNER or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:
  - 1. Notify OWNER no fewer than three days in advance of proposed interruption of utility.
  - 2. Do not proceed with interruption of utility without OWNER'S written permission.
  
- B. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
  - 1. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Architect if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

**PART 2 - PRODUCTS**

2.1 MATERIALS

- A. General: Provide materials that are either new or in serviceable condition.
- B. Cast-in-Place Concrete: ACI 301, of compressive strength required for application.
- C. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

**PART 3 - EXECUTION**

3.1 PREPARATION

- A. Protect structures, utilities, walkways, sidewalks, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.
  - 1. Support, and protect utilities encountered.

3.2 INSTALLATION – GENERAL

- A. Location excavation support and protection systems clear of the permanent construction, so that construction and finishing of other work is not impeded.
  
- B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from OWNER and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

**SECTION 315000**  
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- C. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.
- D. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.
- E. Install wood lagging within flanges of soldier piles as excavation proceeds.
  - 1. Trim excavation as required to install lagging.
  - 2. Fill voids behind lagging with soil, and compact.
- F. Install wales horizontally at locations indicated on Drawings and secure to soldier piles.

**3.3 REMOVAL AND REPAIRS**

- A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.
  - 1. Remove excavation support and protection systems to a minimum depth of 48 inches below overlaying construction and abandon remainder.
  - 2. Fill voids immediately with approved backfill compacted to density specified in Division 31 Section "Earth Moving."
  - 3. Repair or replace, as approved by Engineer, adjacent work damaged or displaced by removing excavation support and protection systems.
- B. Leave excavation support and protection systems permanently in place.

**END OF SECTION 315000**

**SECTION 329200  
TURF AND GRASSES**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Seeding.
  - 2. Erosion-control materials.

1.3 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- C. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- D. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- E. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.4 SUBMITTALS

- A. Qualification Data: For landscape Installer.
- B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture, stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
- C. Product Certificates: For fertilizers, from manufacturer.

**SECTION 329200  
TURF AND GRASSES**

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful turf establishment.
  - 1. Professional Membership: Installer shall be a member in good standing of either the National Association of Landscape Professionals or AmericanHort.
  - 2. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
  - 3. Personnel Certifications: Installer's personnel assigned to the Work shall have certification in one of the following categories from the National Association of Landscape Professionals:
    - a. Landscape Industry Certified Technician - Exterior.
    - b. Landscape Industry Certified Lawn Care Manager.
    - c. Landscape Industry Certified Lawn Care Technician.
  - 4. Pesticide Applicator: State licensed, commercial.

1.6 DELIVERY, STORAGE, AND HANDLING

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

**PART 2 - PRODUCTS**

2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Rules for Testing Seeds" for purity and germination tolerances.
- B. The seed mixture for turf fields shall consist of seeds proportioned by weight as follows:
  - 1. 45 percent Creeping Red Fescue
  - 2. 25 percent Kentucky Bluegrass
  - 3. 15 percent Chewings Fescue
  - 4. 10 percent Perennial Ryegrass
  - 5. 10 percent Annual Ryegrass
- C. Pure live seed percentage of not less than 90% for each cultivar.

2.2 FERTILIZERS

- A. Fertilizer shall contain available elements in conformity with the standards of the Association of Official Agricultural Chemists. The fertilizer shall indicate the weight, contents and guarantee analysis shown thereon or on a securely attached tag, as applicable.
  - 1. Water soluble fertilizer shall be completely soluble in water and contain the following percentages of available nutrients by weight. It shall contain a coloring agent.
    - a. Nitrogen: 16 percent.
    - b. Phosphoric Acid: 32 percent.
    - c. Potash: 16 percent.

**SECTION 329200  
TURF AND GRASSES**

2.3 MULCHES

- A. Sphagnum Peat Mulch: Partially decomposed sphagnum peat moss, finely divided or of granular texture, and with a pH range of 3.4 to 4.8.
- B. Muck Peat Mulch: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent, and containing no sand.
- C. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

2.4 PESTICIDES

- A. General: Pesticide, registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.
  - 1. Verify that no foreign or deleterious material or hazardous liquid has been deposited in soil within a planting area.
  - 2. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
  - 3. Uniformly moisten excessively dry soil that is not workable or which is dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2 PREPARATION

- A. Protect structures; utilities; sidewalks; pavements; and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
  - 1. Protect adjacent and adjoining areas from hydroseeding and hydro-mulching overspray.
  - 2. Protect grade stakes set by others until directed to remove them.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

**SECTION 329200  
TURF AND GRASSES**

3.3 TURF AREA PREPARATION

- A. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- B. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 SEEDING

- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 10 mph.
  - 1. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
  - 2. Do not use wet seed or seed that is moldy or otherwise damaged.
  - 3. Do not seed against existing trees.
- B. Sow seed at a total rate of 5 to 8 lb/1000 sq. ft..

3.5 TURF RENOVATION

- A. Renovate existing turf where indicated.
- B. Renovate turf damaged by CONTRACTOR's operations, such as storage of materials or equipment and movement of vehicles.

3.6 TURF MAINTENANCE

- A. General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and re-mulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
- B. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than one-third of grass height. Remove no more than one-third of grass-leaf growth in initial or subsequent mowing.
- C. Turf Postfertilization: Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with OWNER's operations and others in proximity to the Work. Notify OWNER before each application is performed.

3.7 SATISFACTORY TURF

- A. Turf installations shall meet the following criteria as determined by Architect:
  - 1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.



**SECTION 329200  
TURF AND GRASSES**

- B. Use specified materials to reestablish turf that does not comply with requirements, and continue maintenance until turf is satisfactory.

3.8 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.
- C. Remove nondegradable erosion-control measures after grass establishment period.

**END OF SECTION 329200**

**SECTION 329300  
PLANTS**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Plants.
  - 2. Planting soils.
- B. Related Sections:
  - 1. Division 31 Section "Site Clearing" for protection of existing trees and plantings, topsoil stripping and stockpiling, and site clearing.
  - 2. Division 31 Section "Earth Moving" for excavation, filling, and rough grading and for subsurface aggregate drainage and drainage backfill materials.
  - 3. Division 32 Section "Turf and Grasses" for turf (lawn) and meadow planting, hydroseeding, and erosion-control materials.

1.3 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.
- C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required.
- D. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for type and size of plant required.
- E. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.
- F. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.
- G. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.

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- H. Finish Grade: Elevation of finished surface of planting soil.
- I. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- J. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- K. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- L. Planting Area: Areas to be planted.
- M. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- N. Plant; Plants; Plant Material: These terms refer to vegetation in general, including shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- O. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- P. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- Q. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

**1.4 SUBMITTALS**

- A. Certification:
  - 1. For information only, submit 2 copies of certificates of inspection as required by governmental authorities, and manufacturer's or vendor's analysis for soil amendments and fertilizer materials. Submit other data substantiating that the materials comply with specified requirements.
  - 2. Submit seed vendor's certified statement for each grass seed mixture required, stating botanical and common name, percentage by weight, and percentages of purity, germination, and weed seed for each grass seed species.

**1.5 QUALITY ASSURANCE**

- A. Source Quality Control:
  - 1. General: Ship landscape materials with certificates of inspection as required by governmental authorities. Comply with governing regulations applicable to landscape materials.

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2. Analysis and Standards: Package standard products with manufacturer's certified analysis. For other materials, provide analysis and approval by a Maine Certified Landscape Professional (207-225-3998).
3. Topsoil: Before delivery of topsoil, furnish written statement giving location of properties from which topsoil is to be obtained.
4. Plant Material:
  - a. Plant materials shall mean shrubs, ground covers, and plants of all descriptions, required to be furnished for the project and shall conform to all provisions of ANSI Z60.1.
  - b. Substitutions: In the event that shrubs or other plant material specified in the plant list are in the opinion of the CONTRACTOR, impossible or unreasonably difficult to obtain, the CONTRACTOR shall immediately notify the OWNER's Representative to discuss appropriate substitutions. No substitutions of plant material may be made without the prior approval of the OWNER's Representative. When authorized, adjustment of Contract amount will be made.
5. Inspection: The OWNER's Representative reserves the right to inspect any plant materials either at the place of growth or at the site before planting, for compliance with requirements for name, variety, size, quality and health.
6. All Work of planting shall be done by a proficient landscape CONTRACTOR with five years minimum experience.
7. The plant supplier/nursery shall be ALCA certified.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- A. 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 if applicable. Protect materials from deterioration during delivery, and while stored at the site.
- B. Plant Materials:
  1. In preparing plants for moving, all precautions customary in good trade practice shall be taken. All plants shall be dug immediately before moving unless otherwise specified. Broken, loose, or manufactured balls will be rejected.
  2. All plants shall be packed, transported, and handled with utmost care to insure adequate protection against injury and drying. Do not bend or bind-tie shrubs in such manner as to damage bark, break branches or destroy natural shape. Provide protective covering during delivery.
  3. Deliver plant materials after preparations for planting have been completed and plant immediately. If planting is delayed more than 6 hours after delivery, set all plants in shade, protect from weather and mechanical damage, and keep roots moist.
  4. Label all plant materials of each variety with a securely attached waterproof tag bearing legible designation of botanical and common name.

**1.7 PROJECT CONDITIONS**

- A. Field Measurements: CONTRACTOR to verify actual grade elevations, service and utility locations, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

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- B. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by OWNER or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:
  - 1. Notify Dig Safe 72 hours prior to any excavation.
  - 2. Hand excavate, as required, to minimize possibility of damage to underground utilities.
- C. Planting and Seeding Seasons: Unless variance is requested in writing and approved by the OWNER'S Representative, planting and seeding shall be done within the following dates:
  - 1. Lawns: April 1 - September 15.
  - 2. Plant Materials:
    - a. Potted and Container Spring: April 1 - July 15.
    - b. Grown Plants Fall: Aug. 15 - Nov. 15.
  - 3. Balled and Burlapped Spring: April 1 - June 15.
  - 4. Plants Fall: Aug. 15 - Oct. 15.
- D. Coordination with Turf Areas (Lawns): Plant shrubs and other plants after finish grades are established and before planting turf areas unless otherwise indicated.
  - 1. When planting shrubs and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

**PART 2 - PRODUCTS**

2.1 TOPSOIL

- A. Loam or approved topsoil removed within the confines of the project area shall be reused in accordance with Section 312000, Earthwork. If quantity of stockpiled topsoil is insufficient, provide new topsoil which is fertile, friable, natural loam, surface soil, reasonably free of subsoil, clay lumps, brush, weeds and other litter, and free of roots, stumps, stones larger than 2 in. in any dimension, and other extraneous or toxic matter harmful to plant growth. Sand, silt, and clay contents comprising existing or new topsoil shall fall within the following ranges:
  - 1. Sand 50% - 70%
  - 2. Silt 2% - 40%
  - 3. Clay 10% - 28%
- B. Submit representative soil samples of new topsoil from off-site sources as well as existing topsoil removed from within confines of site to qualified soil testing laboratory to ascertain what amendments may be necessary to obtain proper tilth, nutrient characteristics, and pH balance in accordance with the following. Provide amendments as necessary at rates indicated on the soil test.
  - 1. Organic Matter: greater than 5% organic matter (by weight).
  - 2. pH Range: 5.8 to 6.2.
  - 3. Phosphorus/Potassium: medium to medium high range.
  - 4. Soluble Salt: not greater than 500 ppm.

2.2 MULCHES

- A. Planting Bed Mulch: Provide shredded bark mulch for planting beds. Do not use material that is decayed or mixed with soil, weeds or other foreign matter. Use material that is large enough in size to prevent it from drifting and blowing in normal wind storms. Submit samples to OWNER'S Representative for approval prior to delivery of bark mulch to site.

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- B. Anti-Erosion Mulch: Use "Erosionet" or similar mulch where slopes are too severe to be maintained by planting bed mulch alone.
- C. Mulch Binder: Material for mulch binder may be emulsified asphalt of a type acceptable to the OWNER'S Representative and may be diluted with water to assure even distribution. Other types of approved mulch binders may be used when authorized by the OWNER'S Representative.

2.3 MISCELLANEOUS PRODUCTS

- A. Wood Pressure-Preservative Treatment: AWPA C2, with waterborne preservative for soil and freshwater use, acceptable to authorities having jurisdiction, and containing no arsenic; including ammoniacal copper arsenate, ammoniacal copper zinc arsenate, and chromated copper arsenate.
- B. Anti-Desiccant: Emulsion type, film-forming agent or Wilt-Pruf by Nursery Specialty Products, Inc., designed to permit transpiration but retard excessive loss of moisture from plants. Deliver in manufacturer's fully identified containers and mix in accordance with manufacturer's instructions.
- C. Water: Water used for landscape work shall be free from oil, acids, alkalis, salts, or other substances harmful to plants.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.
  - 1. Verify that no foreign or deleterious material or hazardous liquid has been deposited in soil within a planting area.
  - 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
  - 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
  - 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

## SECTION 329300 PLANTS

### 3.2 PREPARATION

- A. Layout individual shrub locations for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Landscape Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.
- B. Lay out plants at locations directed by Landscape Architect. Stake locations of shrubs and outline areas for multiple plantings.
- C. Apply antidesiccant to shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.
  - 1. If deciduous shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again two weeks after planting.
- D. Wrap shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.
- E. Preparation of Planting Soil: Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful or toxic to plant growth. Mix specified soil amendments with topsoil at the rates specified. Unless otherwise specified or indicated on the Drawings, the following planting soil mixture (thoroughly mixed by volume) shall be used for backfill around shrubs: dehydrated processed manure 1 part; topsoil 8 parts; peat moss 3 parts.

### 3.3 PLANTING AREA ESTABLISHMENT

- A. Preparation of Planting Beds: Loosen subgrade of planting bed areas to a minimum depth of 6 in. using a cultimulcher or similar equipment. Remove stones over 1 1/2 in. in any dimension, and sticks, stones, rubbish and other extraneous matter. Spread planting soil mixture to the 6" minimum depth and as required to meet lines, grades and elevations shown, after light rolling and natural settlement.
- B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.
- C. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

### 3.4 EXCAVATION FOR SHRUBS

- A. Excavate pits in accordance with Typical Planting Details with vertical sides and with bottom of excavation slightly raised at center to provide proper drainage. Loosen hard subsoil in bottom of excavation. For balled and burlapped (B&B) shrubs, make excavations at least twice as wide as the ball diameter and a minimum of 1 ft. 6 in. wider than root spread.

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3.5 SHRUB PLANTING

- A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.
- B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Set balled and burlapped stock plumb and in center of planting pit or trench with root flare 2 inches above adjacent finish grades.
  - 1. Use planting soil for backfill.
  - 2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
  - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
  - 4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
  - 5. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. Set container-grown stock plumb and in center of planting pit or trench with root flare 2 inches above adjacent finish grades.
  - 1. Use planting soil for backfill.
  - 2. Carefully remove root ball from container without damaging root ball or plant.
  - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
  - 4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
  - 5. Continue backfilling process. Water again after placing and tamping final layer of soil.
- E. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.
- F. Dish completed planting pits to form shallow (4") saucer to collect water. Mulch pits, trenches and planted areas with at least 4 in. thickness of shredded bark or equivalent substitute approved by OWNER's Representative.
- G. Apply anti-desiccant using power spray to provide an adequate film over trunks, branches, stems, twigs, and foliage. If deciduous shrubs are moved in full-leaf, spray with anti-desiccant at nursery before moving and again 2 weeks after planting.



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- H. Prune, thin out and shape shrubs in accordance with standard horticultural practice. Remove dead, broken, or diseased branches. Prune shrubs to retain natural character and accomplish their use in the landscape design. Pruning cuts shall be made to outside the branch color or branch bark ridge; tree paint is not permitted. Required shrub sizes are the size after pruning. Remove and replace excessively pruned or misformed stock resulting from improper pruning.
- I. Plant labels shall be removed immediately after acceptance by Landscape Architect.

**3.6 FERTILIZING SHRUBS**

- A. Water Soluble Fertilizer:
  - 1. The first liquid feeding will be permitted as the first watering only during backfilling of the plant, unless otherwise directed by the OWNER's Representative. All seedlings will be liquid fed during planting. The second liquid feeding will be made the following spring season, no later than June 30th.
  - 2. Liquid fertilizer shall be completely dissolved and mixed in water at the rate of 6 lbs. of the fertilizer concentrate to 100 gallons of water.
  - 3. The resulting solution shall be poured in the plant pit as directed by the OWNER's Representative. A second application at the same rate shall be applied as directed by the OWNER's Representative. The solution shall be applied at the following rates for each application:
    - a. Plants up to 2 ft. in height shall receive 4 quarts.
    - b. Plants above 2 ft. and up to 6 ft. shall receive 6 quarts.
    - c. Plants above 6 ft. and up to 12 ft. shall receive 12 quarts.
    - d. Plants above 12 ft. shall receive 16 quarts.
- B. Slow Release Fertilizer Packets:
  - 1. All woody plants except evergreen seedlings shall be fertilized with slow release fertilizer packets at the time of planting, unless otherwise directed by the OWNER's Representative. Fertilizer packets shall be placed equidistantly within the planting pit adjacent to the ball or root mass, but not in direct contact with roots. Placement depth shall be 6 to 8 inches. Packets shall not be cut, ripped or damaged.
  - 2. If it becomes necessary to remove and replace dead or unhealthy plants, damaged or broken packets shall be replaced with new packets. The application rates shall be as follows:

Type of Plants	No. of Packets
Shrubs	
Under 2 ft. height or spread	1
2 ft. to 3 ft. height or spread	2
Over 3 ft. height or spread	3
Vines and Ground Covers	1

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3.7 GROUND COVER

- A. Set out and space ground cover and plants other than shrubs as shown or scheduled.
- B. Excavate subgrade to a depth of 6 inches for contiguous groundcover area and backfill with planting soil.
- C. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- D. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- E. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.
- F. Mulch areas between ground cover plants; place not less than 4" thick.

3.8 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep shrubs free of insects and disease.
- B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.9 PLANT ACCEPTANCE

- A. The acceptability of the plant material furnished and planted under this Contract shall be at the end of a period of establishment, during which the CONTRACTOR, as necessary, shall employ all possible means to preserve the plants in a healthy and vigorously growing condition and to insure their successful establishment. The establishment period shall extend for a period of one (1) calendar year from the date of final acceptance of the project. During this period, the CONTRACTOR shall water, cultivate and prune the plants, repair guy wires and stakes, mouse bait as may be required and do any other work necessary to maintain the plants in a healthy growing condition. This shall include seasonal spraying with approved insecticides or fungicides as may be required. The CONTRACTOR shall also be responsible for protecting the plants from mice and other rodents. All dead or rejected plants shall be promptly removed from the project and replaced by live healthy plants meeting the same specifications, if such plants are declared unacceptable during this planting season. Otherwise, they shall be replaced during the next subsequent planting season. No payment shall be made for unsatisfactory work during the establishment period.

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PLANTS**

- B. The period of establishment shall commence at the date of final acceptance. Necessary replacements shall be made so that at the time of final acceptance all plants shall be in a healthy, vigorous growing condition and free from sizable die-back.
- C. It shall be the sole responsibility of the CONTRACTOR to replace any unsatisfactory plants on the project regardless of whether they are specifically designated by the OWNER's Representative. In the case of individual doubtful plants, the CONTRACTOR may call upon the OWNER's Representative to make a determination as to their acceptability, but it shall not be incumbent on the OWNER's Representative to furnish the CONTRACTOR with exact lists of replacements.
- D. All replacements of plants shall be completed by the end of the planting season prior to the final acceptance date. Any small quantity of plants which fail between the end of the planting season and the final acceptance date shall be canceled from the list of accepted plants and the CONTRACTOR will receive no payment for them. If a sizable number fails, the OWNER's Representative may extend the date of final acceptance to the subsequent planting season, in which case, the CONTRACTOR will be subject to liquidated damages, to be established by the OWNER's Representative. All replacement planting shall conform in every way to the requirements of the original planting. The OWNER's Representative may require that any replacement plants that are not dormant, or that are planted late in the season, be sprayed, as directed, with an approved anti-desiccant.

3.10 CLEANUP AND PROTECTION

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.
- B. Protect plants from damage due to landscape operations and operations of other CONTRACTORS and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

3.11 RESTORATION

- A. All pavements, seeded and planted areas, structures and substructures not specifically provided for in the contract disturbed by the CONTRACTOR during the execution of the work shall be restored by the CONTRACTOR, in a manner satisfactory to the OWNER's Representative, to their original conditions at no additional cost to the OWNER.

**END OF SECTION 329300**

**SECTION 330500  
COMMON WORK RESULTS FOR UTILITIES**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
  - 1. Piping joining materials.
  - 2. Sleeves.
  - 3. Identification devices.
  - 4. Grout.
  - 5. Flowable fill.
  - 6. Piped utility demolition.
  - 7. Piping system common requirements.
  - 8. Equipment installation common requirements.
  - 9. Concrete bases.
  - 10. Metal supports and anchorages.

1.3 DEFINITIONS

- A. Exposed Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions.
- B. Concealed Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
  - 1. Identification devices.

1.5 QUALITY ASSURANCE

- A. Comply with ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

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COMMON WORK RESULTS FOR UTILITIES**

1.7 COORDINATION

- A. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- B. Coordinate installation of identifying devices after completing covering and painting if devices are applied to surfaces.
- C. Coordinate size and location of concrete bases. Formwork, reinforcement, and concrete requirements are specified in Section 033000 "Cast-in-Place Concrete."

**PART 2 - PRODUCTS**

2.1 PIPING JOINING MATERIALS

- A. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.2 SLEEVES

- A. Steel Pipe Sleeves: ASTM A53/A53M, Type E, Grade B, Schedule 40, galvanized, plain ends.
- B. PVC Pipe Sleeves: ASTM D1785, Schedule 40.

2.3 IDENTIFICATION DEVICES

- A. General: Products specified are for applications referenced in other utilities Sections. If more than single type is specified for listed applications, selection is Installer's option.
- B. Equipment Nameplates: Metal permanently fastened to equipment with data engraved or stamped.
  - 1. Data: Manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and essential data.
  - 2. Location: Accessible and visible.
- C. Stencils: Standard stencils prepared with letter sizes complying with recommendations in ASME A13.1. Minimum letter height is 1-1/4 inches for ducts, and 3/4 inch for access door signs and similar operational instructions.
  - 1. Material: Fiberboard.
  - 2. Stencil Paint: Exterior, oil-based, alkyd-gloss black enamel, unless otherwise indicated. Paint may be in pressurized spray-can form.
  - 3. Identification Paint: Exterior, oil-based, alkyd enamel in colors according to ASME A13.1, unless otherwise indicated.
- D. Lettering: Manufacturer's standard preprinted captions as selected by Engineer.

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- E. Lettering: Use piping system terms indicated and abbreviate only as necessary for each application length.
  - 1. Arrows: Either integrally with piping system service lettering to accommodate both directions of flow, or as separate unit on each pipe marker to indicate direction of flow.
  
- F. Plastic Tape: Manufacturer's standard color-coded, pressure-sensitive, self-adhesive vinyl tape, at least 3 mils thick.
  - 1. Width: 1-1/2 inches on pipes with OD, including insulation, less than 6 inches
  - 2. Color: Comply with ASME A13.1, unless otherwise indicated.
  
- G. Plasticized Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with mat finish suitable for writing.
  - 1. Size: 3-1/4 by 5-5/8 inches.
  - 2. Fasteners: Brass grommets and wire.
  - 3. Nomenclature: Large-size primary caption such as DANGER, CAUTION, or DO NOT OPERATE.
  
- H. Lettering and Graphics: Coordinate names, abbreviations, and other designations used in piped utility identification with corresponding designations indicated. Use numbers, letters, and terms indicated for proper identification, operation, and maintenance of piped utility systems and equipment.
  - 1. Multiple Systems: Identify individual system number and service if multiple systems of same name are indicated.

2.4 GROUT

- A. Description: ASTM C1107, Grade B, non-shrink and nonmetallic, dry hydraulic-cement grout.
  - 1. Characteristics: Post hardening, volume adjusting, non-staining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
  - 2. Design Mix: 5000-psi, 28-day compressive strength.
  - 3. Packaging: Premixed and factory packaged.

2.5 FLOWABLE FILL

- A. Description: Low-strength-concrete, flowable-slurry mix.
  - 1. Cement: ASTM C150, Type I, portland.
  - 2. Density: 115- to 145-lb/cu. ft..
  - 3. Aggregates: ASTM C33, natural sand, fine and crushed gravel or stone, coarse.
  - 4. Aggregates: ASTM C33, natural sand, fine.
  - 5. Admixture: ASTM C618, fly-ash mineral.
  - 6. Water: Comply with ASTM C94/C94M.
  - 7. Strength: 100 to 200 psig at 28 days.

**SECTION 330500  
COMMON WORK RESULTS FOR UTILITIES**

**PART 3 - EXECUTION**

**3.1 PIPED UTILITY DEMOLITION**

- A. Refer to Section 024119 "Selective Demolition" for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove piped utility systems, equipment, and components indicated to be removed.
  - 1. Piping to Be Removed: Remove portion of piping as indicated on the Drawings.
  - 2. Equipment to Be Removed: Disconnect and cap services and remove equipment.
  - 3. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make operational.
  - 4. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to OWNER.
- C. If pipe equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.
  - 1. Cut sleeves to length for mounting flush with both surfaces.
- D. Verify final equipment locations for roughing-in.
- E. Refer to equipment specifications in other Sections for roughing-in requirements.

**3.2 PIPING CONNECTIONS**

- A. Make connections according to the following, unless otherwise indicated:
  - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.

**3.3 EQUIPMENT INSTALLATION**

- A. Install equipment level and plumb, unless otherwise indicated.
- B. Install equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference with other installations. Extend grease fittings to an accessible location.

**3.4 IDENTIFICATION**

- A. Piping Systems: Install pipe markers on each system. Include arrows showing normal direction of flow.
  - 1. Stenciled Markers: According to ASME A13.1.
  - 2. Plastic markers, with application systems. Install on insulation segment if required for hot noninsulated piping.

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3. Locate pipe markers on exposed piping according to the following:
  - a. Near each branch, excluding short takeoffs for equipment and terminal units.  
Mark each pipe at branch if flow pattern is not obvious.
  - b. Near locations where pipes pass through walls or floors or enter inaccessible enclosures.
  - c. Near major equipment items and other points of origination and termination.
- B. Adjusting: Relocate identifying devices that become visually blocked by work of this or other Divisions.

**3.5 CONCRETE BASES**

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
  1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
  2. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  3. Install anchor bolts to elevations required for proper attachment to supported equipment.
  4. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
  5. Use 4,000 psi, 28-day compressive-strength concrete and reinforcement as specified in Section 033000 "Cast-in-Place Concrete."

**3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGES**

- A. Refer to Section 055213 "Pipe and Tube Railings".
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor piped utility materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

**3.7 GROUTING**

- A. Mix and install grout for equipment base bearing surfaces and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

**END OF SECTION 330500**