2024 CEMETERY EXPANSION
SOUTHERN MAINE VETERANS' CEMETERY

Bid Documents

Springvale, Maine

Owner:
State of Maine
Department of Defense
Veterans and Emergency Management
Bureau of Maine Veterans' Services
117 State House Station
Augusta, Maine 04333

Prepared by:

WALSH
ENGINEERING ASSOCIATES, INC.

Walsh Engineering Associates, Inc.
One Karen Drive, Suite 2A
Westbrook, Maine 04092

July 12, 2024

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Southern Maine Veterans' Cemetery, Springvale, Maine
ISSUED FOR BIDDING
July 12, 2024

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Notice to Contractors

BGS Project: 3743

2024 Cemetery Expansion Southern
Maine Veterans' Cemetery
83 Stanley Road, Springvale, Maine

Bid Base to include; Excavation and backfill for installation of four columbarium niche walls in Area F with 840 niches, sidewalks, stormwater and landscaping and preparation of Area B for cremains plots including all earthwork, irrigation system, and landscaping.

The cost of the work is approximately $1,118,000. The contract shall designate the Substantial Completion Date on or before *May 2, 2025*, and the Contract Final Completion Date on or before *May 16, 2025*.

1. Submit bids on a completed Contractor Bid Form (section 00 41 13) provided in the Bid Documents, include bid security when required, and scan each item as an attachment to an email addressed to: BGS.Architect@Maine.gov, so as to be received no later than **2:00:00 p.m.** on ***August 23, 2024***. The email subject line shall be marked "**Bid for *2024 Cemetery Expansion, Southern Maine Veterans' Cemetery***".

   Bid submissions will be opened and read aloud at the time and date noted above at the Bureau of General Services office, accessible as a video conference call. Those who wish to participate in the call must submit a request for access to BGS.Architect@Maine.gov.

   Any bid received after the noted time will not be considered a valid bid and will remain unopened. Any bid submitted by any other means will not be considered a valid bid. In certain circumstances, the Bureau of General Services may require the Bidder to surrender a valid paper copy of the bid form or the bid security document. The Owner reserves the right to accept or reject any or all bids as may best serve the interest of the Owner.

2. Questions and comments on the *bid opening process* shall be addressed to: Joseph H. Ostwald, Director, Division of Planning, Design & Construction, Bureau of General Services, 77 State House Station, Augusta, Maine 04333-0077, BGS.Architect@Maine.gov.

3. Questions and comments regarding the *project* design specifications or drawings shall be directed in writing to the Consultant during the bid period prior to the question and comment deadline of 5:00 p.m. on *August 16, 2024*.

   Walsh Engineering Associates
   Norman G. Chamberlain II, PE
   norm@walsh-eng.com

4. ☒ Bid security is required on this project.
   The Bidder shall include a satisfactory Bid Bond (section 00 43 13) or a certified or cashier's check for 5% of the bid amount with the completed bid form submitted to the Owner. The Bid Bond form is available on the BGS website.
   or
   ☐ Bid security is <u>not</u> required on this project.

00 11 13
Notice to Contractors

5. ☒ Performance and Payment Bonds are required on this project.
If noted above as required, or if any combination of Base Bid and Alternate Bids amounts selected in the award of the contract exceeds $125,000.00, the selected Contractor shall furnish a 100% contract Performance Bond (section 00 61 13.13) and a 100% contract Payment Bond (section 00 61 13.16) in the contract amount to cover the execution of the Work. Bond forms are available on the BGS website.
or
☐ Performance and Payment Bonds are not required on this project.

6. Filed Sub-bids *are not required* on this project.

7. ☐ Pre-qualified General Contractors are utilized on this project.
insert the company name, city and state for each
or
☒ Pre-qualified General Contractors are not utilized on this project.

8. ☒ An on-site pre-bid conference (☐ *mandatory* or ☒ *optional*) will be conducted for this project. The pre-bid conference is intended for General Contractors. Subcontractors and suppliers are welcome to attend. Contractors who arrive late or leave early for a mandatory meeting may be prohibited from participating in this meeting and bidding.

10:00 AM, July 31, 2024
Southern Maine Verterans' Cemetery,
83 Stanley Road, Springvale, Maine

or
☐ An on-site pre-bid conference will not be conducted for this project.

9. Bid Documents - full sets only - will be available on or about *July 12, 2024* and may be obtained *via email* from:

Walsh Engineering Associates
1 Karen Drive, Suite 2A
Westbrook ME 04092
(207) 553-9898, jody@walsh-eng.com

10. Bid Documents may be examined at:

AGC Maine
188 Whitten Road
Augusta, ME 04330
Phone 207-622-4741 Fax 207-622-1625

Construction Summary
734 Chestnut Street
Manchester, NH 03104
Phone 603-627-8856 Fax 603-627-4524

00 21 13
Instructions to Bidders

1. Bidder Requirements

1.1 A bidder is a Contractor which is evidently qualified, or has been specifically pre-qualified by the Bureau of General Services, to bid on the proposed project described in the Bid Documents.

1.2 Contractors and Subcontractors bidding on projects that utilize Filed Sub-bids shall follow the requirements outlined in these Bid Documents for such projects. See Section 00 22 13 for additional information.

1.3 Contractors and Subcontractors are not eligible to bid on the project when their access to project design documents prior to the bid period distribution of documents creates an unfair bidding advantage. Prohibited access includes consultation with the Owner or with design professionals engaged by the Owner regarding cost estimating, constructability review, or project scheduling. This prohibition to bid applies to open, competitive bidding or pre-qualified contractor bidding or Filed Sub-bidding. The Bureau may require additional information to determine if the activities of a Contractor constitute an unfair bidding advantage.

1.4 Each bidder is responsible for becoming thoroughly familiar with the Bid Documents prior to submitting a bid. The failure of a bidder to review evident site conditions, to attend available pre-bid conferences, or to receive, examine, or act on addenda to the Bid Documents shall not relieve that bidder from any obligation with respect to their bid or the execution of the work as a Contractor.

1.5 Prior to the award of the contract, General Contractor bidders or Filed Sub-bidders may be required to provide documented evidence to the Owner or the Bureau showing compliance with the provisions of this section, their business experience, financial capability, or performance on previous projects.

1.6 The selected General Contractor bidder will be required to provide proof of insurance before a contract can be executed.

1.7 Contracts developed from this bid shall not be assigned, sublet or transferred without the written consent of the Owner.

1.8 By submitting a bid the Contractor attests that it has not been declared ineligible to bid on State of Maine projects. The Director of the Bureau of General Services may disallow award of this contract to any Contractor if there is evidence that the Contractor or any of its Subcontractors, through their own fault, have been terminated, suspended for cause, debarred from bidding, agreed to refrain from bidding as part of a settlement, have defaulted on a contract, or had a contract completed by another party.

1.9 The Contractor attests that it is not presently indicted for or otherwise criminally or civilly charged by a Federal, State or local government entity with commission of any of the following offenses and has not within a three-year period preceding this bid been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction, or contract under a public transaction, violation of Federal or State anti-trust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.

1.10 The Contractor shall not make any award or permit any award (subgrant or contract) at any tier to any party which is debarred or suspended or is otherwise excluded from or ineligible for participation in Federal assistance programs or State of Maine projects.

2. Authority of Owner

2.1 The Owner reserves the right to accept or reject any or all bids as may best serve the interest of the Owner.

2.2 Subject to the Owner's stated right to accept or reject any or all bids, the Contractor shall be selected on the basis of the lowest dollar value of an acceptable Base Bid, or any combination of Base Bid plus Alternate Bids, as well as other limited cost modifications the Owner determines may best serve the interests of the Owner. An acceptable bid is a duly submitted bid from a responsive and responsible bidder.

2.3 The Owner reserves the right to require Bid Bonds or Performance and Payment Bonds for any project of any contract value.

3. Submitting Bids and Bid Requirements

3.1 Each bid shall be submitted on the forms provided in the Bid Documents.

3.2 Each bid shall be valid for a period of thirty calendar days following the Project bid closing date and time. The bid expiration date may be extended in unusual circumstances by mutual consent of the Bidder and the Owner. The bid amount shall not be modified due to the bid expiration date extension.

3.3 Any provision contained in a bid which shows cost escalation, or any modification of schedule or other requirements shall not be accepted. Such a provision causes the bid to be invalid, or, at the discretion of the Owner and BGS, that element of the bid submission may be disregarded for the purpose of awarding the contract without that provision.

3.4 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. The form of bond is shown in section 00 43 13.

3.5 Bidders recognize that inclusion of contract bonds and the cost of those bonds is dependent on the awarded contract dollar value. Therefore, a Base Bid, or any combination of Base Bid plus Alternate Bids, as well as other limited cost modifications, resulting in a contract award shall include the cost of Performance and Payment Bonds in the submitted bid amount when the construction contract value is over $125,000.00. Similarly, the cost of Performance and Payment Bonds is excluded in the submitted bid amount when the construction contract value is $125,000.00 or less unless bonds are specifically required by the Bid Documents. When required for the project, the selected Contractor shall provide these bonds before a contract can be executed, pursuant to 14 M.R.S.A., Section 871, Public Works Contractors' Surety Bond Law of 1971, subsection 3. The form of bonds is shown in section 00 61 13.13 and 00 61 13.16.

3.6 Bidders may modify bids in writing, by the same means as the original bid submission, prior to the bid closing time. Such written amendments shall not disclose the amount of the initial bid. If so disclosed, the entire bid is considered invalid.

3.7 Bidders implicitly acknowledge all Addenda issued when they submit the bid form. By usual practice the Consultant shall not issue Addenda less than 72 hours prior to the bid closing time, to allow ample time for bidders to incorporate the information. However, some information, such as extending the bid due date and time, may be issued with shorter notice. Addenda shall be issued to all companies who are registered holders of Bid Documents.

3.8 A bid may be withdrawn without penalty if a written request by the bidder is presented to the Owner prior to the bid closing time. Such written withdrawal requests are subject to verification as required by the Bureau.

A bid may be withdrawn without penalty after the bid closing time if, in the determination of the Bureau, evidence provided by the Contractor shows an apparent unintended error such as a miscalculation, or an erroneous number on estimating documents, was the cause of an inaccurate bid. The Bureau may allow withdrawal in consideration of the bid bond or, without utilizing a bid bond, if the Bureau considers documented evidence provided by the Contractor shows factual errors had been made on the bid form.

3.9 In the event State of Maine Offices unexpectedly close on the published date of a public bid opening in the location of that bid opening, prior to the time of the scheduled deadline, the new deadline for the public bid opening will be the following business day at the originally scheduled hour of the day, at the original location. Official closings are posted on the State of Maine government website.

3.10 The Owner may require, in a Notice of Intent to Award letter to the apparent low bidder, a Schedule of Values, Project Schedule, and List of Subcontractors and Suppliers as both a demonstration of capability of the Bidder and as a condition of award.

3.11 Projects which require a State of Maine wage determination will include that schedule as part of the Bid Documents. See section 00 73 46, if such rates are required.

3.12 Projects which require compliance with the Davis-Bacon Act are subject to the regulations contained the Code for Federal Regulations and the federal wage determination which is made a part of the Bid Documents. See section 00 73 46, if such rates are required.

3.13 The Owner is exempt from the payment of Maine State sales and use taxes as provided in 36 M.R.S. §1760 (1). The Contractor and Subcontractors shall not include taxes on exempt items in the construction contract.

00 41 13
Contractor Bid Form

2024 Cemetery Expansion

Southern Maine Veteran's Cemetery
Springvale, Maine

Bid Form submitted by: *email to only email address below*

Bid Administrator:
BGS.Architect@Maine.gov Bureau of General Services
111 Sewall Street, Cross State Office Building, 4th floor
77 State House Station
Augusta, Maine 04333-0077

Bidder:

Signature: _____

Printed name and title: _____

Company name: _____

Mailing address: _____

City, state, zip code: _____

Phone number: _____

Email address: _____

State of incorporation, if a corporation: _____

List of all partners, if a partnership: _____

The Bidder agrees, if the Owner offers to award the contract, to provide any and all bonds and certificates of insurance, as well as Schedule of Values, Project Schedule, and List of Subcontractors and Suppliers if required by the Owner, and to sign the designated Construction Contract within twelve calendar days after the date of notification of such acceptance, except if the twelfth day falls on a State of Maine government holiday or other closure day, or a Saturday, or a Sunday, in which case the aforementioned documents must be received before 12:00 noon on the first available business day following the holiday, other closure day, Saturday, or Sunday.

As a guarantee thereof, the Bidder submits, together with this bid, a bid bond or other acceptable instrument as and if required by the Bid Documents.

00 41 13
Contractor Bid Form

1. The Bidder, having carefully examined the *2024 Cemetery Expansion* Project Manual dated *July 12, 2024*, prepared by *Walsh Engineering Associates*, as well as Specifications, Drawings, and any Addenda, the form of contract, and the premises and conditions relating to the work, proposes to furnish all labor, equipment and materials necessary for and reasonably incidental to the construction and completion of this project for the **Base Bid** amount of:

   $ _____ .00

2. Allowances *are included* on this project.
   Bid amount above includes the following Allowances

   1 Rock Removal at Bid Unit Price per cubic yard: $ _____ .00

   2 30 mil HDPE liner for soil filter Bid Lump Sum Price: $ _____ .00

3. Alternate Bids are included on this project and are shown below
   Any dollar amount line below that is left blank by the Bidder shall be read as a bid of **$0.00**.

   1 Alternate 1: Area F Future Foundations $ _____ .00

   2 Alternate 2: Area F Concrete Sidewalks $ _____ .00

   3 Alternate 3: Gettysburg Plaque $ _____ .00

4. Bid security *is required* on this project.
   If noted above as required, or if the Base Bid amount exceeds $125,000.00, the Bidder shall include with this bid form a satisfactory Bid Bond (section 00 43 13) or a certified or cashier's check for 5% of the bid amount with this completed bid form submitted to the Owner.

5. Filed Sub-bids *are not required* on this project.
   If noted above as required, the Bidder shall include with this bid form a list of each Filed Sub-bidder selected by the Bidder on the form provided (section 00 41 13F).

6. The Bidder acknowledges receipt of the following addenda to the specifications and drawings:

   Addendum No. _____ Dated: _____

   Addendum No. _____ Dated: _____

   Addendum No. _____ Dated: _____

   Addendum No. _____ Dated: _____

   Addendum No. _____ Dated: _____

00 43 13
Contractor Bid Bond

Bond No.: **insert bond number**

We, the undersigned, ***insert company name of Contractor***, ***select type of entity*** of ***insert name of municipality*** in the State of ***insert name of state*** as principal, and ***insert name of surety*** as Surety, are hereby held and firmly bound unto ***select title of obligee*** in the penal sum of ***five percent of the bid amount***, 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 ***insert date, i.e.: 8th*** day of ***select month***, ***select year***, which is the same date as that of the first specified bid due date, or subsequent bid due date revised by addendum.

The condition of the above obligation is such that whereas the principal has submitted to the Owner, or State of Maine, to a certain bid, attached hereto and hereby made a part hereof, to enter into a contract in writing, for the construction of ***insert name of project as designated in the contract documents***

Now therefore:

If said bid shall be rejected, or, in the alternate,

If said bid 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 bid, and shall furnish a bond for the 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 bid, 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 Obligee may accept such bid and said Surety does hereby waive notice of any such extension.

[Fillable bond forms may be downloaded from the Bureau of General Services website.]

00 43 13
Contractor Bid Bond

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 ***insert date, i.e.: 8th*** day of ***select month***, ***select year***, which is the same date as that of the first specified bid due date, or subsequent bid due date revised by addendum.

Contractor

_____

(Signature)

insert name and title

insert company name

insert address
insert city state zip code

Surety

_____

(Signature)

insert name and title

insert company name

insert address
insert city state zip code

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

[Fillable bond forms may be downloaded from the Bureau of General Services website.]

OMB NUMBER: 2900-0559
Expiration Date: Oct. 31, 2026
Respondent Burden: 15 minutes

VA | U.S. Department of Veterans Affairs

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION - LOWER TIER COVERED TRANSACTIONS *(Contractor)*

Respondent Burden: Public reporting burden for this collection of information is estimated to average 15 minutes. Statutory authority for a State Cemetery Grant is 38 U.S.C. 2408. The information requested is necessary to ensure that the contractor has not been debarred, suspended or is ineligible to participate in the VA grant process and receive Federal funds. VA may not conduct or sponsor and you are not required to respond to this collection of information unless it displays a valid OMB number. Respond to this collection is voluntary. Send comments regarding this burden estimate or any other aspects of this collection of information, including suggestions for reducing this burden, to OIRA Desk Officer for VA, 725 17th St NW, Washington, DC 20503. SEND COMMENTS ONLY. Please do not send applications for a grant to this address.

AUTHORITY: This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, Title 2 Part 180, Participants' Responsibilities. The regulations were published as Part VII of the May 26, 1988, Federal Register (pages 19160 - 19211). Copies of the regulations may be obtained by contacting the person to whom this proposal is submitted.

CERTIFICATION: The authorized representative certifies, by submission of this form, that neither the representative nor principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

INSTRUCTIONS:

1. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.

2. The certification in this clause is a material representation of act upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

3. The prospective lower tier participant shall provide immediate written notice to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

4. The terms "covered transaction," "participant," "person," "primary covered transaction," "principle," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to whom this proposal is submitted for assistance in obtaining a copy of those regulations.

5. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

6. The prospective lower tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility, and Voluntary Exclusion-Lower Tier Covered Transactions," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

NAME AND ADDRESS OF COMPANY:	PROJECT FAI *(Federal Application Identifier)* NO.
NAME OF LOWER TIER PARTICIPANT	TITLE OF LOWER TIER PARTICIPANT
SIGNATURE OF LOWER TIER PARTICIPANT	DATE SIGNED *(mm/dd/yyyy)*

AdvantageME CT# _____

State of Maine
CONSTRUCTION CONTRACT

Large Construction Project

This form is used when the Contract value is $50,000 or greater.
The Project Manual, Specifications and Drawings, and any Addenda are considered part of this Contract.

Agreement entered into by and between the ***contracting entity name*** hereinafter called the ***Owner*** and ***Contractor company name*** hereinafter called the ***Contractor***.

BGS Project No.: ***3743*** Other Project No.: ***ME-23-24***

For the following Project: ***title of project as shown on bid documents*** at ***facility or campus name***, ***municipality***, Maine.

The Specifications and the Drawings have been prepared by ***Consultant firm name***, acting as Professional-of-Record and named in the documents as the Consultant Architect or Engineer.

The *Owner* and *Contractor* agree as follows:

ARTICLE 1 COMPENSATION AND PAYMENTS

1.1 The Owner shall pay the Contractor to furnish all labor, equipment, materials and incidentals necessary for the construction of the Work described in the Specifications and shown on the Drawings the Contract Amount as shown below.

Base Bid	*$0.00*
Alternate Bid number and name or "no Alternates"	*$0.00*
Alternate Bid number and name or "no Alternates"	*$0.00*
Alternate Bid number and name or "no Alternates"	*$0.00*
Alternate Bid number and name or "no Alternates"	*$0.00*
Alternate Bid number and name or "no Alternates"	*$0.00*
Total Contract Amount	***$0.00***

1.2 The Contractor's requisition shall contain sufficient detail and supporting information for the Owner to evaluate and support the payment requested.

1.2.1 Payments are due and payable twenty-five working days from the date of receipt of a Contractor requisition which is approved by the Owner.

1.2.2 Provisions for late payments are governed by 5 M.R.S. Chapter 144, *Payment of Invoices Received from Business Concerns*, and interest shall be calculated at 1% per month.

ARTICLE 2 COMMENCEMENT AND COMPLETION DATES

2.1 The Work of this Contract shall commence no sooner than the date this document is executed by the approval authority, or a subsequent date designated in the contract documents.

2.2 The Substantial Completion Date shall be _____.

2.3 The Work of this Contract shall be completed on or before the Contract Final Completion Date of _____.

2.4 The Contract Expiration Date shall be _____. (This date is the Owner's deadline for internal management of contract accounts. The Contract Expiration Date does not directly relate to any contract obligation of the Contractor.)

ARTICLE 3 INELIGIBLE BIDDER

3.1 By signing this contract the Contractor attests that it has not been declared ineligible to bid on State of Maine projects. The Bureau of General Services may disallow award of this contract to any Contractor if there is evidence that the Contractor or any of its Subcontractors, through their own fault, have been terminated, suspended for cause, debarred from bidding, agreed to refrain from bidding as part of a settlement, have defaulted on a contract, or had a contract completed by another party.

3.2 By signing this contract the Contractor attests that it is not presently indicted for or otherwise criminally or civilly charged by a Federal, State or local government entity with commission of any of the following offenses and has not within a three-year period preceding this bid been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction, or contract under a public transaction, violation of Federal or State anti-trust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.

3.3 The Contractor shall not make any award or permit any award (subgrant or contract) at any tier to any party which is debarred or suspended or is otherwise excluded from or ineligible for participation in Federal assistance programs or State of Maine projects.

ARTICLE 4 CONTRACTOR'S RESPONSIBILITIES

4.1 On this project, the Contractor ***shall*** furnish the Owner the appropriate contract bonds in the amount of 100% of the Contract Sum. Contract bonds are mandated if the Contract Sum exceeds $125,000, or if bonds are specifically required by the Contract Documents.

4.2 The Contractor shall comply with all laws, codes and regulations applicable to the Work.

4.3 The Contractor shall acquire all permits and third-party approvals applicable to the Work not specifically identified as provided by the Owner. Costs for Contractor-provided permits and third-party approvals shall be included in the Contract Sum identified in Section 1.1 above.

4.4 The Contractor shall remain an independent agent for the duration of this Contract, shall not become an employee of the State of Maine, and shall assure that no State employee will be compensated by, or otherwise benefit from, this Contract.

4.5 The Contractor shall be responsible for any design cost, construction cost, or other cost incurred on the Project to the extent caused by the negligent acts, errors or omissions of the Contractor or their Subcontractors in the performance of Work under this Contract.

ARTICLE 5 OWNER'S RESPONSIBILITIES

5.1 The Owner shall provide full information about the objectives, schedule, constraints and existing conditions of the project. The Owner has established a budget with reasonable contingencies that meets the project requirements.

5.2 By signing this contract, the Owner attests that all State of Maine procurement requirements for this contract have been met, including the solicitation of competitive bids.

ARTICLE 6 INSTRUMENTS OF SERVICE

6.1 The Contractor's use of the drawings, specifications and other documents known as the Consultant's Instruments of Service is limited to the execution of the Contractor's scope of work of this project unless the Contractor receives the written consent of the Owner and Consultant for use elsewhere.

ARTICLE 7 MISCELLANEOUS PROVISIONS

7.1 This Contract shall be governed by the laws of the State of Maine.

7.2 The Owner and Contractor, respectively, bind themselves, their partners, successors, assigns and legal representatives to this Contract. Neither party to this Contract shall assign the Contract as a whole without written consent of the other party, which consent the Owner may withhold without cause.

7.3 Notwithstanding any other provision of this Agreement, if the Owner does not receive sufficient funds to fund this Agreement or funds are de-appropriated, or if the Owner does not receive legal authority from the Maine State Legislature or Maine Courts to expend funds intended for this Agreement, then the Owner is not obligated to make payment under this Agreement; provided, however, the Owner shall be obligated to pay for services satisfactorily performed prior to any such non-appropriation in accordance with the termination provisions of this Agreement. The Owner shall timely notify the Contractor of any non-appropriation and the effective date of the non-appropriation.

ARTICLE 8 CONTRACT DOCUMENTS

8.1 The Project Manual, Specifications and Drawings, and any Addenda, together with this agreement, form the contract. Each element is as fully a part of the Contract as if hereto attached or herein repeated.

8.2 Specifications: ***indicate date of issuance of project manual***

8.3 Drawings: ***note here or attach each sheet number and title***

8.4 Addenda: ***note each addenda number and date, or "none"***

BGS Project No.: _____

The Contract is effective as of the date executed by the approval authority.

OWNER	**CONTRACTOR**
Signature *Date* *name and title* *name of contracting entity* *address* *telephone* *email address*	*Signature* *Date* *name and title* *name of contractor company* *address* *telephone* *email address* *Vendor Number*

Indicate the names of the review and approval individuals appropriate to the approval authority.

select proper approval authority **Reviewed by:**	**Approved by:**
Signature *Date* *insert name*	*Signature* *Date* *Joseph H. Ostwald*
Project Manager/ Contract Administrator	*Director, Planning, Design & Construction*

00 61 13.13
Contractor Performance Bond

Bond No.: **insert bond number**

We, the undersigned, ***insert company name of Contractor***, ***select type of entity*** of ***insert name of municipality*** in the State of ***insert name of state*** as principal, and ***insert name of surety*** as Surety, are hereby held and firmly bound unto ***select title of obligee*** in the penal sum of the Contract Price $ ***insert the Contract Price in numbers*** 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.

The condition of the above obligation is such that if the principal shall promptly and faithfully perform the contract entered into this ***insert date, i.e.: 8th*** day of ***select month***, ***select year***, which is the same date as that of the notice of intent to award letter, or in the absence of such a letter, not later than the date the Owner signs the construction contract, for the construction of ***insert name of project as designated in the contract documents***, then this obligation shall be null and 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 which the Obligee may accept during the performance of the contract and said Surety does hereby waive notice of any such extension.

[Fillable bond forms may be downloaded from the Bureau of General Services website.]

00 61 13.13
Contractor Performance Bond

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 ***insert date, i.e.: 8th*** day of ***select month***, ***select year***, which is the same date as that of the notice of intent to award letter, or in the absence of such a letter, not later than the date the Owner signs the construction contract.

Contractor

_____

(Signature)

insert name and title

insert company name

insert address
insert city state zip code

Surety

_____

(Signature)

insert name and title

insert company name

insert address
insert city state zip code

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

[Fillable bond forms may be downloaded from the Bureau of General Services website.]

00 61 13.16
Contractor Payment Bond

Bond No.: **insert bond number**

We, the undersigned, ***insert company name of Contractor***, ***select type of entity*** of ***insert name of municipality*** in the State of ***insert name of state*** as principal, and ***insert name of surety*** as Surety, are hereby held and firmly bound unto ***select title of obligee*** in the penal sum of the Contract Price $ ***insert the Contract Price in numbers*** for the use and benefit of claimants, defined as an entity having a contract with the principal or with a subcontractor of the principal for labor, materials, or both labor and materials, used or reasonably required for use in the performance of the contract, 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.

The condition of the above 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 this ***insert date, i.e.: 8th*** day of ***select month***, ***select year***, which is the same date as that of the notice of intent to award letter, or in the absence of such a letter, not later than the date the Owner signs the construction contract, for the construction of ***insert name of project as designated in the contract documents***, and shall fully reimburse the obligee for all outlay and expense with said obligee may incur in making good any default of said principal, then this obligation shall be null and 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 which the Obligee may accept during the performance of the contract and said Surety does hereby waive notice of any such extension.

[Fillable bond forms may be downloaded from the Bureau of General Services website.]

00 61 13.16
Contractor Payment Bond

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 ***insert date, i.e.: 8th*** day of ***select month***, ***select year***, which is the same date as that of the notice of intent to award letter, or in the absence of such a letter, not later than the date the Owner signs the construction contract.

Contractor

_____

(Signature)

insert name and title

insert company name

insert address
insert city state zip code

Surety

_____

(Signature)

insert name and title

insert company name

insert address
insert city state zip code

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

[Fillable bond forms may be downloaded from the Bureau of General Services website.]

00 71 00
Definitions

1. Definitions

1.1 *Addendum*: A document issued by the Consultant that amends the Bid Documents. Addenda shall not be issued less than seventy-two hours prior to the specified bid opening time.

1.2 *Allowance*: A specified dollar amount for a particular scope of work or service included in the Work that is identified in the Bid Documents and included in each Bidder's Bid. The Contractor shall document expenditures for an Allowance during the Project. Any unused balance shall be credited to the Owner. The Contractor is responsible for notifying the Owner of anticipated expenses greater than the specified amount and the Owner is responsible for those additional expenses.

1.3 *Alternate Bid*: The Contractor's written offer of a specified dollar amount, submitted on the Bid Form, for the performance of a particular scope of work described in the Bid Documents. The Owner determines the low bidder based on the sum of the base Bid and any combination of Alternate Bids that the Owner selects.

1.4 *Architect*: A Consultant acting as, or supporting, the Professional-of-Record who is responsible for the design of the Project. Equivalent to "Consultant" in State of Maine contract forms.

1.5 *Architectural Supplemental Instruction (ASI)*: A written instruction from the Architect for the purpose of clarification of the Contract Documents. An ASI does not alter the Contract Price or Contract Time. ASIs may be responses to RFIs and shall be issued by the Architect in a timely manner to avoid any negative impact on the Schedule of the Work.

1.6 *Bid*: The Contractor's written offer of a specified dollar amount or amounts, submitted on a form included in the Bid Documents, for the performance of the Work. A Bid may include bonds or other requirements. A base Bid is separate and distinct from Alternate Bids, being the only cost component necessary for the award of the contract, and representing the minimum amount of Work that is essential for the functioning of the Project.

1.7 *Bid Bond*: The security designated in the Bid Documents, 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.

1.8 *Bidder*: Any business entity, individual or corporation that submits a bid for the performance of the work described in the Bid Documents, acting directly or through a duly authorized representative. See also *Responsive and Responsible Bidder*.

1.9 *Bid Documents*: The drawings, procurement and contracting requirements, general requirements, and the written specifications -including all addenda, that a bidder is required to reference in the submission of a bid.

1.10 *Bureau*: The State of Maine Bureau of General Services, or BGS, in the Department of Administrative and Financial Services.

1.11 *Calendar days*: Consecutive days, as occurring on a calendar, taking into account each day of the week, month, year, and any religious, national or local holidays. Calendar days are used for changes in Contract Time.

1.12 *Certificate of Substantial Completion*: A document developed by the Consultant that describes the final status of the Work and establishes the date that the Owner may use the facility for its intended purpose. The Certificate of Substantial Completion may also include a provisional list of items - a "punch list" - remaining to be completed by the Contractor. The Certificate of Substantial Completion identifies the date from which the project warranty period commences.

1.13 *Certificate of Occupancy*: A document developed by a local jurisdiction such as the Code Enforcement Officer that grants permission to the Owner to occupy a building.

1.14 *Change Order (CO)*: A document that modifies the contract and establishes the basis of a specific adjustment to the Contract Price or the Contract Time, or both. Change Orders may address correction of omissions, errors, and document discrepancies, or additional requirements. Change Orders should include all labor, materials and incidentals required to complete the work described. A Change Order is not valid until signed by the Contractor, Owner and Consultant and approved by the Bureau.

1.15 *Change Order Proposal (COP) (see also Proposal)*: Contract change proposed by the Contractor regarding the contract amount, requirements, or time. The Contractor implements the work of a COP after it is accepted by all parties. Accepted COPs are incorporated into the contract by Change Order.

1.16 *Clerk of the Works*: The authorized representative of the Consultant on the job site. Clerk of the Works is sometimes called the Architect's representative.

1.17 *Construction Change Directive (CCD)*: A written order prepared by the Consultant and signed by the Owner and Consultant, directing a change in the Work prior to final agreement with the Contractor on adjustment, if any, in the Contract Price or Contract Time, or both.

1.18 *Contract*: A written agreement between the Owner and the successful bidder which obligates the Contractor to perform the work specified in the Contract Documents and obligates the Owner to compensate the Contractor at the mutually accepted sum, rates or prices.

1.19 *Contract Bonds (also known as Payment and Performance Bonds)*: The approved forms of security, furnished by the Contractor and their surety, 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.

1.20 *Contract Documents*: The drawings and written specifications (including all addenda), Standard General Conditions, and the contract (including all Change Orders subsequently incorporated in the documents).

1.21 *Contract Expiration Date*: Date determined by the Owner as a deadline for internal management of contract accounts. This allows time after the Contract Final Completion Date for processing the final Requisition for Payment. The Contract Expiration Date does not directly relate to any contract obligation of the Contractor.

1.22 *Contract Final Completion Date*: Point of time when the Work is fully completed in compliance with the Contract Documents, as certified by the Consultant. Final payment to the Contractor is due upon Final Completion of the Project.

1.23 *Contract Price*: The dollar amount of the construction contract, also called *Contract Sum*.

1.24 *Contract Time*: The designated duration of time to execute the Work of the contract, with a specific date for completion.

1.25 *Contractor*: Also called the "General Contractor" or "GC" the individual or entity 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. The Contractor is responsible for the means, methods and materials utilized in the execution and completion of the Work.

1.26 *Consultant*: The Architect or Engineer acting as Professional-of-Record for the Project. The Consultant is responsible for the design of the Project.

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

1.28 *Engineer*: A Consultant acting as, or supporting, the Professional-of-Record who is responsible for the design of the Project. Equivalent to “Consultant” in State of Maine contract forms.

1.29 *Filed Sub-bid*: The designated major Subcontractor's (or, in some cases, Contractor’s) written offer of a specified dollar amount or amounts, submitted on a form included in the Bid Documents, for the performance of a particular portion of the Work. A Filed Sub-bid may include bonds or other requirements.

1.30 *General Requirements*: The on-site overhead expense items the Contractor provides for the Project, typically including, but not limited to, building permits, construction supervision, Contract Bonds, insurance, field office, temporary utilities, rubbish removal, and site fencing. Overhead expenses of the Contractor's general operation are not included. Sometimes referred to as the Contractor's General Conditions.

1.31 *Owner*: The State agency which is represented by duly authorized individuals. The Owner is responsible for defining the scope of the Project and compensation to the Consultant and Contractor.

1.32 *Owner’s Representative*: The individual or entity contracted by the Owner to be an advisor and information conduit regarding the Project.

1.33 *Overhead*: General and administrative expenses of the Contractor’s principal and branch offices, including payroll costs and other compensation of Contractor employees, deductibles paid on any insurance policy, charges against the Contractor for delinquent payments, and costs related to the correction of defective work, and the Contractor’s capital expenses, including interest on capital used for the work.

1.34 *Performance and Payment Bonds (also known as Contract Bonds)*: The approved forms of security, furnished by the Contractor and their surety, 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.

1.35 *Post-Bid Addendum*: Document issued by the Consultant that defines a potential Change Order prior to signing of the construction contract. The Post-Bid Addendum allows the Owner to negotiate

contract changes with the Bidder submitting the lowest valid bid, only if the negotiated changes to the Bid Documents result in no change or no increase in the bid price.

A Post-Bid Addendum may also be issued after a competitive construction Bid opening to those Bidders who submitted a Bid initially, for the purpose of rebidding the Project work without re-advertising.

1.36 *Project*: The construction project proposed by the Owner to be constructed according to the Contract Documents. The Project, a public improvement, may be tied logistically to other public improvements and other activities conducted by the Owner or other contractors.

1.37 *Proposal (see also Change Order Proposal)*: The Contractor's written offer submitted to the Owner for consideration containing a specified dollar amount or rate, for a specific scope of work, and including a schedule impact, if any. A proposal shall include all costs for overhead and profit. The Contractor implements the work of a Proposal after it is accepted by all parties. Accepted Proposals are incorporated into the contract by Change Order.

1.38 *Proposal Request (PR)*: An Owner's written request to the Contractor for a Change Order Proposal.

1.39 *Punch List*: A document that identifies the items of work remaining to be done by the Contractor at the Close Out of a Project. The Punch List is created as a result of a final inspection of the work only after the Contractor attests that all of the Work is in its complete and permanent status.

1.40 *Request For Information (RFI)*: A Contractor's written request to the Consultant for clarification, definition or description of the Work. RFIs shall be presented by the Contractor in a timely manner to avoid any negative impact on the Schedule of the Work.

1.41 *Request For Proposal (RFP)*: An Owner's written request to the Contractor for a Change Order Proposal.

1.42 *Requisition for Payment*: The document in which the Contractor certifies that the Work described is, to the best of the Contractor's knowledge, information and belief, complete and that all previous payments have been paid by the Contractor to Subcontractors and suppliers, and that the current requested payment is now due. See *Schedule of Values.*

1.43 *Responsive and Responsible Bidder*: A bidder who complies, when submitting a bid on a given project, with the following *responsive* standards, as required by the Bid Documents:
- submits specific qualifications to bid the project, if required;
- attends mandatory pre-bid conferences, if required;
- submits a bid prior to the close of the bid period;
- submits a complete bid form;
- submits a bid without indications of intent contrary to the stated requirements;
- submits other materials and information, such as bid security, as required;

and, meets the following minimums regarding these *responsible* standards:
- sustains a satisfactory record of project performance;
- maintains a permanent place of business in a known physical location;
- possesses the financial means for short- and long-term operations;
- possesses the appropriate technical experience and capabilities;
- employs adequate personnel and subcontractor resources;

maintains the equipment needed to perform the work;
complies with the proposed implementation schedule;
complies with the insurance and bonding requirements;
provides post-construction warranty coverage;
and other criteria which can be considered relevant to the contract.

1.44 *Retainage*: The amount, calculated at five percent (5%) of the contract value or a scheduled value, that the Owner shall withhold from the Contractor until the work or portion of work is declared substantially complete or otherwise accepted by the Owner. The Owner may, if requested, reduce the amount withheld if the Owner deems it desirable and prudent to do so. (See Title 5 M.R.S.A., Section 1746.)

1.45 *Sample*: A physical example provided by the Contractor which illustrates materials, equipment or workmanship and establishes standards by which the Work will be judged.

1.46 *Schedule of the Work*: The document prepared by the Contractor and approved by the Owner that specifies the dates on which the Contractor plans to begin and complete various parts of the Work, including dates on which information and approvals are required from the Owner.

1.47 *Schedule of Values*: The document prepared by the Contractor and approved by the Owner before the commencement of the Work that specifies the dollar values of discrete portions of the Work equal in sum to the contract amount. The Schedule of Values is used to document progress payments of the Work in regular (usually monthly) requisitions for payment. See *Requisition for Payment*.

1.48 *Shop Drawings*: The drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

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

1.50 *Subcontractor*: An individual or entity undertaking the execution of any part of the Work by virtue of a written agreement with the Contractor or any other Subcontractor. Also, an individual or entity retained by the Contractor or any other Subcontractor as an independent contractor to provide the labor, materials, equipment or services necessary to complete a specific portion of the Work.

1.51 *Substantial Completion Date*: Point of time when the Work or a designated portion of the Work is sufficiently complete in compliance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended purpose without unscheduled disruption. Substantial Completion is documented by the date of the Certificate of Substantial Completion signed by the Owner and the Contractor.

1.52 *Superintendent*: The representative of the Contractor on the job site, authorized by the Contractor to receive and fulfill instructions from the Consultant.

1.53 *Surety*: The individual or entity that is legally bound with the Contractor and Subcontractor to insure the faithful performance of the contract and for the payment of the bills for labor, materials and equipment by the Contractor and Subcontractors.

1.54 *Work*: The construction and services, whether completed or partially completed, including all labor, materials, equipment and services provided or to be provided by the Contractor and Subcontractors to fulfill the requirements of the Project as described in the Contract Documents.

00 72 13
General Conditions

Table of Contents of this General Conditions Section

1. Preconstruction Conference

1.1 The Contractor shall, upon acceptance of a contract and prior to commencing work, schedule a preconstruction conference with the Owner and Consultant. The purpose of this conference is as follows.

1.1.1 Introduce all parties who have a significant role in the Project, including:
Owner (State agency or other contracting entity)
Owner's Representative
Consultant (Architect or Engineer)
Subconsultants
Clerk-of-the-works
Contractor (GC)
Superintendent
Subcontractors
Other State agencies
Construction testing company
Commissioning agent
Special Inspections agent
Bureau of General Services (BGS);

1.1.2 Review the responsibilities of each party;

1.1.3 Review any previously-identified special provisions of the Project;

1.1.4 Review the Schedule of the Work calendar submitted by the Contractor to be approved by the Owner and Consultant;

1.1.5 Review the Schedule of Values form submitted by the Contractor to be approved by the Owner and Consultant;

1.1.6 Establish routines for Shop Drawing approval, contract changes, requisitions, et cetera;

1.1.7 discuss jobsite issues;

1.1.8 Discuss Project close-out procedures;

1.1.9 Provide an opportunity for clarification of Contract Documents before work begins; and

1.1.10 Schedule regular meetings at appropriate intervals for the review of the progress of the Work.

2. Intent and Correlation of Contract Documents

2.1 The intent of the Contract Documents is to describe the complete Project. The Contract Documents consist of various components; each component complements the others. What is shown as a requirement by any one component shall be inferred as a requirement on all corresponding components.

2.2 The Contractor shall furnish all labor, equipment and materials, tools, transportation, insurance, services, supplies, operations and methods necessary for, and reasonably incidental to, the construction and completion of the Project. Any work that deviates from the Contract Documents which appears to be required by the exigencies of construction or by inconsistencies in the Contract Documents, will be determined by the Consultant and authorized in writing by the Consultant, Owner and the Bureau prior to execution. The Contractor shall be responsible for requesting clarifying information where the intent of the Contract Documents is uncertain.

2.3 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 Consultant in writing of such errors or omissions. The Consultant shall make any corrections or clarifications necessary in such a situation to document the true intent of the Contract Documents.

3. Additional Drawings and Specifications

3.1 Upon the written request of the Contractor, the Owner shall provide, at no expense to the Contractor, up to five sets of printed Drawings and Specifications for the execution of the Work.

3.2 The Consultant shall promptly furnish to the Contractor revised Drawings and Specifications, for the area of the documents where those revisions apply, when corrections or clarifications are made by the Consultant. All such information shall be consistent with, and reasonably inferred from, the Contract Documents. The Contractor shall do no work without the proper Drawings and Specifications.

4. Ownership of Contract Documents

4.1 The designs represented on the Contract Documents are the property of the Consultant. The Drawings and Specifications shall not be used on other work without consent of the Consultant.

5. Permits, Laws, and Regulations

5.1 The Owner is responsible for obtaining any zoning approvals or other similar local project approvals necessary to complete the Work, unless otherwise specified in the Contract Documents.

5.2 The Owner is responsible for obtaining Maine Department of Environmental Protection, Maine Department of Transportation, or other similar state government project approvals necessary to complete the Work, unless otherwise indicated in the Contract Documents.

5.3 The Owner is responsible for obtaining any federal agency project approvals necessary to complete the Work, unless otherwise indicated in the Contract Documents.

5.4 The Owner is responsible for obtaining all easements for permanent structures or permanent changes in existing facilities.

5.5 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, variance or restrictions that may result from the issuing of permits and licenses.

5.6 The Contractor shall comply with all ordinances, laws, rules and regulations and make all required notices bearing on the implementation of the Work. In the event the Contractor observes disagreement between the Drawings and Specifications and any ordinances, laws, rules and regulations, the Contractor shall promptly notify the Consultant in writing. Any necessary changes shall be made as provided in the contract for changes in the work. The Contractor shall not perform any work knowing it to be contrary to such ordinances, laws, rules and regulations.

5.7 The Contractor shall comply with local, state and federal regulations regarding construction safety and all other aspects of the Work.

5.8 The Contractor shall comply with the Maine Code of Fair Practices and Affirmative Action, 5 M.R.S. §784 (2).

6. Taxes

6.1 The Owner is exempt from the payment of Maine State sales and use taxes as provided in 36 M.R.S. §1760 (1). The Contractor and Subcontractors shall not include taxes on exempt items in the construction contract.

6.2 Section 1760 further provides in subsection 61 that sales to a construction contractor or its subcontractor of tangible personal property that is to be physically incorporated in, and become a permanent part of, real property for sale to or owned by the Owner, are exempt from Maine State sales and use taxes. Tangible personal property is defined in 36 M.R.S. §1752 (17).

6.3 The Contractor may contact Maine Revenue Services, 24 State House Station, Augusta, Maine 04333 for guidance on tax exempt regulations authorized by 36 M.R.S. §1760 and detailed in Rule 302 (18-125 CMR 302).

7. Labor and Wages

7.1 The Contractor shall conform to the labor laws of the State of Maine, and all other laws, ordinances, and legal requirements affecting the work in Maine.

7.2 The Consultant shall include a wage determination document prepared by the Maine Department of Labor in the Contract Documents for state-funded contracts in excess of $50,000. The document shows the minimum wages required to be paid to each category of labor employed on the project.

7.3 On projects requiring a Maine wage determination, the Contractor shall submit monthly payroll records to the Owner ("the contracting agency") showing the name and occupation of all workers and all independent contractors employed on the project. The monthly submission must also include the Contractor's company name, the title of the project, hours worked, hourly rate or other method of remuneration, and the actual wages or other compensation paid to each person.

7.4 The Contractor shall not reveal, in the payroll records submitted to the Owner, personal information regarding workers and independent contractors, other than the information described above. Such information shall not include Social Security number, employee identification number, or employee address or phone number, for example.

7.5 The Contractor shall conform to Maine statute (39-A M.R.S. §105-A (6)) by providing to the Workers' Compensation Board a list of all subcontractors and independent contractors on the job site and a record of the entity to whom that subcontractor or independent contractor is directly contracted and by whom that subcontractor or independent contractor is insured for workers' compensation purposes.

7.6 The Contractor 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.

7.7 The Contractor 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 coverage, federal and state unemployment compensation, and Social Security

charges pertaining to this Project. Before final payments are made, the Contractor shall furnish to the Owner affidavits that all such payments described above have been made.

7.8 The Contractor may contact the Maine Department of Labor, 54 State House Station, Augusta, Maine 04333 for guidance on labor issues.

7.9 The Contractor may contact the Maine Workers' Compensation Board, 27 State House Station, Augusta, Maine 04333 for guidance on workers' compensation issues.

8. Indemnification

8.1 The Contractor shall indemnify and hold harmless the Owner and its officers and employees from and against any and all damages, liabilities, and costs, including reasonable attorney's fees, and defense costs, for any and all injuries to persons or property, including claims for violation of intellectual property rights, to the extent caused by the negligent acts or omissions of the Contractor, its employees, agents, officers or subcontractors in the performance of work under this Agreement. The Contractor shall not be liable for claims to the extent caused by the negligent acts or omissions of the Owner or for actions taken in reasonable reliance on written instructions of the Owner.

8.2 The Contractor shall notify the Owner promptly of all claims arising out of the performance of work under this Agreement by the Contractor, its employees or agents, officers or subcontractors.

8.3 This indemnity provision shall survive the termination of the Agreement, completion of the project or the expiration of the term of the Agreement.

9. Insurance Requirements

9.1 The Contractor shall provide, with each original of the signed Contract, an insurance certificate or certificates acceptable to the Owner and BGS. The Contractor shall submit insurance certificates to the Owner and BGS at the commencement of this Contract and at policy renewal or revision dates. The certificates shall identify the project name and BGS project number, and shall name the Owner as certificate holder and as additional insured for general liability and automobile liability coverages. The submitted forms shall contain a provision that coverage afforded under the insurance policies will not be canceled or materially changed unless at least ten days prior written notice by registered letter has been given to the Owner and BGS.

9.2 The Owner does not warrant or represent that the insurance required herein constitutes an insurance portfolio which adequately addresses all risks faced by the Contractor or its Subcontractors. The Contractor is responsible for the existence, extent and adequacy of insurance prior to commencement of work. The Contractor shall not allow any Subcontractor to commence work until all similar insurance required of the Subcontractor has been confirmed by the Contractor.

9.3 The Contractor shall procure and maintain primary insurance for the duration of the Project and, if written on a Claims-Made basis, shall also procure and maintain Extended Reporting Period (ERP) insurance for the period of time that any claims could be brought. The Contractor shall ensure that all Subcontractors they engage or employ will procure and maintain similar insurance

in form and amount acceptable to the Owner and BGS. At a minimum, the insurance shall be of the types and limits set forth herein protecting the Contractor from claims which may result from the Contractor's execution of the Work, whether such execution be by the Contractor or by those employed by the Contractor or by those for whose acts they may be liable. All required insurance coverages shall be placed with carriers authorized to conduct business in the State of Maine by the Maine Bureau of Insurance.

9.3.1 The Contractor shall have Workers' Compensation insurance for all employees on the Project site in accordance with the requirements of the Workers' Compensation law of the State of Maine. Minimum acceptable limits for Employer's Liability are:

Bodily Injury by Accident	$500,000
Bodily Injury by Disease	$500,000 Each Employee
Bodily Injury by Disease	$500,000 Policy Limit

9.3.2 The Contractor shall have Commercial General Liability insurance providing coverage for 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. The policy shall include collapse and underground coverage as well as explosion coverage if explosion hazards exist. Aggregate limits shall apply on a 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

9.3.3 The Contractor shall have 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:

Any one accident or loss	$500,000

9.3.4 For the portion of a project which is 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, for the portion of the project which is new construction, and coverage shall apply during the entire contract period and until the work is accepted by the Owner.

9.3.5 The Contractor shall have Owner's Protective Liability insurance for contract values $50,000 and above, naming the Owner as the Named Insured. Minimum acceptable limits are:

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

10. Contract Bonds

10.1 When noted as required in the Bid 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

executed on the forms furnished in the Bid Documents. The bonds shall allow for any subsequent additions or deductions of the contract.

10.2 The contract bonds shall continue in effect for one year after final acceptance of the 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.

11. Patents and Royalties

11.1 The Contractor shall, for all time, secure for the Owner the free and undisputed right to the use of any 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 due to installations made by the Contractor, and to any awards made as a result of such suits.

11.2 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.

12. Surveys, Layout of Work

12.1 The Owner shall furnish all property surveys unless otherwise specified.

12.2 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 insure their accuracy. All such lines and points shall be carefully preserved throughout the construction.

12.3 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, levels, elevations and dimensions shown on the Drawings and report any errors or inconsistencies to the Consultant prior to commencing work.

13. Record of Documents

13.1 The Contractor shall maintain one complete set of Contract Documents on the jobsite, in good order and current status, for access by the Owner and Consultant.

13.2 The Contractor shall maintain, continuously updated, complete records of Requests for Information, Architectural Supplemental Instructions (or equivalent), Information Bulletins, supplemental sketches, Change Order Proposals, Change Orders, Shop Drawings, testing reports, et cetera, for access by the Owner and Consultant.

14. Allowances

14.1 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.

14.2 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.

15. Shop Drawings

15.1 The Contractor shall administer Shop Drawings prepared by the Contractor, Subcontractors, suppliers or others to conform to the approved Schedule of the Work. The Contractor shall verify all field measurements, check and authorize all Shop Drawings and schedules required by the Work. The Contractor is the responsible party and contact for the Contractor's work as well as that of Subcontractors, suppliers or others who provide Shop Drawings.

15.2 The Consultant shall review and acknowledge Shop Drawings, with reasonable promptness, for general conformity with the design concept of the project and compliance with the information provided in the Contract Documents.

15.3 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 deficiencies.

15.4 The Contractor shall make any corrections required by the Consultant, and shall submit a quantity of corrected copies as may be needed. The acceptance of Shop Drawings or schedules by the Consultant shall not relieve the Contractor from responsibility for deviations from Drawings and Specifications, unless the Contractor has called such deviations to the attention of the Consultant at the time of submission and secured the Consultant’s written approval. The acceptance of Shop Drawings or schedules by the Consultant does not relieve the Contractor from responsibility for errors in Shop Drawings or schedules.

16. Samples

16.1 The Contractor shall furnish for approval, with reasonable promptness, all samples as directed by the Consultant. The Consultant shall review and approve such samples, with reasonable promptness, for general conformity with the design concept of the project and compliance with the information provided in the Contract Documents. The subsequent work shall be in accord with the approved samples.

17. Substitutions

17.1 The Contractor shall furnish items and materials described in the Contract Documents. If the item or material specified describes a proprietary product, or uses the name of a manufacturer, the term “or approved equal” shall be implied, if it is not included in the text. The specific item or material 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 Drawing or written Specification shall not be construed to exclude other manufacturers products of comparable design, quality, and efficiency.

17.2 The Contractor may submit detailed information about a proposed substitution to the Consultant for consideration. Particular models of items and particular materials which the Contractor asserts to be equal to the items and materials identified in the Contract Documents shall be allowed only with written approval by the Consultant. The request for substitution shall include a cost comparison and a reason or reasons for the substitution.

17.3 The Consultant may request additional information about the proposed substitution. The approval or rejection of a proposed substitution may be based on timeliness of the request, source of the information, the considerations of minimum standards described above, or other considerations. The Consultant should briefly state the rationale for the decision. The decision shall be considered final.

17.4 The duration of a substitution review process can not be the basis for a claim for delay in the Schedule of the Work.

18. Assignment of Contract

18.1 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.

19. Separate Contracts

19.1 The Owner reserves the right to create other contracts in connection with this Project using similar General Conditions. The Contractor shall allow the Owner's other contractors reasonable opportunity for the delivery and storage of materials and the execution of their work. The Contractor shall coordinate and properly connect the Work of all contractors.

19.2 The Contractor shall promptly report to the Consultant 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 to observe or report any deficiencies constitutes an acceptance of the Owner's other contractors work as suitable for the interface of the Contractor’s work, except for latent deficiencies in the Owner's other contractors work.

19.3 Similarly, the Contractor shall promptly report to the Consultant and Owner any apparent deficiencies in their own work that would impact the proper execution or results of the Owner's other contractors.

19.4 The Contractor shall report to the Consultant 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.

19.5 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.

20. Subcontracts

20.1 The Contractor shall not subcontract any part of this contract without the written permission of the Owner.

20.2 The Contractor shall submit a complete list of named Subcontractors and material suppliers to the Consultant and Owner for approval by the Owner prior to commencing work. The Subcontractors named shall be reputable companies of recognized standing with a record of satisfactory work.

20.3 The Contractor shall not employ any Subcontractor or use any material until they have been approved, or where there is reason to believe the resulting work will not comply with the Contract Documents.

20.4 The Contractor, not the Owner, is as fully responsible for the acts and omissions of Subcontractors and of persons employed by them, as the Contractor is for the acts and omissions of persons directly or indirectly employed by the Contractor.

20.5 Neither the Contract Documents nor any Contractor-Subcontractor contract shall indicate, infer or create any direct contractual relationship between any Subcontractor and the Owner.

21. Contractor-Subcontractor Relationship

21.1 The Contractor shall be bound to the Subcontractor by all the obligations in the Contract Documents that bind the Contractor to the Owner.

21.2 The Contractor shall pay the Subcontractor, in proportion to the dollar value of the work completed and requisitioned by the Subcontractor, the approved dollar amount allowed to the Contractor no more than seven days after receipt of payment from the Owner.

21.3 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.

21.4 The Contractor shall pay the Subcontractor for completed and requisitioned subcontract work, less retainage, no more than seven days after receipt of payment from the Owner for the Contractor's approved Requisition for Payment, even if the Consultant fails to certify a portion of the Requisition for Payment for a cause not the fault of the Subcontractor.

21.5 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.

21.6 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.

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

21.8 The Contractor shall pay the Subcontractor a just share of any fire insurance payment received by the Contractor.

21.9 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.

21.10 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.

21.11 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 Consultant's instructions.

22. Supervision of the Work

22.1 During all stages of the Work the Contractor shall have a competent superintendent, with any necessary assistant superintendents, overseeing the project. The superintendent shall not be reassigned without the consent of the Owner unless a superintendent ceases to be employed by the Contractor due to unsatisfactory performance.

22.2 The superintendent represents the Contractor on the jobsite. Directives given by the Consultant or Owner to the superintendent shall be as binding as if given directly to the Contractor's main office. All important directives shall be confirmed in writing to the Contractor. The Consultant and Owner are not responsible for the acts or omissions of the superintendent or assistant superintendents.

22.3 The Contractor shall provide supervision of the Work equal to the industry's highest standard of care. The superintendent shall carefully study and compare all Contract Documents and promptly report any error, inconsistency or omission discovered to the Consultant. 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 Consultant that was not revealed by the superintendent in a timely way.

23. Observation of the Work

23.1 The Contractor shall allow the Owner, the Consultant and the Bureau 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.

23.2 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.

23.3 The Contractor shall schedule inspections and obtain all required certificates of inspection for inspections by a party other than the Consultant.

23.4 The Consultant shall make all scheduled observations promptly, prior to the work being concealed or buried by the Contractor. If approval of the Work is required of the Consultant, the Contractor shall notify the Consultant of the construction schedule in this regard. Work concealed or buried prior to the Consultant's approval may need to be uncovered at the Contractor's expense.

23.5 The Consultant may order reexamination of questioned work, and, if so ordered, the work must be uncovered by the Contractor. If the work is found to conform to the Contract Documents, the Owner shall pay the expense of the reexamination and remedial work. If the work is found to not conform to the Contract Documents, the Contractor shall pay the expense, unless the defect in the work was caused by the Owner's Contractor, whose responsibility the reexamination expense becomes.

23.6 The Bureau shall periodically observe the Work during the course of construction and make recommendations to the Contractor or Consultant as necessary. Such recommendations shall be considered and implemented through the usual means for changes to the Work.

24. Consultant's Status

24.1 The Consultant represents the Owner during the construction period, and observes the work in progress on behalf of the Owner. The Consultant has authority to act on behalf of the Owner only to the extent expressly provided by the Contract Documents or otherwise demonstrated to the Contractor. The Consultant has authority to stop the work whenever such an action is necessary, in the Consultant's reasonable opinion, to ensure the proper execution of the contract.

24.2 The Consultant is the interpreter of the conditions of the contract and the judge of its performance. The Consultant shall favor neither the Owner nor the Contractor, but shall use the Consultant's powers under the contract to enforce faithful performance by both parties.

24.3 In the event of the termination of the Consultant's employment on the project prior to completion of the work, the Owner shall appoint a capable and reputable replacement. The status of the new Consultant relative to this contract shall be that of the former Consultant.

25. Management of the Premises

25.1 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 Consultant's directions shall not cause the use of premises to be impeded for the Contractor or Owner.

25.2 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.

25.3 The Contractor shall enforce the Consultant'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.

25.4 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.

26. Safety and Security of the Premises

26.1 The Contractor shall designate, and make known to the Consultant and the Owner, a safety officer whose duty is the prevention of accidents on the site.

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

26.3 The Contractor shall take all necessary precautions to ensure the safety of workers and others on and adjacent to the site, abiding by applicable local, state and federal safety regulations. The Contractor shall erect and continuously maintain safeguards for the protection of workers and others, and shall post signs and other warnings regarding hazards associated with the construction process, such as protruding fasteners, moving equipment, trenches and holes, scaffolding, window, door or stair openings, and falling materials.

26.4 The Contractor shall restore the premises to conditions that existed prior to the start of the project at areas not intended to be altered according to the Contract Documents.

26.5 The Contractor shall protect existing utilities and exercise care working in the vicinity of utilities shown in the Drawings and Specifications or otherwise located by the Contractor.

26.6 The Contractor shall protect from damage existing trees and other significant plantings and landscape features of the site which will remain a permanent part of the site. If necessary or indicated in the Contract Documents, tree trunks shall be boxed and barriers erected to prevent damage to tree branches or roots.

26.7 The Contractor shall repair or replace damage to the Work caused by the Contractor's or Subcontractor's forces, including that which is reasonably protected, at the expense of the responsible party.

26.8 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 Consultant may consult with the Contractor on such means and methods of construction, however, the ultimate responsibility lies with the Contractor.

26.9 The Contractor shall not jeopardize any work in place with subsequent construction activities such as blasting, drilling, excavating, cutting, patching or altering work. The Consultant must approve altering any structural components 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.

26.10 The Contractor may act with their sole discretion 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 Contractor may negotiate with the Owner for compensation for expenses due to such emergency work.

26.11 The Contractor and Subcontractors shall have no responsibility for the identification, discovery, presence, handling, removal or disposal of, or exposure of persons to, hazardous materials in any form at the project site. The Contractor shall avoid disruption of any hazardous materials or toxic substances at the project site and promptly notify the Owner in writing on the occasion of such a discovery.

26.12 The Contractor shall keep the premises free of any unsafe accumulation of waste materials caused by the work. The Contractor shall regularly keep the spaces "broom clean". See the Close-out of the Work provisions of this section regarding cleaning at the completion of the project.

27. Changes in the Work

27.1 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.

27.2 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.

27.3 The Consultant shall prepare the Construction Change Directive representing a complete scope of work, with proposed Contract Price and Contract Time revisions, if any, clearly stated.

27.4 The Contractor shall promptly carry out a Construction Change Directive which has been signed by the Owner and the Consultant. 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.

27.5 The method of determining the dollar value of extra work shall be by:
- .1 an estimate of the Contractor accepted by Owner as a lump sum, or
- .2 unit prices named in the contract or subsequently agreed upon, or
- .3 cost plus a designated percentage, or
- .4 cost plus a fixed fee.

27.6 The Contractor shall determine the dollar value of the extra work for both the lump sum and cost plus designated percentage methods so as not to exceed the following rates. The rates include all overhead and profit expenses.
- .1 Contractor - for any work performed by the Contractor's own forces, up to 20% of the cost;
- .2 Subcontractor - for work performed by Subcontractor's own forces, up to 20% of the cost;
- .3 Contractor - for work performed by Contractor's Subcontractor, up to 10% of the amount due the Subcontractor.

27.7 The Contractor shall keep and provide records as needed or directed for the cost plus designated percentage method. The Consultant shall review and certify the appropriate amount which

includes the Contractor's overhead and profit. The Owner shall make payments based on the Consultant's certificate.

27.8 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.

27.9 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.

27.10 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.

27.11 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.

27.12 The Consultant may order minor changes in the Work, not involving extra cost, which is consistent with the intent of the design or project.

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

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

28. Correction of the Work

28.1 The Contractor shall promptly remove from the premises all work the Consultant declares is non-conforming to the contract. The Contractor shall replace the work properly at no expense to the Owner. The Contractor is also responsible for the expenses of others whose work was damaged or destroyed by such remedial work.

28.2 The Owner may elect to remove non-conforming work if it is not removed by the Contractor within a reasonable time, that time defined in a written notice from the Consultant. The Owner may elect to store removed non-conforming work not removed by the Contractor at the Contractor's expense. The Owner may, with ten days written notice, dispose of materials which the Contractor does not remove. The Owner may sell the materials and apply the net proceeds, after deducting all expenses, to the costs that should have been borne by the Contractor.

28.3 The Contractor shall remedy any defects due to faulty materials or workmanship and pay for any related 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 promptly give notice of observed defects to the Contractor and Consultant. The Consultant shall determine the status of all claimed defects. The Contractor shall perform all remedial work without unjustifiable delay in either the initial response or the corrective action.

28.4 The Consultant 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.

29. Owner's Right to do Work

29.1 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 Consultant 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.

29.2 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.

30. Termination of Contract and Stop Work Action

30.1 The Owner may, owing to a certificate of the Consultant indicating that sufficient cause exists to justify such action, 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. 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:

.1 the contractor is adjudged bankrupt, or makes a general assignment for the benefit of its creditors, or

.2 a receiver is appointed due to the Contractor's insolvency, or

.3 the Contractor persistently or repeatedly refuses or fails to provide enough properly skilled workers or proper materials, or

.4 the Contractor fails to make prompt payment to Subcontractors or suppliers of materials or labor, or

.5 the Contractor persistently disregards laws, ordinances or the instructions of the Consultant, or is otherwise found guilty of a substantial violation of a provision of the Contract Documents.

30.2 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 Consultant shall certify the expense incurred by the Contractor's default. This obligation for payment shall continue to exist after termination of the contract.

30.3 The Contractor may, if the Work is stopped by order of any court or other public authority for a period of thirty consecutive days, and through no act or fault of the Contractor or of anyone employed by the Contractor, with seven days written notice to the Owner and the Consultant, terminate this contract. The Contractor may then recover from the Owner payment for all work executed, any proven loss and reasonable profit and damage.

30.4 The Contractor may, if the Consultant 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 Consultant, with seven days written notice to the Owner and the Consultant, stop the Work or terminate this Contract.

31. Delays and Extension of Time

31.1 The completion date of the contract shall be extended if the work is delayed by changes ordered in the work which have approved time extensions, or by an act or neglect of the Owner, the Consultant, or the Owner's Contractor, or by strikes, lockouts, fire, flooding, unusual delay in transportation, unavoidable casualties, or by other causes beyond the Contractor's control. The Consultant shall determine the status of all claimed causes.

31.2 The contract shall not be extended for delay occurring more than seven calendar days before the Contractor's claim made in writing to the Consultant. In case of a continuing cause of delay, only one claim is necessary.

31.3 The contract shall not be extended due to failure of the Consultant to furnish drawings if no schedule or agreement is made between the Contractor and the Consultant indicating the dates

which drawings shall be furnished and fourteen calendar days has passed after said date for such drawings.

31.4 This article does not exclude the recovery of damages for delay by either party under other provisions in the Contract Document.

32. Payments to the Contractor

32.1 As noted under *Preconstruction Conference* in this section, the Contractor shall submit a Schedule of Values form, before the first application for payment, for approval by the Owner and Consultant. The Consultant 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.

32.2 The Contractor shall submit an application for each payment ("Requisition for Payment") on a form approved by the Owner and Consultant. The Consultant may require receipts or other documents showing the Contractor's payments for materials and labor, including payments to Subcontractors.

32.3 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.

32.4 The Consultant shall verify and certify each Requisition for Payment which appears to be complete and correct prior to payment being made by the Owner. The Consultant 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.

32.5 In the event any materials 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, the full amount previously allowed shall be deducted from subsequent payments unless the Contractor satisfactorily replaces said material.

32.6 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 Consultant 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.

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

32.8 Certified Requisitions for Payment, payments made to the Contractor, or partial or entire occupancy of the project by the Owner shall not constitute an acceptance of any work that does

not conform to the Contract Documents. The making and acceptance of the final payment constitutes a waiver of all claims by the Owner, other than those arising from unsettled liens, from faulty work or materials appearing within one year from final payment or from requirements of the Drawings and Specifications, and of all claims by the Contractor, except those previously made and still unsettled.

33. Payments Withheld

33.1 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. The Contractor may deposit with the Maine State Treasurer certain securities in place of retainage amounts due according to Maine Statute (5 M.R.S. §1746).

33.2 The Consultant 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:

.1 defective work not remedied;
.2 claims filed or reasonable evidence indicating probable filing of claims;
.3 failure to make payments properly to Subcontractors or suppliers;
.4 a reasonable doubt that the contract can be completed for the balance then unpaid;
.5 liability for damage to another contractor.

The Owner shall make payment to the Contractor, in the amount withheld, when the above circumstances are removed.

34. Liens

34.1 The Contractor shall deliver to the Owner a complete release of all liens arising out of this contract before the final payment or any part of the retainage payment is released. The Contractor shall provide with the release of liens an affidavit asserting each release includes all labor and materials for which a lien could be filed. 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.

34.2 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 attorney's fees.

35. Workmanship

35.1 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 Consultant's decision on the quality of work shall be final.

35.2 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 well skilled in their respective trades.

35.3 The Contractor shall perform all cutting, fitting, patching and placing of work in such a manner to allow subsequent work to fit properly, whether that be by the Contractor, the Owner's Contractors or others. The Owner and Consultant may advise the Contractor regarding such 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 Consultant at the Contractor's expense.

35.4 The Contractor shall request clarification or revision of any design work by the Consultant, 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 Consultant 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 Consultant regarding the required request for information.

35.5 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 separate Certificate of Substantial Completion.

36. Close-out of the Work

36.1 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 thorough cleaning is specified. The Contractor shall clean all windows and glass immediately prior to the final inspection, unless otherwise directed.

36.2 The Owner may conduct the cleaning of the premises where the Contractor, duly notified by the Consultant, fails to adequately complete the task. The expense of this cleaning may be deducted from the sum due to the Contractor.

36.3 The Contractor shall participate in all final inspections and acknowledge the documentation of unsatisfactory work, customarily called the "punch list", to be corrected by the Contractor. The Consultant shall document the successful completion of the Work in a dated Certificate of Substantial Completion, to be signed by Owner, Consultant, and Contractor.

36.4 The Contractor shall not call for final inspection of any portion of the Work that is not completely and permanently installed. The Contractor may be found liable for the expenses of individuals called to final inspection meetings prematurely.

36.5 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.

37. Date of Completion and Liquidated Damages

37.1 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.

37.2 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 Consultant if the Contractor fails to make notification of project delays.

37.3 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 Consultant determines has followed the expected rate of progress.

37.4 The Consultant 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.

37.5 Liquidated Damages may be deducted from the sum due to the Contractor for each calendar day that the Work remains uncompleted after the completion date specified in the Contract or an approved amended completion date. The dollar amount per day shall be calculated using the Schedule of Liquidated Damages table shown below.

If the original contract amount is:	The per day Liquidated Damages shall be:
Less than $100,000	$250
$100,000 to less than $2,000,000	$750
$2,000,000 to less than $10,000,000	$1,500
$10,000,000 and greater	$1,500 plus $250 for each $2,000,000 over $10,000,000

38. Dispute Resolution

38.1 Mediation

38.1.1 A dispute between the parties which arises under this Contract which cannot be resolved through informal negotiation, shall be submitted to a neutral mediator jointly selected by the parties.

38.1.2 Either party may file suit before or during mediation if the party, in good faith, deems it to be necessary to avoid losing the right to sue due to a statute of limitations. If suit is filed before good faith mediation efforts are completed, the party filing suit shall agree to stay all proceedings in the lawsuit pending completion of the mediation process, provided such stay is without prejudice.

38.1.3 In any mediation between the Owner and the Consultant, the Owner has the right to consolidate related claims between Owner and Contractor.

38.2 Arbitration

38.2.1 If the dispute is not resolved through mediation, 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.

38.2.2 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.

38.2.3 The costs of the arbitration, including the arbitrators' fees shall be borne equally by the parties to the arbitration, unless the arbitrator orders otherwise.

38.2.4 In any arbitration between the Owner and the Consultant, the Owner has the right to consolidate related claims between Owner and Contractor.

00 73 46
Wage Determination Schedule

PART 1- GENERAL

1.1 Related Documents

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

1.2 Summary

A. This Section includes the wage determination requirements for Contractors as issued by the State of Maine Department of Labor Bureau of Labor Standards or the United States Department of Labor.

1.3 Requirements

A. Conform to the wage determination schedule for this project which is shown on the following page.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION (not used)

THIS DOCUMENT MUST BE CLEARLY POSTED AT ALL CONSTRUCTION SITES FUNDED IN PART WITH STATE FUNDS

State of Maine Department of Labor - Bureau of Labor Standards
Augusta, Maine 04333-0045 - Telephone (207) 623-7906

Wage Determination - In accordance with 26 MRS §1301 et. seq., this is a determination by the Bureau of Labor Standards, of the fair minimum wage rate to be paid to laborers and workers employed on the below titled project.

2024 Fair Minimum Wage Rates -- Highway & Earth York County

Occupational Title	Minimum Wage	Minimum Benefit	Total
Brickmasons And Blockmasons	$32.25	$4.33	$36.58
Bulldozer Operator	$28.00	$4.01	$32.01
Carpenter	$29.69	$6.18	$35.87
Cement Masons And Concrete Finisher	$22.67	$2.21	$24.88
Commercial Divers	$30.00	$4.62	$34.62
Construction And Maintenance Painters	$26.00	$3.81	$29.81
Construction Laborer	$25.00	$3.35	$28.35
Crane And Tower Operators	$33.93	$9.47	$43.40
Crushing Grinding And Polishing Machine Operators	$23.88	$4.94	$28.82
Drywall And Ceiling Tile Installers	$26.20	$10.62	$36.82
Earth Drillers - Except Oil And Gas	$21.65	$2.53	$24.18
Electrical Power - Line Installer And Repairers	$38.93	$8.91	$47.84
Electricians	$33.64	$18.07	$51.71
Elevator Installers And Repairers	$68.38	$45.29	$113.67
Excavating And Loading Machine And Dragline Operators	$25.10	$4.53	$29.63
Excavator Operator	$33.25	$6.34	$39.59
Fence Erectors	$20.00	$0.00	$20.00
Flaggers	$20.00	$0.41	$20.41
Floor Layers - Except Carpet/Wood/Hard Tiles	$27.00	$6.21	$33.21
Glaziers	$37.00	$6.60	$43.60
Grader/Scraper Operator	$27.40	$8.13	$35.53
Hazardous Materials Removal Workers	$21.50	$1.54	$23.04
Heating And Air Conditioning And Refrigeration Mechanics And Installers	$32.00	$5.46	$37.46
Heavy And Tractor - Trailer Truck Drivers	$25.50	$6.04	$31.54
Highway Maintenance Workers	$19.98	$2.55	$22.53
Industrial Machinery Mechanics	$31.25	$1.01	$32.26
Industrial Truck And Tractor Operators	$29.25	$4.06	$33.31
Insulation Worker - Mechanical	$24.05	$3.59	$27.64
Ironworker - Ornamental	$27.75	$4.50	$32.25
Light Truck Or Delivery Services Drivers	$21.50	$0.78	$22.28
Millwrights	$33.75	$8.78	$42.53
Mobile Heavy Equipment Mechanics - Except Engines	$28.00	$4.89	$32.89
Operating Engineers And Other Equipment Operators	$31.50	$3.75	$35.25
Paver Operator	$27.03	$5.14	$32.17
Pile-Driver Operators	$32.75	$1.95	$34.70
Pipelayers	$28.50	$4.69	$33.19
Plumbers Pipe Fitters And Steamfitters	$30.00	$5.87	$35.87
Pump Operators - Except Wellhead Pumpers	$31.49	$32.08	$63.57
Radio Cellular And Tower Equipment Installers	$26.00	$3.77	$29.77
Reclaimer Operator	$28.50	$5.72	$34.22
Reinforcing Iron And Rebar Workers	$22.67	$25.11	$47.78
Riggers	$31.25	$7.68	$38.93
Roofers	$24.00	$3.35	$27.35
Screed/Wheelman	$29.65	$4.56	$34.21
Sheet Metal Workers	$25.25	$5.68	$30.93
Structural Iron And Steel Workers	$30.04	$7.22	$37.26
Tapers	$28.00	$1.71	$29.71
Telecommunications Equipment Installers And Repairers - Except Line Installers	$28.33	$6.08	$34.41
Telecommunications Line Installers And Repairers	$26.00	$4.83	$30.83
Tile And Marble Setters	$27.75	$6.73	$34.48

Welders are classified as the trade to which welding is incidental (e.g. welding structural steel is Structural Iron and Steel Worker)

Apprentices – The minimum wage rates for registered apprentices are the rates recognized in the sponsorship agreement for registered apprentices working in the pertinent classification.

For any other specific trade on this project not listed above, contact the Bureau of Labor Standards for further clarification.

Title 26 §1310 requires that a clearly legible statement of all fair minimum wage and benefits rates to be paid the several classes of laborers, workers and mechanics employed on the construction on the public work must be kept posted in a prominent and easily accessible place at the site by each contractor and subcontractor subject to sections 1304 to 1313.

Appeal – Any person affected by the determination of these rates may appeal to the Commissioner of Labor by filing a written notice with the Commissioner stating the specific grounds of the objection within ten (10) days from the filing of these rates.

A true copy

Attest: Scott R. Cotnoir

Scott R. Cotnoir
Wage & Hour Director
Bureau of Labor Standards

Expiration Date: 12-31-2024
Revision Date: 1-3-2024

00 73 46
Wage Determination Schedule

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End of Section 00 73 46

SECTION 01 11 00

SUMMARY OF WORK

PART l – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specifications, apply to this section.

1.2 SUMMARY

A. This section includes the following:

1. Work Covered by the Contract Documents;
2. Type of the Work;
3. Contract;
4. Permits;
5. Use of Premises;
6. Coordination;
7. Schedule of Values.

1.3 WORK COVERED BY THE CONTRACT DOCUMENTS

A. General

1. Name of Project: 2024 Cemetery Expansion
   Southern Maine Veterans' Cemetery
   83 Stanley Road, Springvale, Maine

2. General Description: Construction of New Burial Vaults Area A, Maintenance Building, Green Burial area in Area T, POW/MIA Monument

3. Contract Documents include plans and specifications entitled Southern Maine Veterans' Cemetery, Springvale, Maine – 2024 Cemetery Expansion Prepared by Walsh Engineering Associates, Inc., dated July 12, 2024.

4. Owner: State of Maine, Department of Defense
   Bureau of Maine Veteran's Services
   117 State House Station
   Augusta, ME 04333
   Tel: (207) 626-4464, Fax: (207) 626-4471

5. Project Designer/Engineer:
   Walsh Engineering Associates, Inc.
   1 Karen Drive, Suite 2A
   Westbrook, Maine 04092
   Tel: (207) 553-9898

B. Contract Documents: Contract Documents indicate the Work of Contract, and related provisions of Project which may include, but are not necessarily limited to, the following:

1. Existing site conditions and restrictions.
2. Other work prior to Work of Contract.
3. Coordination with existing work.
4. Other work subsequent to Work of Contract.
5. Alternates which are Work of Contract and Alternates, which are not Work of Contract.

C. Summary by References: Work of the Contract can be summarized by references to the Contract, General Conditions, Supplementary Conditions, Specification Sections, addenda and modifications to the contract documents issued subsequent to the initial printing of this project manual, and including, but not necessarily limited to, printed material referenced by any of these. It is recognized that work of the Contract is also unavoidably affected or influenced by governing regulations, natural phenomenon, including weather conditions and other forces outside the contract documents.

D. Abbreviated Written Summary: Briefly and without force and effect upon the contract documents, the Work of the Contract can be summarized as follows:

Base Bid: Area B Cremains Burial and Area F Columbaria *– Project entails regrading, removal of rocks, addition of loam and seed and installation of an irrigation system in Area B and construction of four new Columbarium Walls with 210 niches each in Area F; concrete, bituminous and paver sidewalks; underdrained soil filter; including excavation, removal of rock and ledge, drainage, monumentation and landscaping.*

Alternate 1: Area F Columbarium Foundations – *Project entails construction of four additional concrete foundations for future columbarium walls.*

Alternate 2: Area F Concrete Sidewalks – *Bid price to be increase or decrease in construction cost for substitution of concrete sidewalks for bituminous sidewalks to Area F Columbarium Walls.*

Alternate 3: Gettysburg Plaque – *Provide and install free standing Gettysburg Plaque, including plaque, foundations and landscaping.*

1.4 TYPE OF CONTRACT

A. Base Bid and Alternates 1, 2, and 3, if selected, would be constructed under a single prime contract with the Bureau of Maine Veterans' Services.

1.5 PERMITS

A. The Owner will notify the Maine Department of Environmental Protection of changes made to the Site Location of Development Act Permit under MRS Title 38 §488. An amendment to the approved Site Plan from the City of Sanford is required for this project and will be obtained by the owner. Any other state and local permits shall be obtained by the contractor prior to any construction activity.

B. Fees for all other permits, included but are not limited to those required by private utility companies, State of Maine or federal entities, City of Sanford, shall be included in Contract Sum and paid by Contractor, unless otherwise specified.

1.6 USE OF PREMISES

A. General: Contractor shall have limited use of premises for construction operations as indicated on Drawings by the Contract limits of Work.

1.7 COORDINATION

A. General: The work of this Contract includes coordination of the entire work of the project with the Owner or Owner's Representative and any and all coordination with sub-contractors and suppliers.

1.8 SCHEDULE OF VALUES

A. Within 15 days of award of contract, submit a schedule of values to the Owner.

PART 2 – PRODUCTS (not applicable)

PART 3 – EXECUTION

3.1 COMMENCEMENT OF WORK

A. Once a contract is signed with the selected contractor, all work can begin including shop drawings.

B. Contractor shall not begin any work on site until site access is granted by the owner.

C. The Contractor shall be aware that funeral services are frequently conducted throughout the day at the cemetery. The Contractor must coordinate work with burial services in the vicinity. Heavy equipment operation may need to be shut down. Interruptions to work are intermittent.

3.2 BUILD AMERICA, BUY AMERICA ACT

A. Cemeteries must follow Build America, Buy America Act (BABA) requirements in Public Law, 117-58 that ensure all iron, steel, manufactured products, and construction materials United States produced. Cemeteries must certify that they will use grant funds for projects that meet BABA domestic content procurement preferences. All iron, steel, and construction materials used in VA-funded projects must be U.S. produced or manufactured. All manufactured products used in the project must U.S produced (cost of the components of the U.S. manufactured product must exceed 55%[1] of the total cost of all components).

[1] *effective October 25, 2022, more than 60 percent of the cost of its components must be U.S. mined, produced, or manufactured. The domestic content threshold further increases to 65 percent in calendar year 2024, and 75 percent in calendar year 2029. In the event no domestic products can meet the new thresholds or the cost to get them would be unreasonable, domestic content for manufactured products must exceed 55 percent from October 25, 2022, through December 31, 2029*

END OF SECTION 01 11 00

SECTION 01 21 00

ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements governing the following:

1. Quantity allowances.

B. See Division 01 Section "Unit Prices" for procedures for using unit prices.

1.2 SUBMITTALS (Not Used)

1.3 COORDINATION

A. Coordinate allowance items with other portions of the Work.

1.4 QUANTITY ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and ordered by Owner under allowance shall be included as part of the Base Bid and not part of the allowance.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALLOWANCES

A. Allowance No. 1: Include an allowance of 10 cubic yards of Open Rock removal as specified in Section 31 23 16 "Rock Removal". Cost for removal to be included in the Base Bid amount for ledge removal at Area F Columbaria at the Unit Price quoted on the Bid Form. Quantities above or below the allowance to be paid to the Contractor or returned to the Owner based on the actual quantity removed.

B. Allowance No. 2: Include procurement and installation of a 30 mil HDPE liner for the grassed underdrained soil filter if the minimum separation to ledge or seasonal groundwater cannot be attained as required in Note 10 of the detail. Installation to include sealing any seams and pipe penetrations per manufacturer's instructions. Allowance to be paid to Contractor if liner is required.

END OF SECTION 01 21 00

SECTION 01 22 00

UNIT PRICES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for unit prices
B. Related Sections include the following
   1. Division 01 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

1.3 DEFINITIONS

A. Unit price is an amount proposed by bidders, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work issued by allowance required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, hauling, disposal, installation, insurance, applicable taxes, overhead, and profit.
B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

PART 2 – PRODUCTS (not used)

PART 3 - EXECUTION (not used)

END OF SECTION 01 22 00

SECTION 01 25 00

SUBSTITUTION PROCEDURE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.
B. Related Requirements:
   1. Division 01 Section 01 22 00 "Unit Prices" for products selected under a unit price.
   2. Division 01 Section 01 23 00 "Alternates" for products selected under an alternate.
   3. Divisions 02 through 33 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
   1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
   2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Substitution Request Form: Use facsimile of form provided at end of Section.
   2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
      a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
      b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.

c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within three days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution by addendum.
a. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated or notification is not made by addendum.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

B. Products with asbestos: Asbestos containing materials are not to be purchased or installed in this project.

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 – PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
   a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
   b. Substitution request is fully documented and properly submitted.
   c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
   d. Requested substitution will not adversely affect Contractor's construction schedule.
   e. Requested substitution has received necessary approvals of authorities having jurisdiction.
   f. Requested substitution is compatible with other portions of the Work.
   g. Requested substitution has been coordinated with other portions of the Work.
   h. Requested substitution provides specified warranty.
   i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Article 9 of Section 00 72 00, Conditions of the Contract; specify time restrictions for submitting requests for Substitutions during the

bidding period to requirements specified in this section. Requests received after that time may be considered or rejected at discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
   a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
   b. Requested substitution does not require extensive revisions to the Contract Documents.
   c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
   d. Substitution request is fully documented and properly submitted.
   e. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
   f. Requested substitution will not adversely affect Contractor's construction schedule.
   g. Requested substitution has received necessary approvals of authorities having jurisdiction.
   h. Requested substitution is compatible with other portions of the Work.
   i. Requested substitution has been coordinated with other portions of the Work.
   j. Requested substitution provides specified warranty.
   k. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (not used)

END OF SECTION 01 25 00

SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

B. Related Requirements:

1. Division 01 Section "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
2. Division 01 Section "Unit Prices" for administrative requirements for using unit prices.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AlA Document G710, "Architect's Supplemental Instructions".

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within 20 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.

d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Division 0 l Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use CSI Form l3.6A, "Change Order Request (Proposal)," with attachments CSI Form l3.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail."

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, Architect will issue a Change Order form for signatures of Owner and Contractor.

B. Any Change Order that involves an adjustment to the Contract Sum or change of material requires VCGS approval.

PART 2 – PRODUCTS (not used)
PART 3 - EXECUTION (not used)

END OF SECTION 01 26 00

SECTION 01 29 00

PAYMENT PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:

1. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
2. Division 01 Section "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
   a. Application for Payment forms with continuation sheets.
   b. Submittal schedule.
   c. Items required to be indicated as separate activities in Contractor's construction schedule.
2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
3. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work; provide subschedules showing values coordinated with each element.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

a. Project name and location.
b. Name of Architect.
c. Architect's project number.
d. Contractor's name and address.
e. Date of submittal.

2. Submit draft of request for payment form.
3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
   a. Related Specification Section or Division.
   b. Description of the Work.
   c. Name of subcontractor.
   d. Name of manufacturer or fabricator.
   e. Name of supplier.
   f. Change Orders (numbers) that affect value.
   g. Dollar value of the following, as a percentage of the Contract Sum to nearest one hundredth percent, adjusted to total 100 percent.
      1) Labor.
      2) Materials.
      3) Equipment.
4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
   a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
9. Each item in the schedule of values and Applications for Payment shall be complete.Include total cost and proportionate share of general overhead and profit for each item.
   a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
10. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
   1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
   1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.

C. Payment Application Forms: Use AlA Document G702 and AlA Document G703 Continuation Sheets as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
   1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made
   2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
   3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site
   1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
   2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
   3. Provide summary documentation for stored materials indicating the following:
      a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
      b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
      c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

F. Transmittal: Submit five signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24

hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. The list of subcontractors, principal suppliers and fabricators shall be used to designate which entities involved in the Work must submit waivers. The list shall be approved by the Owner.
4. Submit final Application for Payment with or proceeded by conditional final waivers from every entity involved with performance of the Work covered by the application that is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors;
2. Schedule of values;
3. Contractor's construction schedule (preliminary, if not final);
4. Submittal schedule (preliminary if not final);
5. List of Contractor's staff assignments;
6. Copies of building permits;
7. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work;
8. Initial progress report;
9. Report of preconstruction conference;
10. Certificates of insurance and insurance policies; and
11. Data needed to acquire Owner's insurance;

I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.

2. Final submittal of record documents and operation and maintenance data.
3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
4. Updated final statement, accounting for final changes to the Contract Sum.
5. Evidence that claims have been settled.
6. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
7. Final liquidated damages settlement statement.

PART 2 – PRODUCTS (not used)
PART 3 - EXECUTION (not used)

END OF SECTION 01 29 00

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. Coordination Drawings.
   2. Administrative and supervisory personnel.
   3. Project meetings.

B. Related section include the following:
   1. Division 01 Section "Closeout Procedures" for coordination Contract closeout.

1.3 COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.
   4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical. Coordinate location of pipes, conduits, ducts and similar items in confined areas to assure proper fit and access. Contractor is responsible for handling interferences created by the work of subcontractors (example: sprinkler pipe interfering with installation of duct work; duct work interfering with installation of light fixtures).

B. Coordinate with contractors doing work for the Owner under separate contracts. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

C. Prepare similar memoranda for Owner and separate contractors if coordination of their work is required.

D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's Construction Schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.
9. Project closeout activities.

E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1.4 SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings as determined by the Contractor and subcontractor, if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
b. Indicate required installation sequences.
c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.5 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.
1. Include special personnel required for coordination of operations with other contractors.

1.6 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
   1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
   2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
   3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Architect, and VCGS within three days of the meeting.

B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
   1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
   2. Agenda: Discuss items of significance that could affect progress, including the following:
      a. Tentative construction schedule;
      b. Phasing;
      c. Critical work sequencing and long-lead items;
      d. Designation of key personnel and their duties;
      e. Procedures for processing field decisions and Change Orders;
      f. Procedures for requests for interpretations (RFIs);
      g. Procedures for testing and inspecting;
      h. Procedure for commissioning;
      i. Procedures for processing Applications for Payment;
      j. Distribution of the Contract Documents;
      k. Submittal procedures;
      l. Preparation of Record Documents;
      m. Use of the premises and existing building;
      n. Work restrictions;
      o. Owner's occupancy requirements;
      p. Responsibility for temporary facilities and controls;
      q. Construction waste management and recycling;
      r. Parking availability;
      s. Office, work, and storage areas;
      t. Equipment deliveries and priorities;
      u. First aid;
      v. Security;
      w. Progress cleaning; and
      x. Working hours.
      y. Record drawings and documents process
   3. Minutes: Record and distribute meeting minutes.
   4. Include action items and responsible party.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
   1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
   2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
      a. The Contract Documents;
      b. Options;
      c. Related requests for interpretations (RFIs);
      d. Related Change Orders;
      e. Purchases;
      f. Deliveries;
      g. Submittals;
      h. Review of mockups;
      i. Possible conflicts;
      j. Compatibility problems;
      k. Time schedules;
      l. Weather limitations;
      m. Manufacturer's written recommendations;
      n. Warranty requirements;
      o. Compatibility of materials;
      p. Acceptability of substrates;
      q. Temporary facilities and controls;
      r. Space and access limitations;
      s. Regulations of authorities having jurisdiction;
      t. Testing and inspecting requirements;
      u. Installation procedures;
      v. Coordination with other work;
      w. Required performance results;
      x. Protection of adjacent work; and
      y. Protection of construction and personnel.
   3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
   4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include action items and responsible party.
   5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Monthly Meetings: Conduct progress meetings at monthly intervals. Coordinate dates of meetings with preparation of payment requests.
   1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the

conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
   a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
      1) Review schedule for next period.
   b. Application for Payment: Contractor shall bring copy of Application for Payment to meeting. Review Application for Payment and required attachments, including record drawing and documents status, waivers of mechanic's liens, list of completed tests, checklists, and similar requirements for the work are submitted and in compliance with the Contract Documents.
   c. Review present and future needs of each entity present, including the following:
      1) Interface requirements;
      2) Sequence of operations;
      3) Status of submittals;
      4) Deliveries;
      5) Off-site fabrication;
      6) Access;
      7) Site utilization;
      8) Temporary facilities and controls;
      9) Work hours;
      10) Hazards and risks;
      11) Progress cleaning;
      12) Quality and work standards;
      13) Status of correction of deficient items;
      14) Field observations;
      15) Requests for interpretations (RFIs);
      16) Status of proposal requests;
      17) Pending changes;
      18) Status of Change Orders;
      19) Pending claims and disputes;
      20) Documentation of information for payment requests; and
      21) Record drawings and documents status.
3. Minutes: Record and distribute the meeting minutes.
   a. Include action items and responsible party.
   b. The Veterans Cemetery Grant Service (VCGS) shall be copied on all published meeting minutes, progress reports and monthly field reports.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
   a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made

or recognized. Issue revised schedule concurrently with the report of each meeting.

E. Coordination/Progress Meetings: Conduct Project coordination/progress meetings at regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences

1. Attendees: In addition to representatives of Owner, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to Combined Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    b. Review present and future needs of each contractor present, including the following:
        1) Interface requirements;
        2) Sequence of operations;
        3) Status of submittals;
        4) Deliveries;
        5) Off-site fabrication;
        6) Access;
        7) Site utilization;
        8) Temporary facilities and controls;
        9) Work hours;
        10) Hazards and risks;
        11) Progress cleaning;
        12) Quality and work standards; and
        13) Change Orders;
3. Conduct coordination meetings with mechanical, plumbing, sprinkler and electrical trades, and other trades affected by the work. Before the trades start work in an area of the building, review structural clearances and locations of ducts, pipes and fittings, conduits, light fixtures, equipment and other items that affect location and proper fit. Prepare coordination drawings as determined by the Contractor and subcontractors, where limited space availability necessitates maximum utilization of space for efficient installation of different components. Verify depths and clearances before fabrication of ductwork.
4. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.
    a. Include action items and responsible party.

b. The Veterans Cemetery Grant Service (VCGS) shall be copied on all published meeting minutes, progress reports and monthly field reports.

PART 2 - PRODUCTS (not used)
PART 3 - EXECUTION (not used)

END OF SECTION 01 31 00

SECTION 01 33 00

SUBMITTAL PROCEDURE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
   1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
   2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
   3. Division 01 Section "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
   4. Division 01 Section "Closeout Procedures" for submitting warranties
   5. Divisions 02 through 32 Sections for specific requirements for submittals in those sections.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Engineer's responsive action.

B. Informational Submittals: Written information that does not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
   2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
      a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

B. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to

transmit submittals enough m advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days minimum for initial review of each submittal Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days minimum for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Engineer's consultants, Owner, or other parties is indicated, allow 21 days minimum for initial review of each submittal.

C. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Engineer.
3. Include the following information on label for processing and recording action taken:
   a. Project name;
   b. Date;
   c. Name and address of Engineer;
   d. Name and address of Contractor;
   e. Name and address of subcontractor;
   f. Name and address of supplier;
   g. Name of manufacturer;
   h. Submittal number or other unique identifier, including revision identifier;
      1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01A).
   i. Number and title of appropriate Specification Section;
   j. Drawing number and detail references, as appropriate;
   k. Location(s) where product is to be installed, as appropriate; and
   l. Other necessary identification.

D. Deviations: Encircle or otherwise specifically identify deviations from the Contract Documents on submittals. Mark with dark colored pen that permits photocopying. Do not use highlighter.

E. Additional Copies: Unless additional copies are required for final submittal, and unless Engineer observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
1. Additional copies submitted for maintenance manuals will be marked with action taken and will be returned.

F. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Engineer will return submittals, without review, received from sources other than Contractor.
   1. Transmittal Form: Provide locations on form for the following information:
      a. Project name;
      b. Date;
      c. Destination (To:);
      d. Source (From:);
      e. Names of subcontractor, manufacturer, and supplier;
      f. Category and type of submittal;
      g. Submittal purpose and description;
      h. Specification Section number and title;
      i. Drawing number and detail references, as appropriate;
      j. Transmittal number, numbered consecutively;
      k. Submittal and transmittal distribution record;
      l. Remarks; and
      m. Signature of transmitter.
   2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Engineer on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.

G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
   1. Note date and content of previous submittal.
   2. Note date and content of revision in label or title block and clearly indicate extent of revision.
   3. Resubmit submittals until they are approved.

H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

I. Use for Construction: Use only final submittals with mark indicating approval taken by Engineer.

1.5 CONTRACTOR'S USE OF ENGINEER'S CAD FILES

A. Copies of drawings in digital format will be made available by the Engineer to those requesting same in accordance with the "Agreement Between Engineer of Record and Owner or Contractor for Transfer of Computer Aided Drafting (CAD) Files On Electronic Media" forms attached to the end of this section. Agreement form shall be filled out and signed by each party requesting computer aided drafting (CAD) files before electronic media is released to them.

PART 2 – PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.
   1. Mark with dark colored pen that permits photocopying. Do not use highlighter.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
   1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
   2. Mark each copy of each submittal to show which products and options are applicable.
   3. Include the following information, as applicable:
      a. Manufacturer's written recommendations;
      b. Manufacturer's product specifications;
      c. Manufacturer's installation instructions;
      d. Standard color charts;
      e. Manufacturer's catalog cuts;
      f. Wiring diagrams showing factory-installed wiring
      g. Printed performance charts;
      h. Operational range diagrams;
      i. Mill reports;
      j. Standard product operation and maintenance manuals;
      k. Compliance with specified referenced standards;
      l. Testing by recognized testing agency;
      m. Application of testing agency labels and seals; and
      n. Notation of coordination requirements.
   4. Submit Product Data before or concurrent with Samples.
   5. Number of Copies: Submit three copies of Product Data, unless otherwise indicated. Engineer will return one copy for reproduction and distribution. Mark up and retain one returned copy as a Project Record Document.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base shop Drawings on reproductions of the Contract Documents or standard printed data.
   1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
      a. Dimensions;
      b. Identification of products;
      c. Fabrication and installation drawings;
      d. Roughing-in and setting diagrams;
      e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring;
      f. Shopwork manufacturing instructions;
      g. Templates and patterns;
      h. Schedules;

i. Design calculations;
j. Compliance with specified standards;
k. Notation of coordination requirements;
l. Notation of dimensions established by field measurement;
m. Relationship to adjoining construction clearly indicated;
n. Seal and signature of professional engineer if specified; and
o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
3. Number of Copies: Submit three opaque copies of each submittal. Engineer will retain two copies; Engineer will return one copy for reproduction and distribution. Mark up and retain one returned copy as a Project Record. Drawing and copies where copies are required for operation and maintenance manuals.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:
a. Generic description of Sample;
b. Product name and name of manufacturer;
c. Sample source; and
d. Number and title of appropriate Specification Section.
3. Disposition: Maintain sets of approved Samples at Project site, available for quality control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
a. Number of Samples: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Engineer will return submittal with options selected.
5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of

manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

a. Number of Samples: Submit three sets of Sample. Engineer will retain two sample sets; remainder will be returned
   1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated
   2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
   1. Type of product. Include unique identifier for each product.
   2. Number and name of room or space.
   3. Location within room or space.
   4. Number of Copies: Submit three copies of product schedule or list, unless otherwise indicated. Engineer will return one copy for reproduction and distribution.
      a. Mark up and retain one returned copy as a Project Record Document.

F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

G. Submittals Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

H. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."

I. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."

J. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
   1. Name, address, and telephone number of entity performing subcontract or supplying products.
   2. Number and title of related Specification Section(s) covered by subcontract.
   3. Drawing number and detail references, as appropriate, covered by subcontract
   4. Number of Copies: Submit three copies of subcontractor list, unless otherwise indicated. Engineer will return one copy.
      a. Mark up and retain one returned copy as a Project Record Document.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.
   1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Engineer will not return copies.
   2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
   3. Test and Inspection Reports: Comply with requirements specified in Division 01 Section "Quality Requirements."

B. Coordination Drawings: Comply with requirements specified in Division 01 Section "Project Management and Coordination."

C. Contractor's construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation".

D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of Engineers and owners, and other information specified.

E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience, where required.

H. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

I. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

J. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on

evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

L. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
1. Name of evaluation organization;
2. Date of evaluation;
3. Time period when report is in effect;
4. Product and manufacturers' names;
5. Description of product;
6. Test procedures and results; and
7. Limitations of use.

M. Schedule of Tests and Inspections: Comply with requirements specified in Division 1 Section "Quality Requirements."

N. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

O. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product Include written recommendations for primers and substrate preparation needed for adhesion.

P. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

Q. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

R. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

S. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
1. Preparation of substrates;
2. Required substrate tolerances;
3. Sequence of installation or erection;
4. Required installation tolerances;

5. Required adjustments; and
6. Recommendations for cleaning and protection.

T. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
1. Name, address, and telephone number of factory-authorized service representative making report;
2. Statement on condition of substrates and their acceptability for installation of product;
3. Statement that products at Project site comply with requirements;
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken;
5. Results of operational and other tests and a statement of whether observed performance complies with requirements;
6. Statement whether conditions, products, and installation will affect warranty;
7. Other required items indicated in individual Specification Sections.

U. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

V. Material Safety Data Sheets (MSDSs): Submit information directly to Owner at end of the project; do not submit to Engineer. Maintain copy at the site for the duration of the construction.
1. Engineer will not review submittals that include MSDSs and will return them.

2.3 DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Engineer.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.

1. The Contractor shall review submittals for completeness and compliance with the Contract Documents. If submittal contains substitutions, Contractor shall process substitutions in accordance with Division 01 Section "Substitutions and Product Options," and not part of specified Shop Drawings or Product Data submittals. Contractor is responsible for keeping Subcontractors on time with the submittal schedule. If the Contractor submits submittals that are repeatedly rejected, requiring the Engineer to perform multiple reviews of the same submittal because of the failure to properly prepare and complete the submittals:
   a. Owner will compensate Engineer for such additional services.
   b. Owner will deduct the amount of such compensation from the final payment to the Contractor.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ENGINEER'S ACTION

A. General: Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or modifications required and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.

C. The Engineer's marking of "Approved", " Approved as Noted" or similar verbiage means submittal has been reviewed for general conformance to the contract documents only and does not mean unqualified acceptance. The Contractor is fully responsible for compliance with the contract documents.

D. Informational Submittals: Engineer will review each submittal and will not return it, or will return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.

E. Partial submittals are not acceptable, will be considered non-responsive, and will be returned without review.

F. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

Agreement between Walsh Engineering Associates, Inc. (WEA) and Recipient (Named Below) for Transfer of Computer Aided Drafting (CAD) Files on Electronic Media

Recipient

Company Name: Contact:

Email Address: Phone Number:

Project Name: Location:

Document Owner: Walsh Engineering Associates, Inc.

The Document Owner will provide the following CAD files, dated _____ to the Recipient:

These CAD files were prepared using Autodesk Civil 3D 2021 and converted back to AutoCAD 2004.

Recipient shall pay the Document Owner a service fee of $_____.

Terms and Conditions

1. The Document Owner makes no representation as to the compatibility of the CAD files with any hardware or software.

2. Since the information set forth on the CAD files can be modified unintentionally or otherwise, the Document Owner reserves the right to remove all indication of its ownership and/or involvement from each electronic display.

3. In accepting and utilizing any drawings, reports, and data on any form of electronic media generated and furnished by the Document Owner, the Recipient agrees and acknowledges that such electronic files are instruments of service of the Document Owner, who shall be deemed the author, and shall retain all common law, statutory law, and other rights, including copyrights.

4. The Document Owner makes no representation to the Recipient regarding the accuracy, completeness, or permanence of CAD files, nor for their merchantability or fitness for a particular purpose. In the event of a conflict between the Document Owner's printed plans and the CAD files, the printed plans shall govern.

5. In consideration of the substantial risks to the Document Owner in rendering professional services in connection with this project, the Recipient agrees to indemnify and hold harmless the Document Owner, and agrees to make no claim and hereby waives, to the fullest extent permitted by law, any claim or cause of action of any nature against the Document Owner, its officers, directors, employees, agents, sub-consultants, or sub-contractors, which may

arise out of or any connection with this project or the performance by any of the parties above-named of services under this agreement.

6. The Recipient and its consultants or sub-contractors shall, to the fullest extent permitted by law, indemnify, defend and hold harmless the Document Owner, its officers, directors, employees, agents, sub-consultants or sub-contractors from all claims, damages, losses, expenses, penalties and liabilities of any kind, including attorney's fees, arising out of or resulting from the use of the CAD files by the Recipient, or by third party recipients of the CAD files from the Recipient.

7. The Recipient agrees not to reuse these electronic files, in whole or in part, for any purpose other than for record keeping of the Project. The Recipient agrees not to transfer these electronic files to others without the prior written consent of the Document Owner. The Recipient further agrees that the Document Owner, its officers, directors, employees, agents and subconsultants (collectively, the Document Owner) shall have no responsibility or liability to the Recipient or others for any changes made by anyone other than the Document Owner or for any reuse of the electronic files without the prior written consent of the Document Owner. The Recipient waives any and all claims against the Document Owner arising out of or relating to the unauthorized use, reuse, or transfer of electronic files.

8. The Document Owner believes that no licensing or copyright fees are due to others on account of the transfer of the CAD files, but to the extent any are, the Recipient will pay the appropriate fees and hold the Document Owner harmless from such claims.

9. Payment of the service fee is due upon receipt of the CAD files. This form shall serve as the invoice for these services.

10. Under no circumstances shall delivery of electronic files for use by the Recipient or its consultants or sub-contractors be deemed a sale by the Document Owner, and the Document Owner makes no warranties, either express or implied, of merchantability and fitness for any particular purpose. In no event shall the Document Owner, its officers, directors, employees, agents, sub-consultants, or sub-contractors be liable for indirect or consequential damages as a result of the use or reuse of the electronic files by the Recipient, its consultants, its contractors, its sub-contractors, or any party to which the file is provided.

11. This agreement shall be governed by the laws of the principal place of business of the Document Owner, in the State of Maine.

12. By signing this agreement, the Recipient and any consultants, contractors, or sub-contractors it uses agrees to the above Terms and Conditions and to pay the associated fee.

Authorized Acceptance

Walsh Engineering Associates, Inc.	Recipient Signature
William R. Walsh, III, President	Name and Title (Printed)
Date	Date

END OF SECTION 01 33 00

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
   1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
   2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
   3. Requirements for Contractor to provide quality-assurance and -control services required by Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

C. Related sections include the following:
   1. Divisions 02 through 33 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Engineer.

C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples.

D. Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.

E. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.

F. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.

G. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e. plant, mill, factory, or shop.

H. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

I. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

J. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
   1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter". It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

K. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Engineer for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

1.5 SUBMITTALS

A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
1. Specification Section number and title;
2. Description of test and inspection;
3. Identification of applicable standards;
4. Identification of test and inspection methods;
5. Number of tests and inspections required;
6. Time schedule or time span for tests and inspections;
7. Entity responsible for performing tests and inspections;
8. Requirements for obtaining samples;
9. Unique characteristics of each quality-control service.

C. Reports: Prepare and submit certified written reports that include the following:
1. Date of issue;
2. Project title and number;
3. Name, address, and telephone number of testing agency;
4. Dates and locations of samples and tests or inspections;
5. Names of individuals making tests and inspections;
6. Description of the Work and test and inspection method;
7. Identification of product and Specification Section;
8. Complete test or inspection data;
9. Test and inspection results and an interpretation of test results;
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting;
11. Comments or professional opinion on whether tested or inspected Work and materials complies with the Contract Document requirements;
12. Name and signature of laboratory inspector;
13. Recommendations on retesting and reinspecting.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements

B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.

F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
   1. Requirement for specialists shall not supersede building codes and regulations governing the Work.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities
   1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
   2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
   1. Contractor responsibilities include the following:
      a. Provide test specimens representative of proposed products and construction;
      b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work;
      c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements;
      d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project;

e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work;
f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Engineer, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Engineer.
2. Notify Engineer seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship
4. Obtain Engineer's approval of mockups before starting work, fabrication, or construction.
a. Allow seven days for initial review and each re-review of each mockup.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed, unless otherwise indicated.

K. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Sections in Divisions 02 through 33.

1.7 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Payment for these services will be made by the Owner.
3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

B. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.

3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."

D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

E. Testing Agency Responsibilities: Cooperate with Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections
1. Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel Provide the following:
1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

H. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality- control services required by the Contract Documents. Submit schedule within 30 days of date established for commencement of the Work.

I. Distribution: Distribute schedule to Owner, Engineer, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 – PRODUCTS (not used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Engineer.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Engineer's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
2. Comply with the Contract Document requirements for Division 01 Section "Cutting and Patching".

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section includes temporary utilities, temporary controls, and construction facilities.
B. Temporary Utilities: Electricity, lighting, heat, ventilation, telephone service, water, and sanitary facilities.
C. Temporary Controls: Barriers, enclosures and fencing, protection of the Work, and water control.
D. Construction Facilities: Access roads, parking, progress cleaning, project signage, temporary staging and temporary buildings.
E. Related sections include the following:
   1. Division 01 Section "Closeout Requirements"

1.3 TEMPORARY ELECTRICITY:

A. Costs associated with temporary electricity will be the responsibility of the Contractor.
B. Maintain existing electrical systems and equipment, during the construction period, if utilized for temporary electricity.
C. Complement existing power service capacity and characteristics as required.
D. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each floor as required. Provide flexible power cords as required.
E. Permanent convenience receptacles may be utilized during construction.

1.4 TEMPORARY WATER SERVICE:

A. Coordinate with the Owner for use of existing facility water for construction purposes. Provide potable drinking water daily to areas where work is being performed.

1.5 TEMPORARY SANITARY FACILITIES:

A. Use of Owner's toilet facilities in the buildings will not be allowed. Contractor shall provide and maintain required temporary facilities and enclosures at time of project mobilization. Provide toilets in number and locations as to provide adequate facilities as the work and the work force progresses.
B. Maintain daily in clean and sanitary condition.
C. At end of construction, remove facilities.

1.6 BARRIERS:

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
B. Provide protection for plants designated to remain. Replace damaged plants.
C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.7 FENCING:

A. Install construction fencing per plans and as needed for project safety and security.

1.8 WATER CONTROL:

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.9 PROTECTION OF INSTALLED WORK:

A. Protect installed work and provide special protection where specified in individual specification sections.
B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
C. Provide protective coverings as necessary.

D. Prohibit traffic from landscaped areas.

1.10 SECURITY:

A. Provide security and facilities to protect work, and existing facilities from unauthorized entry, vandalism, or theft.

1.11 ACCESS:

A. Coordinate with the Owner to accommodate facility operations.
B. Provide and maintain access to fire hydrants, free of obstructions.
C. Provide means of removing mud from vehicle wheels before entering streets.
D. Existing on-site roads may be used for construction traffic.

1.12 PARKING:

A. Parking for construction personnel should be located at the contractor staging area. No on-street parking is allowed. Parking cannot interfere with daily operations.

1.13 PROGRESS CLEANING AND WASTE REMOVAL:

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
B. Collect and remove waste materials, debris, and rubbish from site daily and dispose off-site.
C. Each trade shall pick up and dispose of debris and rubbish generated by that trade in the execution of their work.
D. For general construction, each trade shall pick up the debris and rubbish, generated by that trade, and dispose of it in dumpsters furnished by the General Contractor.
E. Removal of debris, rubbish and other materials from the site.

1.14 TEMPORARY STAGING:

A. Provide temporary staging where required allowing all trades to perform the necessary work.

1.15 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Final Application for Payment inspection.
B. Remove underground installations to a minimum depth of 2 feet (600 mm). Grade site as indicated.
C. Clean and repair damage caused by installation or use of temporary work.
D. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

1.16 CLEANING AND PROTECTION:

A. General: Clean and protect work in progress, adjoining work, and Town and State roads on the basis of continuous maintenance.

1.17 PROTECTION OF UTILITIES:

A. General: Cooperate with the Owner and utility companies involved. Follow their recommendations and requirements for protection and repair of utilities. Maintain protection of utilities for the duration of the work. Prior to starting work, become familiar with all utilities and pipelines which may be affected by performance of the work and have them located in the field as work progresses.
B. Damage to Utilities: Repair damage resulting from Contractor's operations to the satisfaction of the Engineer and the utility company involved.
C. Repairs are at the Contractor's expense.
D. Adjustments in grade and alignment of the work or utilities may be made by the Engineer to avoid interference. Where utilities must be relocated, and the relocation has not been made part of the Drawings or Specifications, payment will be negotiated as extra work.
E. Contractor to contact/notify Dig Safe a minimum of 72 hours prior to mobilization to the Site.

1.18 ENVIRONMENTAL CONTROLS:

A. General: Specific environmental controls are shown on the Drawings or specified in other sections.
B. Dust Control: Use all means necessary to control dust caused by performance of the work, whether on or off the site. Perform sweeping periodically as directed by the Engineer or Owner.
C. Water Pollution Control: Take all precautions necessary to prevent contaminating, polluting, or silting of water courses or water storage areas.

D. Erosion Control: Follow all Maine DEP Best Management Practices (BMP's) and approved Erosion and Sedimentation Control Plan.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION (not applicable)

END OF SECTION 01 50 00

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

B. Related Sections include the following:
1. Division 01 Section "Alternates" for products selected under an alternate.
2. Division 01 Section "Substitutions and Product Options" for procedures and requirements for product substitutions.
3. Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout.
4. Divisions 01 through 32 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.
   1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
   2. If a dispute arises between contractors over concurrently selectable but incompatible products, Engineer will determine which products shall be used.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

B. Delivery and Handling:
   1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
   2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
   3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
   4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:
   1. Store products to allow for inspection and measurement of quantity or counting of units.
   2. Store materials in a manner that will not endanger Project structure.
   3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
   4. Store cementitious products and materials on elevated platforms.
   5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
   6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
   7. Protect stored products from damage and liquids from freezing.

8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract documents.
1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
3. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures".

PART 2 – PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Engineer will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Engineer's.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Division 01 Section "Substitutions and Product Options" to obtain approval for use of an unnamed product.

B. Product Selection Procedures:
1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, that complies with requirements.
6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, that complies with requirements.
7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Division 01 Section "Substitutions and Product Options" for consideration of an unnamed product or system.
8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Division 01 Section "Substitutions and Product Options" for consideration of an unnamed product by the other named manufacturers.
9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Engineer's sample. Engineer's decision will be final on whether a proposed product matches.
10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
    a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Engineer will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
    b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Engineer will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

PART 3 - EXECUTION (not used)

END OF SECTION 01 60 00

SECTION 01 73 00

EXECUTION REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
   1. Construction layout.
   2. General installation of products.
   3. Coordination of Owner-installed products.
   4. Progress cleaning.
   5. Starting and adjusting.
   6. Protection of installed construction.
   7. Correction of the Work.

B. Related Section include the following:
   1. Division 01 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
   2. Division 01 Section "Submittal Procedures" for submitting surveys.
   3. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording, of Owner-accepted deviation from indicated lines and levels, and final cleaning.

PART 2 – PRODUCTS (not used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
   1. Before construction, verify the location and points of connection of utility services.

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
   1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
      a. Description of the Work.
      b. List of detrimental conditions, including substrates.
      c. List of unacceptable installation tolerances.
      d. Recommended corrections.
   2. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Engineer. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings. If discrepancies are discovered, notify Engineer promptly.

B. General: Engage a land surveyor or professional engineer to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
3. Inform installers of lines and levels to which they must comply.
4. Check the location, level and plumb, of every major element as the Work progresses.
5. Notify Engineer when deviations from required lines and levels exceed allowable tolerances.
6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.

D. Building Lines and Levels: Locate and lay out lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Level foundations and piers from two or more locations.

E. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
1. Do not change or relocate existing benchmarks or control points without prior written approval of Engineer. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Engineer before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

3.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated
4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling, unless indicated otherwise.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
   1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Engineer.
   2. Allow for building movement, including thermal expansion and contraction
   3. Coordinate installation of anchorages. 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.

H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.
   1. No asbestos containing materials shall be used in the work.

3.5 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction forces.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.
   1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
   2. Preinstallation Conferences: Include Owner's construction forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
   1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
   2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 degrees Fahrenheit.
   3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work It is the Contactor's responsibility for job site safety.
   1. Remove liquid spills promptly.
   2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
      a. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly coated surfaces.
   3. Remove materials and debris that create tripping hazards.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove dirt, debris and garbage from concealed spaces, including stud cavities before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section "Quality Requirements".

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.9 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching"
   1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 73 00

SECTION 01 77 00

CLOSEOUT REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Inspection procedures.
   2. Warranties.
   3. Final cleaning.
   4. Project record documents.
   5. Operation and maintenance data (Submittals at Project Closeout).
   6. Spare parts and maintenance data.

B. Related Sections include the following:
   1. Division 01 Section "Payment Procedures" for requirements for Applications for payment for Substantial and Final Completion.
   2. Division 01 Section "Execution Requirements" for progress cleaning of project site.
   3. Divisions 01 through 32 Sections for specific closeout and special cleaning requirements for the work in those sections.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
   1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
   2. Advise Owner of pending insurance changeover requirements.
   3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
   4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   5. Prepare and submit Project Record Documents, operation and maintenance manuals, and similar final record information.
   6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
   7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.

8. Complete startup testing of systems.
9. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
10. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
11. Complete final cleaning requirements, including touchup painting.
12. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
13. Submit initial draft copy of operation and maintenance manuals at least 15 days before requesting inspection for Substantial Completion.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Engineer, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed Shop Drawings, Product Data, and Samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction

D. Record information concurrent with construction progress.

E. Record Drawings: Legibly mark each item to record actual construction including:
1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
3. Field changes of dimension and detail.
4. Details not on original Contract drawings.

F. Submit documents to Architect/Engineer with claim for final Application for Payment.

1.5 OPERATION AND MAINTENANCE DATA (Submittals at Project Closeout)

A. Submit data requested in each specification section, bound in 8-1/2 x 11 inch text pages, three D side ring binders with durable plastic covers.

B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.

C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, typed on white paper, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
   2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
      a. Significant design criteria.
      b. List of equipment.
      c. Parts list for each component.
      d. Operating instructions.
      e. Maintenance instructions for equipment and systems.
      f. Maintenance instructions for [special] finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
   3. Part 3: Project documents and certificates, including the following:
      a. Shop drawings and product data.
      b. Air and water balance reports.
      c. Certificates.
      d. Photocopies of warranties.

E. Submit 1 draft copy of completed volumes 15 days prior to final inspection. This copy will be reviewed and returned, with Architect/Engineer comments. Revise content of all document sets as required prior to final submission.

F. Submit two 2 sets of revised final volumes, within 14 days after comments from Architect/Engineer.

1.6 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra Products in quantities specified in individual specification sections.

B. Deliver to Owner; obtain receipt prior to final payment and provide the Architect with a copy of receipts.

1.7 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
   1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
   2. Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance
   3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
   4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
   1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 INSPECTION FEES

A. If Engineer performs reinspections due to failure of Work to comply with the claims of status of completion made by contractor, or, should Contractor fail to complete the work, or, should Contractor fail to promptly correct warranty items or work later found to be deficient:
   1. Owner will compensate Engineer for such additional services.
   2. Owner will deduct amount of such compensation from final payment to Contractor.

B. If the Work is not completed by date set in the Agreement, and the Engineer needs to perform additional Contract Administrative and on site observation duties.
   1. Owner will compensate Engineer for such additional services.
   2. Owner will deduct amount of such compensation from final payment to Contractor.

1.9 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
   1. Organize list of spaces in sequential order.

2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
   a. Project name;
   b. Date;
   c. Name of Engineer;
   d. Name of Contractor;
   e. Page number.

1.10 WARRANTIES

A. Submittal Time: Submit written warranties on request of Engineer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated in the contract documents.
   1. Unless indicated otherwise, all warranties shall commence on the date of Substantial Completion.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
   1. Submit final warranties as a package for the entire project, assembled and identified as described below.
   2. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
   3. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
   4. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
   5. Electronic Media: Submit copy of warranty binder on CD-R in PDF format Bookmark based on the table of contents, and for each warranty within each section.
   6. Provide additional copies of each warranty to include in operation and maintenance manuals.

D. Warranty Response Time: The Contract shall respond and begin to take necessary action within 7 days of receipt of written notification from the Owner. Response time for life safety items, and for building perimeter security shall be within 24 hours of receipt of written notification from the Owner.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
    a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    e. Remove snow and ice to provide safe access to site.
    f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    g. Sweep pre-cast concrete pavers broom clean.
    h. Remove labels that are not permanent.
    i. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
    j. Replace parts subject to unusual operating conditions.
    k. Leave Project clean and ready for occupancy.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or

dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01 77 00

SECTION 02 11 01

TREE AND PLANT PROTECTION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions (if any) apply to this Section.

1.02 DESCRIPTION OF WORK:

A. The extent of landscape work is shown on the Drawings and in schedules. Tree and plant protection includes, but is not limited to, the following:
   1. Protection of existing trees and shrubs to remain.
   2. Work around existing trees to remain.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

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

1.04 PROJECT CONDITIONS:

A. Install snow fencing when site areas, utility corridors and construction access ways have been determined and work limits established, prior to beginning clearing and grubbing, topsoil stripping, earthwork and other construction. Maintain in repair throughout construction period.

B. Throughout construction period, protect existing trees and shrubs to remain and vegetated areas to be left undisturbed from damage by construction activity including:
   1. Root area compaction.
   2. Materials and equipment storage stockpiles.
   3. Contaminated runoff from equipment cleaning and spillages of harmful substances.
   4. Disposal of boulders, rocks, soil, stumps, limbs, vegetative matter, debris, rubbish or waste.
   5. Avoidable cutting of roots.
   6. Breakage and de-barking.
   7. Nailing, hanging, cutting or attaching.
   8. Unapproved pruning.
   9. Grading within shrub masses and within the drip line of trees.
   10. Unapproved cutting of major roots.
   11. Damage to root system by flooding, ponding, filling mud or silt buildup.
   12. Damage by moving vehicles and equipment.
   13. Trampling, foot traffic, congregations and other intrusions by workmen.
   14. Other damaging occurrences.

C. If trees and shrubs to remain are severely injured or killed by construction operations and inadequate care, or die within one year after project completion, Contractor shall:
   1. Replace trees and shrubs under 3" cal. with new plants of same size, quality, and species meeting same requirements and installed and maintained as new plants under Landscaping Section.
   2. Remove damaged or killed plants, trees and roots, and pay as fixed liquidated damages:
      a. $1,000.00 for each tree 3" - 5" caliper.
      b. $2,500.00 for each tree 6" - 11" caliper.
      c. $5,000.00 for each tree 12" caliper or more.

D. Restore vegetated areas to be left undisturbed which are damaged with grasses and ground covers according to applicable provisions of Landscaping Section to satisfaction of Landscape Architect and replace or pay for trees and shrubs within areas as required in paragraphs above.

PART 2 – PRODUCTS

2.01 MATERIALS:

A. Snow fencing shall be approved by Landscape Architect.

PART 3 – EXECUTION

3.01 INSPECTION:

A. Prior to beginning work, examine trees and shrubs to remain and vegetated areas to be left undisturbed in review with Landscape Architect.
   1. Landscape Architect will review type, locations and extent of protective barriers to be installed as indicated on Drawings. In order to minimize damage to trees, shrubs and undisturbed areas, to account for construction and field conditions and improve protection, Landscape Architect may direct that:
      a. Locations of layouts, corridors, access ways and work limits be adjusted.
      b. Locations of area protection fencing and individual tree protection be adjusted.
   2. Contractor shall determine what additional protective barriers may be needed for adequate protection.

3.02 INSTALLATION OF PROTECTIVE BARRIERS:

A. Vegetated Area Protection: Install snow fencing attached to posts set no more than 8' on center along perimeter of each area.

B. Individual Tree Protection: Install snow fence at drip line of tree canopy or where surface roots are evident, whichever is further from tree trunk. Drive posts and/or excavate and backfill to make secure and plumb. Secure all necessary hardware to meet specifications and provide a fence system to meet requirements

for intended use. Modify configuration only where conditions do not permit as directed by Landscape Architect.

C. Secure signs to fencing and maintain; minimum one per individual tree or 25' spacing on area fencing.

3.03 WORKING AROUND EXISTING TREES AND SHRUBS TO REMAIN VEGETATED AREAS TO BE LEFT UNDISTURBED:

A. General:
1. When working within canopy spread of trees and in immediate vicinity of shrubs, use care not to damage roots and their soil environment.
2. Relocate work to avoid damage if so directed by Landscape Architect.
3. Perform work using manual methods unless Landscape Architect approves each specific piece of mechanical equipment being proposed for use.

B. Grubbing:
1. Conduct work as per Clearing and Grubbing Section 31 11 00.

C. Stripping Topsoil: Conduct work as per Soil Stripping and Stock piling section 31 14 13.

D. Excavating:
1. Conduct excavation work as per Excavation, Trenching and Backfill Section 31 22 13.
2. Do not cut main lateral roots and tap roots. Cut only smaller roots which interfere with installation of new work with sharp pruning instruments. Do not break and chop roots.

E. Cutting and Filling:
1. Where grade cuts expose major roots and massive root systems, promptly spread 150 mm protective covering of topsoil over the tops and ends of the exposed roots and water in. Protect roots from further hazards and construction operations.
2. When existing grade at edge of canopy spread of trees and shrubs is higher than adjacent proposed subgrade, cut gently, sloping transition outward from edge and down to proposed subgrade.
3. When existing grade at edge of canopy spread of trees and shrubs is lower than adjacent proposed subgrade, place fill to form gently sloping transition outward from edge of canopy spread and upward to proposed subgrade.

F. Topsoiling:
1. When installing topsoil in stripped areas adjacent to canopy edges and vegetated areas to remain undisturbed, do not cover adjacent edges with soil unless otherwise indicated on Drawings, approved by Landscape Architect and except as follows:
a. In order to eliminate sharp grade breaks in proposed finish grades up and down, feather depth of topsoil out over short

distance into vegetated area and area beneath canopy blending surfaces together smoothly.

2. Where it is required to raise grades within canopy and vegetated areas, use topsoil placed by hand without compaction and overfill to compensate for natural settlement as follows:
   a. Minor fills over 100mm or less: Fill with topsoil placed in single layer and fine grade.
   b. Moderate fills greater than 100 mm or more: Place layer of approved fill material to 150 mm below finish grade and cover with approved drainage fabric. Fill with topsoil placed in single layer and fine grade.

3.04 MAINTENANCE:

A. Routinely inspect protective barriers, trees, shrubs and vegetated areas for damage and conditions which are causing damage and may cause damage and submit reports as specified. Following Landscape Architect's review and authorization, repair, treat and take corrective action without delay, at no additional cost to the Owner.
   1. Inspect immediately after rains and during periods of runoff for ponding and silting caused by drainage from construction areas. Promptly drain and remove mud and silt back to natural grade.
   2. Inspect and remove boulders, rocks, soil, stumps, limbs, vegetative matter, debris, rubbish and waste that has accumulated.
   3. Water trees and plants to remain as required to maintain their health throughout construction period.

3.05 CLEANING:

A. Remove protection materials at end of construction period when directed by Landscape Architect and dispose of off site.

END OF SECTION

SECTION 02 41 13

PAVING & STRUCTURE REMOVAL

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. Description of work: Provide labor, materials, equipment, and services necessary for proper and complete paving removal as indicated on the Drawings and as herein specified including the following items:

1. Concrete removal and disposal.
2. Pavement removal and disposal.
3. Temporary erosion and sedimentation control measures

1.3 MATERIAL OWNERSHIP

A. Removed materials shall become Contractor's property and shall be removed from Project site, except for materials that are indicated to be stockpiled and re-used, or otherwise remain the Owner's property.

1.4 SUBMITTALS

A. Existing Conditions: Documentation of paved areas that establishes preconstruction conditions that might be misconstrued as damage caused by removal activities.

1. Use sufficiently detailed photographs or videotape.
2. Include plans and notations to indicate specific breakage and damage conditions and quantities of sections of paved areas.

1.5 QUALITY ASSURANCE

A. Pre-construction Conference: Conduct conference at Project site.

B. Schedule: Provide Architect with detailed schedule of demolition work.

1.6 PROJECT CONDITIONS

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

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.

2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where directed.

C. Utility Locator Service: The Contractor shall notify utility locator service for area where Project is located and perform the following actions prior to site clearing.

1. Pre-mark the boundaries of your planned excavation with white paint, flags or stakes, so utility crews know where to mark their lines.

2. Call Dig Safe, at 1-888-DIGSAFE, at least three business days, but no more than 30 calendar days, before starting work.

3. If blasting, notify Dig Safe at least one business day in advance.

4. Wait three business days for lines to be located and marked with color-coded paint, flags or stakes. Note the color of the marks and the type of utilities they indicate. Transfer these marks to the As-Built drawings.

5. Contact the landowner and other non-member utilities (water, sewer, gas, etc.), for them to mark the locations of their underground facilities. Transfer these marks to the As-Built drawings.

6. Re-notify Dig Safe and the non-member utilities if the digging, drilling or blasting does not occur within 30 calendar days, or if the marks are lost due to weather conditions, site work activity or any other reason.

7. Hand dig within 18 inches in any direction of any underground line until the line is exposed. Mechanical methods may be used for initial site penetration, such as removal of pavement or rock.

8. Dig Safe requirements are in addition to town, city and/or state DOT street opening permit requirements.

9. For complete Dig Safe requirements, call the PUC or visit their website.

10. If damage, dislocation, or disturbance of any underground utility line is observed, immediately notify the affected utility. If damage creates safety concerns, call the fire department and take immediate steps to safeguard health and property.

11. Any time an underground line is damaged or disturbed, or if lines are improperly marked, the Contractor must file an Incident Report with the PUC. For an Incident Report form visit www.state_me.us/mpuc or call the PUC at 800-452-4699.

D. Do not commence removal operations until temporary erosion and sedimentation control and plant protection measures are in place.

E. Soil Stripping, Handling, and Stockpiling: Perform when the topsoil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Erosion and sedimentation control materials and methods are described in Site Appendix "A" entitled,

1. Erosion and Sedimentation Control Plan for Columbarium Niche Walls at Southern Veterans' Memorial Cemetery, 83 Stanley Road, Springvale, Maine.

2. Section 31 25 00

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction

B. 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 requirements of authorities having jurisdiction. The Contractor shall conduct his operations in conformity with all Federal and State permit requirements concerning water, air, and noise pollution, and the disposal of contaminated or hazardous materials. Erosion control measures shown on the Drawings are minimum only and are not intended to be complete. Satisfy the current requirements of the regulatory agencies. Comply with materials and procedures listed on the "Erosion and Sedimentation Control Plan Appendix "A" for temporary erosion and sedimentation control.

B. Inspect, maintain, and repair erosion and sedimentation control measures during construction until permanent vegetation has been established.

C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal once 85% rigorous vegetative grown has been achieved.

3.3 CONCRETE REMOVAL

A. The full depth of existing concrete shall be removed in the areas indicated on the Drawings.

Prior to removal, concrete pavement shall be neatly vertically sawcut perpendicular to the direction of travel at the limits of removal indicated on the Drawings.

B. Contractor shall prevent damage to paved areas outside the limits of removal indicated on the plans.

C. Removed pavement shall become the property of the Contractor and shall be disposed properly disposed.

D. Damage to concrete outside the limits of removal caused by the Contractor's activities shall be repaired to the original condition by the Contractor at no additional cost to the Owner.

3.4 PAVEMENT REMOVAL

A. The full depth of existing pavement shall be removed in the areas indicated on the Drawings. Prior to removal, pavement shall be neatly vertically sawcut perpendicular to the direction of travel at the limits of removal indicated on the Drawings.

B. Contractor shall prevent damage to paved areas outside the limits of removal indicated on the plans.

C. Removed pavement shall become the property of the Contractor and shall be disposed properly disposed.

D. Damage to concrete outside the limits of removal caused by the Contractor's activities shall be repaired to the original condition by the Contractor at no additional cost to the Owner.

3.5 MONUMENT RELOCATION

A. Contractor shall remove existing monuments and relocate as shown on the plans. Contractor shall exercise care in handling monument so as not to damage it. Any damage shall be immediately reported to the owner.

B. Monument shall be replaced in the location shown on the plans and reset in a similar manner as in the original location.

END OF SECTION 02 41 13

SECTION 03 30 00 - CONCRETE WORK:

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

A. Provide all cast-in-place concrete work.
B. Provide all precast concrete work.
C. Provide all metal inserts, anchor bolts and cast-in items required for construction.

1.02 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of following codes, specifications and standards (latest edition with current amendments), except where more stringent requirements are shown or specified:

1. ACI 301 "Specifications for Structural Concrete for Buildings."
2. ACI 318 "Building Code Requirements for Reinforced Concrete."
3. ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures."
4. Concrete Reinforcing Steel Institute, "Manual of Standard Practice."
5. Other ACI and ASTM specifications noted herein.

B. Testing and Services by Contractor: Performed by an approved testing laboratory at the Contractor's expense:

Material evaluation tests
Concrete mix designs
Tests not specifically indicated to be done at Owner's expense including retesting of rejected materials and installed work.

Furnish equipment including buckets, shovels, and wheelbarrows for proper sampling of concrete mix, molds for compression test specimens, facilities for storing and curing specimens at the job site, and labor to assist technician performing field tests.

C. Materials and installed work may require testing and retesting at any time during the progress of the work as directed by the Engineer. Allow free access to material stockpiles and facilities. These tests will be done by an independent, approved laboratory at the Contractor's expense.

D. Testing by Owner: Field tests will be by the Engineer's representative or by an independent testing laboratory. Tests are to be done for slump, air content and concrete temperature and compression test specimens will be taken. See Part 3, Execution.

E. Field Testing for Small Placements: For placements of 15 cubic yards or less, variation from the ASTM requirement for sampling the middle portion of the batch for testing will be required. This is to prevent the first portion of a batch of defective concrete from being used in a small placement. Prior to small placements, meet with Engineer and determine an acceptable testing procedure based on the first portion of each batch.

1.03 SUBMITTALS:

A. Product Data: Submit manufacturer's product data with application and installation instructions for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others as requested by Engineer.

B. Shop Drawings; Reinforcement: Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement required at openings through concrete structures.

C. Samples: Submit samples of materials as specified and as otherwise requested by Engineer, including names, sources and descriptions.

D. Laboratory Test Reports and Mix Designs: Submit laboratory test reports for concrete materials and mix design test as specified.

E. Material Certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted by Engineer. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

PART 2 - PRODUCTS

2.01 FORM MATERIALS:

A. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct formwork complying with ACI 347, for exposed concrete surfaces with plywood, metal, metal-framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient stiffness to withstand pressure of newly-placed concrete without bow or deflection.

B. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal or other acceptable material.

C. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain or adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces. Form coating shall not come in contact with any reinforcing. Form coating that comes in contact with reinforcing shall be removed in its entirety prior to placement of concrete.

D. Form Ties: Factory-fabricated, adjustable-length, removable or snapoff metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.

Unless otherwise indicated, provide ties so portion remaining within concrete after removal is at least 1" inside concrete.

Unless otherwise shown, provide form ties which will not leave holes larger than 1" diameter in concrete surface.

2.02 REINFORCING MATERIALS:

A. Reinforcing Bars: ANSI/ASTM A 615, Grade 60, new deformed bars.

B. Welded Wire Fabric (WWF): ANSI/ASTM A 185, welded steel wire fabric, sheet type.

C. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI recommendations, unless otherwise acceptable.

For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

2.03 CONCRETE MATERIALS:

A. Portland Cement: ANSI/ASTM C 150, Type II, unless otherwise acceptable to Engineer.

Use one brand of cement throughout project, unless otherwise acceptable to Engineer.

B. Normal Weight Aggregates: ANSI/ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.

Local aggregates not complying with ANSI/ASTM C 33 but which have shown by special test or actual service to produce concrete of adequate strength and durability may be used when acceptable to the Engineer.

C. Water: Potable, free of any substances that may be deleterious to concrete or reinforcing steel.

D. Air-Entraining Admixture: ANSI/ASTM C 260.

E. Mid-Range Water-Reducer: ANSI/ASTM C 494, Type A or F, and contain not more than 1% chloride ions.

F. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F or G for structures needing 0.40 water cement ratio and contain not more than 1% chloride ions.

G. Fibrous Concrete Reinforcement for Slabs on Grade: 100 percent virgin polypropylene fibers specially manufactured for use as concrete reinforcement. Fibrous concrete reinforcement shall be as manufactured by Fibermesh Company, or approved equivalent.

Physical Characteristics:
1. Specific gravity: 0.9
2. Tensile strength: 100 ksi
3. Fiber lengths: 3/4 inch

H. Calcium chloride not permitted.

2.04 RELATED MATERIALS:

A. Non-Shrink Grout: CRD-C 588, factory pre-mixed grout with minimum 1000 psi compressive strength in 1 day.

Products: Subject to compliance with requirements, provide one of the following:

Type D, Non-metallic
"Masterflow 713;" Master Builders.
"Sonogrout;" Sonneborn-Contech.
"Euco-NS;" Euclid Chemical Co.
"Five Star Grout;" U.S. Grout Co.

B. Liquid Water-Repellent Penetrating Sealer: Liquid type penetrating sealer equivalent to Sikagard 701W as produced by the Sika Corporation or approved by Engineer.

C. Bonding Compound: Polyvinyl acetate, rewettable type.

D. Bituminous Dampproofing: Equal to brush grade foundation coating by Euclid.

F. Vapor Barrier: Stego Wrap 15-mil by Stego Industries, LLC (no alternates allowed). Contact Matt McMonagale at Tel# 973-667-0986. (Vapor barrier has been determined and selected by others.) Install per manufacturer recommendations.

2.05 PROPORTIONING AND DESIGN OF MIXES:

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to Engineer for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing unless otherwise acceptable to Engineer.

B. Submit written reports to Engineer of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by Engineer. Include the following in mix design submittals:

Identification of aggregate source of supply.
Results of compliance tests for aggregates.
Scale weights of each aggregate.
Absorbed water in each aggregate.
Brand, type, and amount of each cement and each admixture.
Proportions of each material required per cubic yard.

C. Design Mixes to provide normal weight concrete with the following properties:

1. Interior Slabs:
   28 day compressive strength, 3000 PSI
   Max. agg. size: 3/4"
   No (0%) entrained air content by design
   Max. water-cement ratio: 0.50
2. Exterior Slabs:
   28 day compressive strength, 4500 PSI
   Max. agg. size: 1½"
   6 +/- 1% entrained air content by design
   Max. water-cement ratio: 0.40

3. Walls, Footings:
   28 day compressive strength, 4000 PSI
   Agg. size: 3/4"
   Air content 6%± 1% by volume

Max. water-cement ratio: 0.45

4. Slump: All concrete placements:
Not less than 1", not more than 3". (Use a mid-range water reducer if a higher slump is desired. Maximum slump after admixture has been added is 6 inches.)

D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by Engineer. Laboratory test data for reviewed mix design and strength results must be submitted to and accepted by Engineer before using in work.

2.06 CONCRETE MIXES:

A. Job-Site Mixing: Not allowed.

B. Ready-Mix Concrete: Comply with requirements of ANSI/ASTM C 94, and as herein specified.

Provide batch ticket for each batch discharged and used in work, indicating project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.

Water may be added for retempering provided maximum permissible slump and maximum water cement ratio is not exceeded. Do not make additions without notifying the Engineer. Additional field tests and compressive test specimens may be required.

C. Precast Concrete: Comply with requirements of ACI 218-253.

PART 3 - EXECUTION

3.01 FORMS:

A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position and have correct finish.

Tolerances for formed surfaces are listed in a table at the end of this section.

B. Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.

C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, and recesses for easy removal.

D. Admixtures: Comply with manufacturer's instructions for use of admixtures.

E. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

F. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

G. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.

H. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retighten forms and bracing after concrete placement as required to eliminate mortar leaks and maintain proper alignment.

3.02 PLACING REINFORCEMENT:

A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports, and as herein specified.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

C. Accurately position support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

D. Tolerances for placing reinforcement are given in Table 2 at the end of this section.

E. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in

position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

F. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least two full meshed and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.03 JOINTS:

A. Construction Joints: Locate and install construction joints which are not shown on drawings, at or near center of beam and slab span, so as not to impair strength and appearance of the structure, as acceptable to Engineer.

B. Provide keyways at least 1-1/2" deep (unless shown different on plans) in construction joints in walls and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs, with Engineer's approval.

C. Place construction joints perpendicular to the main reinforcement. Continue reinforcement across construction joints.

D. Form isolation joints as detailed on the drawings.

E. Form control joints by saw cuts as soon as the surface is firm enough so that it will not be torn or damaged by the blade, usually within 4 to 12 hours after the concrete hardens.

F. Waterstop: (If indicated on plans) Make all joints and splices in waterstop watertight in accordance with manufacturer's instructions. Provide preformed joint sections for corners and intersections.

3.04 INSTALLATION OF EMBEDDED ITEMS:

A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of these items.

B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

3.05 PREPARATION OF FORM SURFACES:

A. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.

Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

3.06 CONCRETE PLACEMENT:

A. General: Comply with ACI 304, and these specifications. Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.

B. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation; in such cases hopper vertical chute or other approved means shall be used to prevent segregation.

C. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

D. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.

E. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

F. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

G. Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

H. Maintain reinforcing in proper position during concrete placement operations.

I. Cold Weather Placing: Comply with ACI 306. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures. When air temperature has fallen to or is expected to fall below 40°F (4°C), obtain a concrete mixture temperature of not less than 50°F (10°C), and not more than 80°F (27°C) at point of placement.

Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

Do not use calcium chloride salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

J. Hot Weather Placing: Comply with ACI 305 when hot weather conditions exist that would impair quality and strength of concrete. Contact Engineer to obtain copy of ACI 305 if needed.

K. Maintain concrete temperature at time of placement below 90°F (32°C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing.

Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.

Wet forms thoroughly before placing concrete.

Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

3.07 FINISH OF FORMED SURFACES:

A. Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.

B. Smooth Form Finish: For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.

C. Water Repellent/Chloride Protecting Penetrating Sealer: Provide water repellent/chloride protecting penetrating sealer to all concrete surfaces exposed to view in accordance with manufacturer's specifications. Water/chloride repellent penetrating sealer shall be Sikagard 70 poli-siloxane resin applied at a rate in accordance with manufacturer's specifications.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

E. Frost Protection: Coat exterior surfaces of below grade concrete retaining walls and basement walls with brushcoat bituminous dampproofing by Euclid. Comply with manufacturer's recommendations for application rates and methods.

3.08 SLAB FINISHES:

A. Finished floor slab surfaces shall be true plane surfaces, with tolerance of 1/8" in 10' unless otherwise indicated on the drawings. Surfaces shall be pitched to drains. The dusting of finished surfaces with dry materials will not be permitted.

Except where otherwise specified, floor slabs shall be finished by tamping the concrete with special tools to force the coarse aggregate away from the surface, then screeding and floating with straight edges to bring the surfaces to the required finish level. While the concrete is still green but sufficiently hardened to bear a man's weight without deep imprint, it shall be wood-floated to a true, even plane with no coarse aggregate visible. Sufficient pressure shall be used on the wood floats to bring moisture to the surface. After surface moisture has disappeared, surfaces shall be steel-troweled to a smooth, even impervious finish, free from trowel marks. After having set sufficiently to ring the trowel, the surface shall be given a broom brushed finish.

B. Contractor or subcontractors performing flatwork finishing of concrete slabs as outlined in this specification shall provide at least one (1) flatwork finisher or technician currently holding the following certifications:

- ACI Concrete flatwork finisher/technician

The contractor will submit to the engineer/owner a list of personnel that will provide these services on the project as well as a copy of the individual current ACI certification (wallet certificate).

A list of current ACI certified personnel may be found on the ACI website: ACI-INT.ORG.

3.09 CONCRETE CURING AND PROTECTION:

A. General: Comply with ACI 308. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

B. Curing Methods: Perform curing of concrete by moist curing, by moisture-retaining cover curing, by curing compound, and/or combinations of methods.

C. Provide moisture curing by following methods.

Keep concrete surface continuously wet by covering with water.

Continuous water-fog spray.

Covering concrete surface with absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

D. Provide moisture-cover curing as follows:

Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

E. Provide curing compound for slabs as follows:

Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring, painting, and other coatings and finish materials, unless otherwise acceptable to Engineer.

F. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

G. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing compound.

Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

3.10 REMOVAL OF FORMS:

A. Formwork not supporting weight of concrete such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50°F (10°C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

3.11 MISCELLANEOUS CONCRETE ITEMS:

A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

B. Construction Practices:

Reinforcement: Comply with requirements of CRSI.

Minimum Concrete Cover: 3" for concrete cast against soil; 2" for other concrete, unless otherwise shown.

Development Splicing: Provide development and tension lap splice lengths in accordance with the following (unless noted otherwise on plans):

Bar Size	Development Length*	Class B* Lap Slice
#4	20"	26"
#5	31"	40"
#6	44"	57"
#7	59"	77"
#8	78"	102"
#9	99"	129"
#10	126"	163"
#11	154"	200"

- *Based on Category 1, Lap Class B lap splice using 4000psi concrete, Grade 60, Uncoated New Deformed Bars-Per CRSI 2002 Manual.
- Where different bar sizes are spliced, use lap splice length required for the largest bar.

3.12 CONCRETE SURFACE REPAIRS:

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Engineer.

B. For exposed-to-view surfaces, blend white portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

C. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Engineer. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or pre-cast cement cone plugs secured in place with bonding agent.

D. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

E. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plan to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having required slope.

Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.

Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.

Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Engineer.

F. Repair defective area, including honeycomb, rock pockets, voids over 1/4" in any dimension and holes left by tie rods and bolts except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

G. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part Portland cement to 1-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

Use epoxy-based mortar for structural repairs, where directed by Engineer.

H. Repair methods not specified above may be used, subject to acceptance of Engineer.

3.13 QUALITY CONTROL TESTING DURING CONSTRUCTION:

A. The Owner will employ a testing laboratory to perform initial field tests and to submit test reports. Testing agencies providing sampling and field testing of concrete as outlined in this specification shall provide field technicians currently holding the following certifications:

- ACI Concrete Field Testing Technician – Grade 1

The testing agency will submit to the engineer/owner a list of personnel that will provide these services on the project as well as a copy of the individual current ACI certification (wallet certificate).

A list of current ACI certified personnel may be found on the ACI website: WWW.ACI-INT.ORG.

B. Sampling and testing for quality control during placement of concrete may include the following, as directed by Engineer. Tests will be made for each concrete load and for each set of compression test specimens or as often as required to ensure compliance with the specifications.

Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

Slump: ASTM C 143; at point of discharge.

Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure for normal weight concrete.

Concrete Temperature: Test hourly when air temperature is 40° F (4°C) and below, and when 80°F (27°C) and above.

Compression Test Specimen: ASTM C 31; one set of 3 standard cylinders for each compressive strength test unless field-cured cylinders are required. Mold and store cylinders for laboratory cured test specimens except when field-cured test specimens are required.

Compressive Strength Tests: ASTM C 39; 1 specimen tested at 7 days, 2 specimens tested at 28 days.

When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.

Concrete is satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.

C. Frequency of Testing

Frequency of testing shall be as follows, unless directed otherwise by Engineer:

Conduct compression test specimen, slump, air content, and concrete temperature for every continuous 50 cubic yards of concrete placed. Conduct intermediate tests for air, temperature and slump.

D. Test results will be reported in writing to Engineer and Contractor on same day that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.

E. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Engineer. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as stated in ACI 301. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.

3.14 DEFECTIVE WORK ACCEPTANCE, AND REMEDIES:

A. Defective Work: Any work which fails to comply with the requirements of these specifications or does not comply with the acceptance requirements of Chapters 17 and 18 of ACI 301.

B. Remedies: Work which may be repaired to comply with these specifications using approved repair methods may be accepted. All repairs are at the Contractor's expense.

C. Remove and replace work which cannot be repaired or strengthened with approved methods. Removal and replacement are at the Contractor's expense.

D. Inadequate concrete strength: If test results show inadequate concrete strength, the following may be required at the Contractor's expense:

Additional curing of areas with inadequate concrete.

Modifications to mix designs for remaining work.
Changes in member size or reinforcing for remaining work.

TABLE 1

TOLERANCES FOR FORMED SURFACES

1.	Variation from plumb:		
	A.	In the lines and surfaces of columns, piers, walls, and in arrises:	
		In any 10 ft. of length	1/4 in.
		Maximum for the entire length	1 in.
	B.	For exposed corner columns, control-joint grooves, and other conspicuous lines:	
		In any 20 ft. length	1/4 in.
		Maximum for the entire length	1/2 in.
2.	Variation from the level or from the grades specified in the contract documents:		
	A.	In slab soffits, ceilings, beam soffits and in arrises, measured before removal of supporting shores	
		In any 10 ft. of length	1/4 in.
		In any bay or in any 20 ft. length	3/8 in.
		Maximum for the entire length	3/4 in.
	B.	In exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines:	
		In any bay or in 20 ft. length	1/4 in.
		Maximum for the entire length	3/4 in.
3.	Variation of the linear building lines from established position in plan and related position of columns, walls, and partitions:		
		In any bay	1/2 in.
		In any 20 ft. of length	1/2 in.
		Maximum for the entire length	1 in.
4.	Variation in the sizes and location of sleeves, floor openings, and wall openings.		± 1/4 in.

5.	Variation in cross-sectional dimensions of columns and beams and in the thickness of slabs and walls.	
	Minus	1/4 in.
	Plus	1/2 in.
6.	Footings*	
	A. Variations in dimensions in plan:	
	Minus	1/2 in.
	Plus	2 in.
	B. Misplacement or eccentricity:	
	2 percent of the footing width in the direction of misplacement but not more than	2 in.
	C. Thickness:	
	Decrease in specified thickness	5%
	Increase in specified thickness	No Limit
7.	Variation in steps:	
	A. In a flight of stairs:	
	Rise	± 1/16 in.
	Tread	± 1/8 in.

* Tolerances apply to concrete dimensions only, not to positioning of vertical reinforcing steel, dowels, or embedded items.

TABLE 2

TOLERANCES FOR PLACING REINFORCEMENT

Clear distance to formed surfaces	± 1/4 in.
Minimum spacing between bars	- 1/4 in.
Top bars in slabs and beams:	
Members 8 in. deep or less	± 1/4 in.
Members more than 8 in. but not over 2 ft. deep	± 1/2 in.
Members more than 2 ft. deep	± 1 in.
Crosswise of members	spaced evenly within 2 in.
Lengthwise of members	± 2 in.

END OF SECTION

SECTION 03 48 24
PRECAST CONCRETE COLUMBARIUM UNITS

PART ONE: GENERAL

1.1 SUMMARY

A. This section covers the manufacture and installation of precast concrete columbarium units, as shown on the drawings and specified herein, including but not limited to: the steel reinforcement, steel embedment plates, required sleeves, finished exposed surfaces, preparation of setting surface, adhesive, columbarium fasteners, and niche cover anchor clip assemblies.

B. Acceptable designs of the columbarium units' components are provided as shown on the Drawings. The Contractor may use this design for this Work or may propose alternate designs of the corresponding components as follows:

1. Design for alternate columbarium units shall comply with the design criteria as per Articles 1.3.F and shall comply with the functional tests as per Article 1.3.G of this Specification.
2. Unless indicated otherwise, all provisions of this Specification shall apply to the Contractor proposed design.

C. The Government may accept or reject part or all of any design proposed by the Contractor.

D. This section includes finishing of exposed faces of the columbarium units as indicated on drawings or described herein.

E. This section covers acceptance and installation of the Government- provided niche covers, one for each niche of the new columbarium units.

1.2 RELATED DOCUMENTS

A. Section 31 20 00, EARTH MOVING

B. Section 03 30 53, CAST-IN-PLACE CONCRETE (SHORT FORM) for Cast-in-place concrete work.

C. Section 07 92 00, JOINT SEALANTS, Materials and Workmanship for sealant application.

D. Section 01 33 00, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

1.3 QUALITY ASSURANCE

A. Manufacturer's and Installer's Qualifications: Prior to commencement of work, Contractor shall submit documentation regarding the experience

of his precast concrete supplier and his precast concrete installer in the design, manufacture and installation of Precast Concrete structures and custom units.

B. Precast concrete manufacturer's qualified Registered Professional Structural Engineer to certify that precast reinforced concrete conforms to specified requirements.

C. Codes and regulations of the Federal, State and County authorities shall apply.

D. Fabricate to dimensions shown or approved. Replace or correct Columbarium Units that do not comply with the individual dimensions and tolerances.

E. Before starting production of Precast Concrete Columbarium Units, furnish at the site, two complete Precast Concrete Columbarium Units, to demonstrate quality of construction. Commence production of columbarium units only after written approval has been obtained from the Resident Engineer/COR.

F. Design Criteria:

1. The Columbarium Units shall be of the following type, style, and size:
   a. Type: Precast concrete, reinforced.
   b. Size: Interior and exterior dimensions as indicated on plans.
2. Columbarium top shall be capable of structurally supporting imposed service live load of no less than 240 Kgs./Square Meter (50 lb./ ft^2), and dead loads based on cap (coping) thickness and heights, including material composition and element section properties, mortar and grout, and dead loads based on concrete top element sectional properties.
3. The Contractor shall submit to the Resident Engineer for review and approval 5 sets of design documentation showing structural design of the complete Columbarium. This documentation shall include dimensions, methods of construction, and calculations. All design calculations and drawings shall be signed and sealed by qualified Professional Structural Engineer.

G. Functional Load Tests: If required by the Resident Engineer, a functional load test will be made at the Contractor's expense to insure that the columbarium proposed by the Contractor, as furnished, will be

capable of supporting loads stated in Article 1.3.F.2. The functional test will consist of the following loading conditions:

1. Unconfined Loading: The columbarium will be placed on a flat surface with no support against the sides. The entire top of the columbarium will be subjected to a simulated uniform load of live load of 240 Kgs./Square Meter (50 lb./ft²) and required dead load simulating cap, mortar, and grout as they will be installed. The load will be maintained for no less than 72 hours. At end of the loading period, the maximum deflection of the Columbarium top elements shall be no more than 3 mm (1/8"). Upon removal of the load from the unit the residual deflection shall be no more than 1.5 mm (1/16") and concrete elements shall be free of all structural distress.

1.4 MANUFACTURER AND INSTALLER QUALIFICATIONS

A. Precast concrete columbarium units shall be product of manufacturer who has a minimum of 3 years experience in fabrication of the precast concrete columbarium units similar in material, design, and quantity to that indicated on the drawings and specified herein.

B. Precast concrete columbarium units installer shall have been regularly engaged for at least three years in installation of precast concrete similar to this project.

C. Supply and Installation of fastener system shall be by product manufacturers and installers, both whom have had a minimum of 3 years experience in installation of similar design to that indicated on the drawing.

D. Installation of niche covers will be performed by those companies who have demonstrated previous experience in installation of similar design as indicated in the drawings and specified herein.

1.5 ALLOWABLE TOLERANCES

A. In addition to tolerances of individual elements required by American Concrete Institute Publication 533.3R, erection tolerances shall be as follows:

1. Variation of anchors and fasteners from dimensions specified.....
   3 mm.(1/8")
2. Variation in overall dimensions of precast element (height and width)..... 3 mm.(1/8")

3. Maximum differential between adjacent units in erected position.....
   3 mm.(1/8")
4. Variation in thickness of precast panels and
   elements..... 3 mm.(1/8")
5. Maximum vertical differential between adjacent columbarium units in installed position.
   3mm.(1/8")

1.6 SUBMITTALS

A. In accordance with Division 1 Section 01 33 23 SHOP DRAWINGS, PRODUCT DATA, and SAMPLES, furnish the following:

1. Samples of all fastening systems, mounting hardware and exposed surface finishes including, but not limited to, the following:
   a. Stainless Steel Angle
   b. Stainless Steel Bolt, Nut and Washers
   c. Tamper Proof Stainless Steel Bolt
   d. Stainless Steel Rosette
   e. Stainless Steel Expansion Anchors, Bolts and pins
   f. Stainless Steel Ferrule loop insert.
   g. Shims
2. Samples of two complete Precast Concrete Columbarium Units, to demonstrate quality of construction, delivered to the site to be approved prior to production…
3. Samples of adhesives and grouts.
4. Shop Drawings: Complete shop and erection drawings of all precast concrete columbarium units, showing all dimensions and details of construction, installation and relation to adjoining work, reinforcements, anchorage, attachments, inserts, location of all pre-drilled sleeves and other items to be installed in the work of other trades, joint treatment, joint alignment coordinated with cap stone joints, and other work required for a complete installation. Provide evidence that the Contractor to be installing the cast in place concrete foundations for the columbarium and pier units has been contacted prior to any work relating to the footings for the columbarium construction, and that the construction of the concrete support (foundations) work has been coordinated with the precast columbarium unit manufacturer and installer.
5. Production Drawings:

a. Elevation view of each structural element.
b. Planametric view of unit.
c. Sections and details to show quantities and position of reinforcing steel, anchors, inserts, and essential embedded and non-embedded hardware for fabrication, handling, transportation and installation.
d. Lifting and erection inserts.
e. Dimensions and finishes.
f. Method of transportation.
g. Method of erection and handling.

6. Manufacturer's Literature and Data:
   a. Each type of Concrete Fastener, including adhesive and anchor devices.
   b. Instructions for final cleaning
   c. Concrete stain/coating, including color charts of manufacturers standard color palette (If applicable for this project.)
7. Certificates: Manufacturer's qualifications specifying precast concrete columbarium units meet the requirements of ACI 533.3R and as specified.
8. Certificates: Installer's qualifications documenting the quality and quantity of experience of the precast concrete installer in the installation of Precast Concrete structures and custom units.

1.7 DELIVERY, STORAGE

A. Ship precast concrete columbarium units to site with adequate protection to prevent chipping, breaking and other damage. Materials shall be marked giving proper identifications and location. Store materials in protected areas to prevent damage including vandalism, injurious effects of weather and inclusion of foreign matter.

1.8 COORDINATION

A. Coordinate the manufacture and erection of precast concrete columbarium units with related work of other sections of the Specifications. Provide templates for inserts and other devices for anchoring precast concrete columbarium units to the work of other trades, in sufficient time to be built into adjoining construction. Perform cutting, fitting and other related work in connection with erection of precast concrete

columbarium unit work. See Section 01 33 00 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES for details regarding the coordination of work.

1.9 GUARANTEE

A. Guarantee precast concrete columbarium unit work, including anchorage, joint treatment and related components to be free from all defects in materials and workmanship, including cracking and spalling, and after erection, completed work will be subject to terms of "Guarantee" article in Division 1 Specification Sections except that guarantee period is one year.

1.10 APPLICABLE PUBLICATIONS

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

B. Federal Specifications (Fed. Spec.):

QQ-S-766C (5).....Steel Plates, Sheets, and Strip-Corrosion Resisting

QQ-W-423B.....Wire, Steel, Corrosive-Resisting

TT-S-00227E (3).....Sealing Compound Elastomeric Type, Multi-Component (For Caulking, Sealing, And Glazing In Building And Other Structures)

TT-S-00230C (2).....Sealing Compound: Elastomeric Type, Single Component (For Caulking, Sealing and Glazing In Building and Other Structures)

C. American Concrete Institute (ACI) Publications:

ACI 533.3R-70.....Fabrication, Handling And Erection of Precast Concrete.

D. American Society for Testing Materials (ASTM) Standards:

A36/A36M-08 .....Structural Steel

A82/A82M-07 .....Steel Wire, Plain, for Concrete Reinforcement

A185/A185M-07 .....Welded Steel Wire Fabric for Concrete Reinforcement.

ASTM A276-10 .....Stainless Steel Bars and Shapes

A615/A615M-08b.....Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

C33-08.....Concrete Aggregates

C150-07 .....Portland Cement

E. American Welding Society (AWS) Publications:

AWS D1.1-90.....Structural Welding Code

AWS D1.4-80.....Welding Reinforcing Steel

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

A. Manufacturers that have previously completed at least one successful NCA columbarium project are deemed to be acceptable for processing their units through the procedures according to these specifications and the drawings.

B. Manufacturers that do not have previous successful experience for a NCA columbarium project may be selected by the Contractor for the project. Contractor is hereby notified that the submittal process for a manufacturer with no previous NCA experience with a successful columbarium project, typically takes longer to process.

2.2 COARSE AGGREGATE

A. Hard durable aggregate carefully graded from coarse to fine in proportions required to match approved samples of precast concrete columbarium units.

2.3 AGGREGATE FOR BACK-UP MIX (FINE AND COARSE AGGREGATE LIGHTWEIGHT):

A. ASTM C33. Limit gradation as required to produce the specified appearance and quality of concrete.

2.4 PORTLAND CEMENT

A. ASTM C150, Type I and Type II; Color as required.

2.5 STRUCTURAL STEEL

A. ASTM A36.

2.6 STEEL FABRIC REINFORCEMENT

A. ASTM A185, galvanized.

2.7 STEEL WIRE REINFORCEMENT

A. ASTM A82, cold drawn.

2.8 REINFORCING STEEL

A. ASTM A615, deformed, Grade 60.

2.9 MISCELLANEOUS GALVANIZED STEEL ITEMS

A. Bolts, nuts, washers, anchors, inserts, and the like for handling, erection, or use by trades.

2.10 GRANITE NICHE COVERS

A. Granite niche covers shall be furnished by the Government and delivered to the site on pallets and shall be of size, type, finish and quantities required for this project. Contractor and Government representatives shall inspect the niche covers upon delivery to the site. The general quantity and condition shall be observed and an adequate count to cover all the installed columbarium units, plus required spares shall be verified. Once the niche covers are accepted at the site, they shall become the Contractors responsibility until installed and the installation is accepted by the Resident Engineer.

2.11 NICHE COVER ATTACHMENT HARDWARE (ROSETTES)

A. VA National Cemetery Administration, standard stainless steel rosette, mounting brackets, and bolts for complete attachment of the niche covers to the precast columbarium units as shown on drawings:

1. ASTM Type 316 stainless steel sheet goods, 0.100 inch thick
2. Die stamp, producing an eight-petal flower pattern as shown on drawings, one-inch diameter with slight convex; center hole of 0.218", concentric to outer edge, with shoulder recess of 0.400" in diameter and 0.035" in depth.
3. Luster finish.
4. ASTM Type 316 stainless steel tamper-resistant bolts, nuts, washers, anchors, mounting brackets, inserts and the like.

2.12 BACK-UP MATERIAL

A. Closed cell neoprene, butyl, polyurethane, vinyl or polyethylene foam rod, diameter approximately 1-1/3 times the joint width.

2.13 BOND BREAKERS IF USED

A. Type and material recommended by sealant manufacturer.

2.14 SEALING COMPOUND IF USED

A. Fed. Spec. TT-S-00230 C, Type II, Class A, or ASTM C 920-87, Type S, Grade NS, Class 25.

2.15 FABRICATION

A. Precast concrete columbarium units shall NOT be: fabricated, delivered or incorporated in the work until samples have been approved. Precast concrete shall comply with ACI 533.3R, except as modified herein.

1. Concrete for precast columbarium units shall have minimum compressive strength of 34.5 MPa (5,000 psi) at 28 days.

2. Provide additional steel reinforcing as required for casting, handling and erection loads.
3. Back-up Mix: Porosity, strength, weight and gradation of coarse aggregate shall be as required to produce specified characteristics.
4. Columbarium units shall be cast in steel forms designed to suit shape and finish required and to withstand high frequency vibration. Concrete shall be deposited in oiled forms. Form oil shall be non- staining type. Vibrations, where required, shall be continuous during process of casting to attain through compaction, complete embedment of reinforcement and to assure concrete of uniform and maximum density without segregation of mix and full thickness of precast element is attained.
   a. Anchors, lifting devices, provisions for cutouts and openings, dovetail slots, notches, reglets, inserts and similar items required for the work of other trades shall be accurately positioned in forms before casting elements.
   b. All fastener location holes, including those for anchoring of units and attachment of niche covers, shall be cast into units. Drilling to precast concrete columbarium units, after fabrication, shall not be acceptable.
5. Cement, aggregate and water shall be obtained from single sources for facing mix of precast concrete work in order to assure regularity of appearance and uniformity of color.
6. Finish: Exposed faces shall have smooth natural concrete finish, unless otherwise noted. The face of the units shall be processed by the manufacturer, following removal from the forms to insure that the discoloration and blemishes on the niche faces are removed before shipping to the site.
   a. Back side of single columbarium units, with back exposed to view shall have surface finish as indicated on the drawings.
   b. Specified surface finish for the exposed back of the columbarium units shall be applied during the appropriate time of fabrication and curing. Seal coating of exposed back of units shall be applied as per manufacturer's recommendations.
7. Curing: Precast concrete shall be cured as required to develop specified structural characteristics and shall be stored in a manner

that will permit all surfaces to cure equally and minimize warping, without staining the exposed faces.

2.16 ANTI-GRAFFITI COATING IF USED

A. Furnish and install a permanent two coat anti-graffiti coating system, matte type finish (non-gloss), designed to be applied on concrete and brick surfaces and to provide a minimum life, as indicated in the manufacturer's literature, of 10 years. The coating system shall be clear.

PART 3 - EXECUTION

3.1 HANDLING AND INSTALLATION

A. Before beginning installation, inspect work of other trades in-so-far as it affects the work of this Section. Install units by competent installation crews meeting the requirements of paragraph 1.4 B. Commencing installation of precast concrete columbarium units will be construed as acceptance, as suitable, of such work of other trades. Concrete base for the columbarium units shall be inspected and modified as required, grinding off high spots, to become an acceptable base upon which to install the units. Columbarium units shall be handled in a nearly vertical plane at all times and stacked vertically on wood supports of adequate strength, until erected. Cover and protect precast concrete columbarium units against staining and other damage. Reinstall, realign and otherwise correct improperly installed units.

1. Accurately place and securely anchor precast concrete columbarium units to adjoining construction in accordance with approved shop and erection drawings.

3.2 SETTING

A. Each precast element shall be set level and true to line with uniform joints. Joints required to have sealants shall be kept free of dirt and other contaminants for their full depth. Precautions shall be taken to protect precast concrete work from being damaged and soiled during and after installation. Wedges, spacers or other appliances which are likely to cause staining shall be removed from joints.

B. Where shown, joints shall be filled with sealant. Surfaces and other joints for precast concrete columbarium units shall be cleaned of all dust, dirt and other foreign matter.

C. Exposed surfaces of units for which the final finish is an anti- graffiti coating shall either be protected by anti-graffiti coating at the manufacturer or shall be otherwise protected from vandalism until units are installed and field-applied coating is applied following installation. Units that have been damaged on exposed surfaces by graffiti, when not coated in advance shall be rejected and removed from the site.

3.3 SEALING OF JOINTS

A. Where shown and/or wherever required to make the work watertight, joints between precast concrete columbarium units and between other precast elements and adjoining masonry, concrete and other materials shall be filled with back-up material for depth extending as required to form joint of depth as shown or recommended by sealant manufacturer. Provide bond breakers, at base of sealant where space for back-up does not exist and to prevent sealant from bonding to material at base of joint.

1. Workmanship shall be in accordance with Division 1 Specification Sections and Section 07 92 00, JOINT SEALANTS.

3.4 CLEANING

A. After erection is complete, clean precast columbarium units using materials, equipment and methods recommended by manufacturer.

3.5 REPLACEMENT AND REPAIR

A. Precast concrete columbarium units which are damaged, cracked, stained, improperly fabricated or otherwise defective shall be removed and be replaced. Precast units having minor defects not affecting serviceability or appearance may be repaired when approved by the Resident Engineer. Repaired work shall be sound, permanent, flush with adjacent surfaces and of color and texture matching similar adjoining surfaces and shall show no line of demarcation between original and patched surfaces. Replacement and repairs shall be done at no additional cost to the Government.

3.6 FINISHING OF EXPOSED FACES

A. Apply coating to complete, cleaned exposed concrete back and sides as per manufacturer's standard specifications and recommendations.

3.7 INSTALLATION OF NICHE COVERS

A. Install niche covers plumb and level as shown so that exposed faces of niche covers lie in the same plane and that rows of niche covers align both horizontally and vertically. Tighten fasteners to achieve snug fit but do not over tighten to the point where they may crack or break niche covers.Coordinate the installation procedures with the Resident Engineer and establish the critical visual line for which the best alignment is to be established.

END OF SECTION 03 48 24

SECTION 04 43 00
NATURAL STONE VENEER

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies requirements for construction of natural stone veneer.

1.2 RELATED WORK

A. Cast-in-place concrete columbarium complexes: Section 03 30 53, (SHORT FORM) CAST-IN-PLACE CONCRETE.

B. Precast Concrete Columbarium Niches: 03 48 24, PRECAST CONCRETE COLUMBARIUM UNITS.

H. Sealants and sealant installation: Section 07 92 00, JOINT SEALANTS.

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 00, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

B. Samples:

1. Stone Veneer, sample, 200 mm by 400 mm (8 inches by 16 inches,) showing full color range and texture of stone, bond, and proposed mortar joints.
2. Anchors, and ties, one each and joint reinforcing 1200 mm (48 inches) long.

C. Certificates signed by stone source, including name and address of contractor, project location, and the quantity, and date or dates of shipment of delivery to which certificate applies; indicate that the stone veneer meets specification requirements.

D. Manufacturer's Literature and Data:

1. Anchors, ties, and reinforcement.
2. Reinforcing bars.

E. Shop Drawings: Complete drawings of stone veneer pieces depicting face sizes, including incising of addressing characters, mortar joints, expansion joints, and showing all dimensions. Drawings shall include all required anchoring hardware and spacings.

1.4 SAMPLE PANEL

A. Before starting masonry, lay up a sample panel as specified:

1. Use stone units from random pallets of units delivered on site.

2. Include reinforcing, ties, and anchors.
3. Provide a 1.2m x 1.8m (4 feet x 5 feet) panel.

B. Use sample panels approved by RE/COR for standard of workmanship of new masonry work.

C. Use sample panel to test cleaning methods.

1.5 WARRANTY

A. Warrant exterior masonry walls against moisture leaks and subject to terms of "Warranty of Construction", FAR clause 52.246-21, except that warranty period to be five years.

1.6 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

B. American Society for Testing and Materials (ASTM):

A82/A82M-07	Steel Wire, Plain, for Concrete Reinforcement
A153/A153M-09	Zinc Coating (Hot-Dip) on Iron and Steel Hardware
A951/A951M-11	Steel Wire for Masonry Joint Reinforcement
C97/C97M-09	Absorption and Bulk Gravity of Dimension Stone
C99/C99M-09	Modulus of Rupture of Dimension Stone
C119-11	Standard Terminology Relating to Dimension Stone
C170/C170M-09	Compressive Strength of Dimension Stone
C568/C568M-10	Limestone Dimension Stone
C615/C615M-11	Granite Dimension Stone
C616/C616M-10	Quartz-Based Dimension Stone
C880/C880M-09	Flexural Strength of Dimension Stone
C1242-12ae1	Selection, Design, and Installation of Dimension Stone Attachment Systems
C1353-09	Abrasion Resistance of Dimension Stone Subjected to Foot Traffic Using a Rotary Platform, Double-Head Abraser
C1515-11	Cleaning of Exterior Dimension Stone, Vertical and Horizontal Surfaces, New or Existing
C1528-12b	Selection of Dimension Stone

D1056-07	Flexible Cellular Materials – Sponge Expanded Rubber
D7089-06	Determination of the Effectiveness of Anti-Graffiti Coating for Use on Concrete, Masonry, and Natural Stone Surfaces by Pressure Washing

C. Masonry Industry Council:
All Weather Masonry Construction Manual, 2000

D. International Masonry Industry All Weather Council (IMIAC):
Recommended Practices and Guide Specification for Cold Weather Masonry Construction

1.7 PRE-INSTALLATION CONFERENCE

A. Convene a meeting on site, after submittals are received and approved but before any work, to review drawings and specifications, submittals, schedule, manufacturer instructions, site logistics and pertinent matters of coordination, temporary protection, governing regulations, tests and inspections; participants to include RE/COR and all parties whose work is effected or related to the work of this section.

PART 2 - PRODUCTS

2.1 ACCEPTABLE STONE PRODUCTS

A. Granite Veneer: Meet ASTM C615. All Granite shall be of Standard Architectural Grade, free of cracks, seams or starts that may impair its structural integrity or function. Color or other visual characteristics indigenous to the particular material and adequately demonstrated in the mock up phase will be acceptable, provided they do not compromise structural integrity. Texture and finish will be within the range of samples approved by the Architect/Engineer.

1. Face Size: As indicated.
2. Type 1 Granite (light color) – to match color of existing columbarium units. Finish – Honed.
3. Type 2 Granite (dark color) – to match color of existing columbarium units. Finish – Honed.
4. Finishes shall be as defined by the National Building Granite Quarries Association, Inc. (NBGQA)

2.2 REINFORCEMENT AND ANCHORAGES

A. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply paragraphs below, unless otherwise indicated.
   1. Stainless Steel Sheet: ASTM A 666, Type 304 or 316. Thickness: 0.1094 inch (2.8mm).

B. Dovetail Slots:
   1. 24 gage x 1 inch, stainless steel: ASTM A 666, Type 304 or 316.

2.3 ACCESSORIES

A. Joint Sealant: Refer to Section 07 92 00.

B. Cavity Weeps: Flexible polypropylene vent. Provide for weeps in granite veneer masonry.

C. Mortar Materials:
   1. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold weather conditions. Provide natural color, white, or a blend to produce mortar color indicated.
   2. Hydrated Lime: ASTM C 207, Type S.
   3. Portland Cement Lime Mix: Packaged blend of Portland cement complying with ASTM C 150, Type III, and hydrated lime complying with ASTM C 207.

2.4 STONE FABRICATION

A. General: Fabricate stone in sizes and shapes required with requirements indicated, including details on Drawings.
   1. For granite, comply with recommendation of National Building Granite Quarries Association (NBGQA) "Specifications for Architectural Granite".

B. Cut stone to produce pieces of thickness, size and shape indicated and to comply with fabrication and construction tolerances recommended by applicable stone associations or, if none, by stone source, for faces, edges, beds, and backs. Clean sawn backs of stone to remove rust stains and iron particles.

C. Carefully inspect stone units at quarry or fabrication plant for compliance with requirements, material, and fabrication. Replace defective units before shipment.

2.5 MORTAR MIXES

A. General: Comply with referenced standards and with manufacturers' written instructions for mix proportions, mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures needed to produce mortar of uniform quality and with optimum performance characteristics.
   1. Do not use admixtures, including pigments, air entraining agents, accelerators, retarders, water repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated. Do not use calcium chloride.
   2. Mixing: Combine with ASTM C 270, proportion specification, for job mixed mortar; and ASTM C 1142 for ready mixed mortar, of types indicated below:
      a. Limit cementitious materials in mortar to Portland cement and limes.
      b. Set stone with Type S mortar.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.
B. Verify items provided by other Sections of work are properly sized and located.
C. Verify that built-in items are in proper location, and ready for roughing into masonry work.
D. Beginning of installation means installer accepts existing conditions.

3.2 PREPARATION

A. Verify items provided by other Sections of work are properly sized and located.
B. Establish lines, levels, and coursing; protect from disturbance.
C. Provide temporary bracing during erection of masonry work. Maintain in place until structure provides permanent bracing.
D. Scaffolding: Provide, erect, maintain, move, and finally remove scaffolding and staging required for stone/masonry installation. Construct and maintain scaffolding in compliance with applicable ordinances, laws, rules and regulations. Scaffolding must be sufficiently substantial to support workmen, and necessary materials

and equipment. Provide adequate guard rails for protection of property, workmen, and passerby.

E. Clean dirty or stained stone surfaces by removing soil, stains, and foreign materials before setting. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.

3.3 PREPARATION

A. Advise installer of other work about specific requirements for placement of reinforcement, anchors, ties, flashing and similar items to be built into stone masonry.

B. Protect stone masonry during erection as follows:

1. Prevent staining of stone from mortar, grout, sealants and other sources. Immediately remove such materials without damaging stone.

2. Protect base of walls from rain splashed mud and mortar splatter by coverings spread on the ground and over the wall surface.

3.4 SETTING STONE MASONRY

A. Execute stone masonry by skilled masons experienced with the kind of form of stone and installation method indicated.

B. Set stone to comply with requirements indicated on Drawings. Install anchors, supports, fasteners and other attachments indicated or necessary to secure stone masonry in place. Set stone accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.

C. Maintain uniform joint widths, except for variations due to stone size variations and minor variations required to maintain bond alignment, if any. Lay stones with joints of the following width.

1. Joint Width: 1/4 to 3/8 inch (6 to 10 mm).

D. Place weep joints where moisture may accumulate including base of cavity walls. Locate weep holes between sections of stone veneer.

1. Form weep holes with product specified in Part 2 of this Section.

3.5 TOLERANCES

A. Variation of Linear Building Line: For position shown in plan and related portion of walls, and partitions do not exceed 1/2 inch in 20 feet or 3/4 inch in 40 feet or more.

B. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch in 40 feet or more.

3.6 ADJUSTING AND CLEANING

A. Remove and replace stone masonry of the following description:
   1. Broken, chipped, stained or otherwise damaged stone. Stone may be repaired if the methods and results are approved by the Architect.
   2. Defective joints.
   3. Stone masonry not complying with requirements indicated.

B. Replace in a manner that result in stone masonry matching approved samples, complying with requirements, and showing no evidence of replacement.

C. In-Progress Cleaning: Clean stone masonry as work progresses. Remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean stone masonry as follows:
   1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
   2. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
   3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
   4. Clean stone by bucket and brush hand cleaning method described in BIA Technical Note No. 20 Revised II, using the following masonry cleaner:
      a. Job mixed detergent solution.
      b. Acidic cleaner, applied in compliance with written directions of acidic cleaner manufacturer.

E. Protection: Provide final protection and maintain conditions in a manner acceptable to manufacturer and installer that ensure stone masonry is without damage and deterioration at the time of substantial completion.

3.7 PROTECTION

A. Maintain protective boards at exposed external corners which may be damaged by construction activities.

B. Provide protection without damaging completed work.

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SECTION 07 92 00
JOINT SEALANTS

PART 1 - GENERAL

1.1 DESCRIPTION:

Section covers all sealant and caulking materials and their application, wherever required for complete installation of building materials or systems.

1.2 RELATED WORK:

A. Precast Concrete Columbarium Units: Section 03 48 24, PRECAST CONCRETE COLUMBARIUM UNITS.

B. Stone veneer: Section 04 43 00, NATURAL STONE VENEER.

1.3 QUALITY CONTROL:

A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Product Testing: Obtain test results from a qualified testing agency based on testing current sealant formulations within a 12-month period.

1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021.
2. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C920, and where applicable, to other standard test methods.
4. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.

E. VOC: Acrylic latex and Silicon sealants shall have less than 50g/l VOC content.

1.4 SUBMITTALS:

A. Submit in accordance with Section 01 33 00, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's installation instructions for each product used.

C. Cured samples of exposed sealants for each color where required to match adjacent material.

D. Manufacturer's Literature and Data:

2. Primers

3. Sealing compound, each type, including compatibility when different sealants are in contact with each other.

1.5 PROJECT CONDITIONS:

A. Environmental Limitations:

1. Do not proceed with installation of joint sealants under following conditions:

a. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 °C (40 °F).

b. When joint substrates are wet.

B. Joint-Width Conditions:

1. Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

C. Joint-Substrate Conditions:

1. Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.6 DELIVERY, HANDLING, AND STORAGE:

A. Deliver materials in manufacturers' original unopened containers, with brand names, date of manufacture, shelf life, and material designation clearly marked thereon.

B. Carefully handle and store to prevent inclusion of foreign materials.

C. Do not subject to sustained temperatures exceeding 32° C (90° F) or less than 5° C (40° F).

1.7 DEFINITIONS:

A. Definitions of terms in accordance with ASTM C717 and as specified.

B. Back-up Rod: A type of sealant backing.

C. Bond Breakers: A type of sealant backing.

D. Filler: A sealant backing used behind a back-up rod.

1.8 WARRANTY:

A. Warranty exterior sealing against leaks, adhesion, and cohesive failure, and subject to terms of "Warranty of Construction", FAR clause 52.246-21, except that warranty period shall be extended to two years.

B. General Warranty: Special warranty specified in this Article shall not deprive Government of other rights Government may have under other provisions of Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of Contract Documents.

1.9 APPLICABLE PUBLICATIONS:

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

B. American Society for Testing and Materials (ASTM):

C509-06.....Elastomeric Cellular Preformed Gasket and Sealing Material.

C612-10.....Mineral Fiber Block and Board Thermal Insulation.

C717-10.....Standard Terminology of Building Seals and Sealants.

C834-10.....Latex Sealants.

C919-08.....Use of Sealants in Acoustical Applications.

C920-10.....Elastomeric Joint Sealants.

C1021-08.....Laboratories Engaged in Testing of Building Sealants.

C1193-09.....Standard Guide for Use of Joint Sealants.

C1330-02 (R2007).....Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.

D1056-07.....Specification for Flexible Cellular Materials—Sponge or Expanded Rubber.

E84-09.....Surface Burning Characteristics of Building Materials.

C. Sealant, Waterproofing and Restoration Institute (SWRI).
The Professionals' Guide

PART 2 - PRODUCTS

2.1 SEALANTS:

A. S-1:

1. ASTM C920, polyurethane or polysulfide.
2. Type M.
3. Class 25.
4. Grade NS.
5. Shore A hardness of 20-40

B. S-2:

1. ASTM C920, polyurethane or polysulfide.
2. Type M.
3. Class 25.
4. Grade P.
5. Shore A hardness of 25-40.

C. S-3:

1. ASTM C920, polyurethane or polysulfide.
2. Type S.
3. Class 25, joint movement range of plus or minus 50 percent.
4. Grade NS.
5. Shore A hardness of 15-25.
6. Minimum elongation of 700 percent.

D. S-4:

1. ASTM C920 polyurethane or polysulfide.
2. Type S.
3. Class 25.
4. Grade NS.
5. Shore A hardness of 25-40.

E. S-5:

1. ASTM C920, polyurethane or polysulfide.
2. Type S.
3. Class 25.
4. Grade P.
5. Shore hardness of 15-45.

F. S-6:

1. ASTM C920, silicone, neutral cure.
2. Type S.

3. Class: Joint movement range of plus 100 percent to minus 50 percent.
4. Grade NS.
5. Shore A hardness of 15-20.
6. Minimum elongation of 1200 percent.

G. S-7:
1. ASTM C920, silicone, neutral cure.
2. Type S.
3. Class 25.
4. Grade NS.
5. Shore A hardness of 25-30.
6. Structural glazing application.

H. S-8:
1. ASTM C920, silicone, acetoxy cure.
2. Type S.
3. Class 25.
4. Grade NS.
5. Shore A hardness of 25-30.
6. Structural glazing application.

I. S-9:
1. ASTM C920 silicone.
2. Type S.
3. Class 25.
4. Grade NS.
5. Shore A hardness of 25-30.
6. Non-yellowing, mildew resistant.

J. S-10:
1. ASTMC C920, coal tar extended fuel resistance polyurethane.
2. Type M/S.
3. Class 25.
4. Grade P/NS.
5. Shore A hardness of 15-20.

K. S-11:
1. ASTM C920 polyurethane.
2. Type M/S.
3. Class 25.
4. Grade P/NS.

5. Shore A hardness of 35 to 50.

L. S-12:

1. ASTM C920, polyurethane.
2. Type M/S.
3. Class 25, joint movement range of plus or minus 50 percent.
4. Grade P/NS.
5. Shore A hardness of 25 to 50.

2.2 COLOR:

A. Sealants used with exposed masonry shall match color of mortar joints.

B. Sealants used with unpainted concrete shall match color of adjacent concrete.

C. Color of sealants for other locations shall be light gray or aluminum, unless specified otherwise.

2.3 JOINT SEALANT BACKING:

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

1. Type C: Closed-cell material with a surface skin.

C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 32° C (minus 26° F). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.4 FILLER:

A. Mineral fiber board: ASTM C612, Class 1.

B. Thickness same as joint width.

C. Depth to fill void completely behind back-up rod.

2.5 PRIMER:

A. As recommended by manufacturer of caulking or sealant material.

B. Stain free type.

2.6 CLEANERS-NON POUROUS SURFACES:

Chemical cleaners acceptable to manufacturer of sealants and sealant backing material, free of oily residues and other substances capable of staining or harming joint substrates and adjacent non-porous surfaces and formulated to promote adhesion of sealant and substrates.

PART 3 - EXECUTION

3.1 INSPECTION:

A. Inspect substrate surface for bond breaker contamination and unsound materials at adherent faces of sealant.

B. Coordinate for repair and resolution of unsound substrate materials.

C. Inspect for uniform joint widths and that dimensions are within tolerance established by sealant manufacturer.

3.2 PREPARATIONS:

A. Prepare joints in accordance with manufacturer's instructions and SWRI.

B. Clean surfaces of joint to receive caulking or sealants leaving joint dry to the touch, free from frost, moisture, grease, oil, wax, lacquer paint, or other foreign matter that would tend to destroy or impair adhesion.

1. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants.
2. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:
   a. Concrete.
   b. Masonry.
   c. Natural Stone Veneer.
3. Remove laitance and form-release agents from concrete.
4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

a. Metal.

C. Do not cut or damage joint edges.

D. Apply masking tape to face of surfaces adjacent to joints before applying primers, caulking, or sealing compounds.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

E. Apply primer to sides of joints wherever required by compound manufacturer's printed instructions.

1. Apply primer prior to installation of back-up rod or bond breaker tape.
2. Use brush or other approved means that will reach all parts of joints.

F. Take all necessary steps to prevent three sided adhesion of sealants.

3.3 BACKING INSTALLATION:

A. Install back-up material, to form joints enclosed on three sides as required for specified depth of sealant.

B. Where deep joints occur, install filler to fill space behind the back-up rod and position the rod at proper depth.

C. Cut fillers installed by others to proper depth for installation of back-up rod and sealants.

D. Install back-up rod, without puncturing the material, to a uniform depth, within plus or minus 3 mm (1/8 inch) for sealant depths specified.

E. Where space for back-up rod does not exist, install bond breaker tape strip at bottom (or back) of joint so sealant bonds only to two opposing surfaces.

F. Take all necessary steps to prevent three sided adhesion of sealants.

3.4 SEALANT DEPTHS AND GEOMETRY:

A. At widths up to 6 mm (1/4 inch), sealant depth equal to width.

B. At widths over 6 mm (1/4 inch), sealant depth 1/2 of width up to 13 mm (1/2 inch) maximum depth at center of joint with sealant thickness at center of joint approximately 1/2 of depth at adhesion surface.

3.5 INSTALLATION:

A. General:

1. Apply sealants and caulking only when ambient temperature is between 5° C and 38° C (40° and 100° F).
2. Do not use polysulfide base sealants where sealant may be exposed to fumes from bituminous materials, or where water vapor in continuous contact with cementitious materials may be present.
3. Do not use sealant type listed by manufacture as not suitable for use in locations specified.
4. Apply caulking and sealing compound in accordance with manufacturer's printed instructions.
5. Avoid dropping or smearing compound on adjacent surfaces.
6. Fill joints solidly with compound and finish compound smooth.
7. Tool joints to concave surface unless shown or specified otherwise.
8. Finish paving or floor joints flush unless joint is otherwise detailed.
9. Apply compounds with nozzle size to fit joint width.
10. Test sealants for compatibility with each other and substrate. Use only compatible sealant.

B. For application of sealants, follow requirements of ASTM C1193 unless specified otherwise.

3.6 FIELD QUALITY CONTROL:

3.7 CLEANING:

A. Fresh compound accidentally smeared on adjoining surfaces: Scrape off immediately and rub clean with a solvent as recommended by the caulking or sealant manufacturer.

B. After filling and finishing joints, remove masking tape.

C. Leave adjacent surfaces in a clean and unstained condition.

3.8 LOCATIONS:

A. Exterior Building Joints, Horizontal and Vertical:

1. Metal to Metal: Type S-1, S-2
2. Metal to Masonry or Stone: Type S-1
3. Masonry to Masonry or Stone: Type S-1
4. Stone to Stone: Type S-1
5. Masonry Expansion and Control Joints: Type S-6

B. Metal Reglets and Flashings:

1. Flashings to Wall: Type S-6
2. Metal to Metal: Type S-6

D. Horizontal Traffic Joints:

1. Concrete Paving, Unit Pavers: Type S-11 or S-12

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SECTION 31 10 00
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. Provide all labor, material, equipment, and services required to complete the work specified in this section, and as shown on the drawings.

B. The work of this section includes but is not necessarily limited to:

1. Removing existing vegetation
2. Clearing and grubbing
3. Stripping and stockpiling topsoil
4. Removing above- and below-grade site improvements
5. Disconnecting, capping or sealing, and abandoning site utilities in place, or removing site utilities, where directed
6. Temporary erosion and sedimentation control measures
7. Removal of existing building foundations, footings, and slabs

1.3 DEFINITIONS

A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

B. 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.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in- place surface soil and is the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch (25 mm) in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.

D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 MATERIAL OWNERSHIP

A. Cleared materials shall become Contractor's property and shall be removed from Project site, except for stripped topsoil, granite curb, and other materials that are indicated to be stockpiled and re-used, or otherwise remain the Owner's property.

1.5 SUBMITTALS

A. Product Data: For each type of product

B. 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 videotape.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

C. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 QUALITY ASSURANCE

A. Pre-installation Conference: Conduct conference at Project site.

B. Schedule: Provide Architect with detailed schedule of demolition work.

1.7 PROJECT CONDITIONS

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

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where directed.

C. Utility Locator Service: The Contractor shall notify utility locator service for area where Project is located and perform the following actions prior to site clearing.

1. Pre-mark the boundaries of your planned excavation with white paint, flags or stakes, so utility crews know where to mark their lines.
2. Call Dig Safe, at 1-888-DIGSAFE, at least three business days, but no more than 30

calendar days, before starting work.

3. If blasting, notify Dig Safe at least one business day in advance.
4. Wait three business days for lines to be located and marked with color-coded paint, flags or stakes. Note the color of the marks and the type of utilities they indicate. Transfer these marks to the As-Built drawings.
5. Contact the landowner and other non-member utilities (water, sewer, gas, etc.), for them to mark the locations of their underground facilities. Transfer these marks to the As-Built drawings.
6. Re-notify Dig Safe and the non-member utilities if the digging, drilling or blasting does not occur within 30 calendar days, or if the marks are lost due to weather conditions, site work activity or any other reason.
7. Hand dig within 18 inches in any direction of any underground line until the line is exposed. Mechanical methods may be used for initial site penetration, such as removal of pavement or rock.
8. Dig Safe requirements are in addition to town, city and/or state DOT street opening permit requirements.
9. For complete Dig Safe requirements, call the PUC or visit their website.
10. If damage, dislocation, or disturbance of any underground utility line is observed, immediately notify the affected utility. If damage creates safety concerns, call the fire department and take immediate steps to safeguard health and property.
11. Any time an underground line is damaged or disturbed, or if lines are improperly marked, the Contractor must file an Incident Report with the PUC. For an Incident Report form visit www.state_me.us/mpuc or call the PUC at 800-452-4699.

D. Do not commence site clearing operations until temporary erosion and sedimentation control and plant protection measures are in place.

E. Soil Stripping, Handling, and Stockpiling: Perform when the topsoil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Erosion and sedimentation control materials and methods are described in Appendix "C" entitled,

1. "Erosion and Sedimentation Control Plan for Columbarium's at the Southern Maine Veteran's Cemetery, Springvale, Maine."

2. Section 31 25 00.

B. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Division 31 Section "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. 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 requirements of authorities having jurisdiction. The Contractor shall conduct his operations in conformity with all Federal and State permit requirements concerning water, air, and noise pollution, and the disposal of contaminated or hazardous materials. Erosion control measures shown on the Drawings are minimum only and are not intended to be complete. Satisfy the current requirements of the regulatory agencies. Comply with materials and procedures listed on the "Erosion and Sedimentation Control Plan Appendix "A" for temporary erosion and sedimentation control.

B. Inspect, maintain, and repair erosion and sedimentation control measures during construction until permanent vegetation has been established.

C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal once 85% rigorous vegetative grown has been achieved.

3.3 EXISTING UTILITIES

A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed, or abandoned in place.

1. Arrange with utility companies to shut off indicated utilities.

2. Owner will arrange to shut off indicated utilities within his control, when requested by Contractor.

B. 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 Architect not less than two days in advance of proposed utility interruptions

2. Do not proceed with utility interruptions without Architect's or Owner's written

permission.

C. Excavate for and remove underground utilities indicated to be removed.

D. Removal of underground utilities is included in Division 33 Sections

3.4 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Recycle wood and wood debris either on-site or off-site, and do not bury or burn wood material. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches (450 mm) below exposed subgrade.

2. Chip removed tree branches and recycle the material either on-site or 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.

3.5 TOPSOIL STRIPPING

A. Strip topsoil to whatever depths are encountered 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, stones and other objects more than 2 inches in diameter; trash, debris, weeds, roots, stumps, and other waste materials.

B. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover with temporary seed and mulch to prevent windblown dust and erosion.

1. Dispose of surplus topsoil in same manner specified for surplus soil. Surplus topsoil is that which exceeds quantity required for reuse.

3.6 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

B. Remove buildings, walls, concrete, metal, glass, slabs, foundations, retaining walls, paving, curbs, gutters, and aggregate base as indicated

1. Unless existing full-depth joints coincide with line of demolition, neatly sawcut along line of existing pavement to remain before removing adjacent existing pavement. Sawcut faces vertically. Remove existing pavement where indicated on the Plans. Properly

dispose of removed pavement off-site.

3.7 BUILDING OR STRUCTURE FOUNDATIONS

A. Below-Grade Construction: Demolish foundation walls, below grade utilities and other construction extending below-grade where indicated on the Plans.

1. Remove below-grade construction, including foundation walls, and footings, completely. Crush material and use for fill in compliance with Section 31 20 00 "Earth Moving" or remove from site and transport to recycling facilities.

2. 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".

3. 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.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, brick, concrete, metal, and waste materials including trash and debris, and legally dispose of them off-site.

1. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 31 10 00

SECTION 31 20 00

EARTH MOVING, EXCAVATION AND FILL

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. Provide all labor, material, equipment, and services required to complete the work specified in this section, and as shown on the drawings.
B. The work of this section includes but is not necessarily limited to:

1. Excavation, trenching, filling, and backfilling for building foundations, driveway/parking areas, slabs-on-grade, site structures, utilities, site drainage, landscaping, and compaction.
2. Excavation and off-site disposal of all unsuitable or excess materials. Excavation shall include removal and satisfactory disposal of all unclassified material encountered throughout the site.
3. Compaction of undisturbed original soil or existing fill as appropriate and as specified, prior to construction and placement of new fill and backfill.
4. Provide all necessary sheeting, shoring, and bracing to protect the Work and assure safety of workers, adjacent property and the public.
5. Maintenance of all excavations free from water.
6. Coordinate field density test as required herein and as directed by the Engineer.
7. Compacted fill from top of utility bedding to subgrade elevations.
8. Rough grading and final grading, including placement, moisture conditioning and compaction of fills and backfill.
9. The removal, hauling and stockpiling of suitable excavated materials for subsequent use in the work. Stockpiling shall include protection to maintain materials in a workable condition.
10. Re-handling, hauling and placing of stockpiled materials for use in refilling, filling, backfilling, grading, and other such operations.
11. Providing products in sufficient quantities to meet the project requirements.
12. Obtain all required permits, licenses, and approvals of appropriate municipal and utility authorities, prior to commencing the work of this Section, and pay costs incurred therefrom.

C. A Geotechnical Investigation has been prepared and is included as Appendix B.

1.3 SUBMITTALS

A. Comply with Section 01 33 00 - Submittal Procedures.
B. Comply with Section 01 40 00 – Quality Requirements.
C. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.
D. Test Reports: Submit the following reports:

1. Reports on material gradations (ASTM D422).
2. Verification of each footing subgrade.
3. Field density test reports (ASTM D2922).
4. One optimum moisture-maximum density curve for each type of material used in the Work (ASTM D-1557 modified).

E. Materials Source: Submit name of imported materials source.
F. Material Certifications: Submit materials certificate signed by the material supplier and Contractor, certifying that materials comply with, or exceed, the requirements herein.
G. Product Data: Submit data for geotextile fabric indicating fabric and construction.

1.4 CLOSEOUT SUBMITTALS

A. Comply with:

1. Section 01 33 00 – Submittal procedures.
2. Section 01 73 00 – Execution requirements.
3. Section 01 77 00 – Closeout procedures.

B. Project Record Documents: Accurately record actual locations of all utilities by horizontal dimensions, elevations or inverts, and slope gradients.

1.5 COORDINATION

A. Comply with Section 01 31 00 – Project Management and Coordination.
B. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

1.6 QUALITY ASSURANCE

A. Comply with the requirements of Section 01 40 00 – Quality Requirements.
B. Documents affecting Work of this Section include, but are not necessarily limited to; the Conditions of the Contract, General Conditions, Supplementary Conditions, Addenda, and all Sections of Division 01 are hereby made a part of this Section.
C. Coordinate Work with that of other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of the Work.
D. All Work shall comply with the requirements of the Maine Department of Environmental Protection, the York County Soil & Water Conservation District Standards, and City of Sanford, Maine Standards to minimize adverse environmental impacts. Reference is made to the Erosion and Sedimentation Control Plan included in the Plan set for this project. Strict adherence to the Specifications and Plans is required in order to prevent adverse downstream impacts.
E. All Work shall comply with the conditions of the enclosed permits.
F. Work shall be accomplished in accordance with regulations of local, county and state agencies and national or utility company standards as they apply.
G. The Contractor shall protect structures, utilities, sidewalks, pavements, property monuments, monitoring wells, and other facilities from damages caused by settlement, lateral movement, undermining, washout, and other hazards created from earthwork operation.
H. The Contractor shall bear all cost associated with correcting any Work that does not meet the requirements of this Section or any damaged items due to construction activities. These costs include any professional services required for inspection of repairs or replacements.
I. Costs related to retesting due to unacceptable qualities of work and failures discovered by testing shall be paid for by the Contractor at no additional expense to Owner, and the costs thereof will be deducted by the Owner from the Contract Sum.
J. Paved surfaces: Do not operate equipment on paved surfaces. Paved surfaces outside the limits of Work which become damaged shall be repaved by the Contractor.
K. Contractor shall be responsible for notifying all affected utility companies and Dig Safe before starting work.
L. Field Measurements:
    1. Verify that survey horizontal and vertical control reference points are present and correct as indicated. Protect these points from disturbance during the course of the Work, or correctly re-establish as necessary.
    2. During construction, provide all necessary line and grade staking to properly control the Work.

1.7 SAFETY

A. Maintain excavations with approved barricades, lights, and signs to project life and property until excavation is filled and graded to a condition acceptable to the Engineer.
B. Provide all necessary sheeting and shoring for trench excavation in accordance with OSHA standards.

PART 2 - PRODUCTS

2.1 SOURCE QUALITY CONTROL

A. Comply with Section 01 40 00 - Quality Requirements.
B. When tests indicate materials do not meet specified requirements, change material and retest.
C. Furnish materials of each type from same source throughout the Work.

2.2 MATERIALS

A. Common Borrow: shall consist of earth, suitable for embankment construction. It shall be free from frozen material, perishable rubbish, peat, and other unsuitable material. The moisture content shall be sufficient to provide the required compaction and stable embankment. In no case shall the moisture content exceed 4% above optimum, which shall be determined in accordance with AASHTO T180, Method C or D.
B. Unsuitable Materials: Materials that cannot be compacted to required density or contain frozen material, organic material, peat, muck, coal, ash, debris, pavement, construction waste, or boulders greater than 6 inches in any dimension, and any material that, in the opinion of the Engineer, is not suitable for its use.
C. Excavated rock may not be used as fill material, except as general site fill outside of pavement and structure limits and as fill greater than 7 feet deep in burial plot areas with approval of the Engineer.
D. Gravel Borrow: Clean, well graded granular, non-frost susceptible, sand and gravel, free of organics and other deleterious materials meeting the following gradation:

Sieve Size	Percent Finer by Weight
6 inch	100
3 inch	90 to 100
¼ inch	0 to 70
No. 40	0 to 30
No. 200	0 to 7

E. Structural Fill: Structural granular fill shall be used below and adjacent to the building entrance/canopy supports and where indicated in Contract Documents. Compacted structural fill shall consist of sand and gravel of hard durable particles, free of organic material, loam, lumps or balls of clay, trash, snow, ice, frozen soil, stones over 4-inch diameter, or other objectionable material. The gradation of that portion of the material passing a 3-inch sieve shall meet the following limits:

Sieve Size	Percent Finer by Weight
3 inch	100
¼ inch	25 to 70
No. 40	0 to 30
No. 200	0 to 5

F. Crushed Stone: in conformance with Maine DOT Standard Specification 703.22 "Underdrain Backfill Type C":

Sieve Size	Percent Finer by Weight
1 inch	100
¾ inch	90 to 100
3/8 inch	0 to 75
No. 4	0 to 25
No. 200	0 to 5

G. Leveling Sand: Aggregate for sand leveling shall be sand of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances in conformance with Maine DOT Standard Specification 703.05 "Aggregate for Sand Leveling". The gradation shall meet the grading requirements of the following table.

Sieve Size	Percent Passing
3/8"	85 - 100
No. 200	0-5.0

H. Sand: Clean granular material, free from lumps, balls of clay, and organic material and shall be Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter and conforming to the following gradation:

Sieve Size	Percent Passing
1 inch	100
½ inch	75 to 100
No. 4	50 to 100
No. 20	15 to 80
No. 50	0 to 15
No. 200	0-5

I. Pea Gravel: Rounded drainage stone for placement around crypts shall be clean, sound gravel material and shall meet the following gradation:

Sieve Size	Percent Passing
½ inch	100
3/8 inch	85 to 100
No. 4	10 to 30
No. 8	0 to 10
No. 16	0 to 5
No. 200	0

J. Drainage Stone: 2" crushed and washed stone for placement around burial crypts shall be clean, sound material meeting Maine DOT Standard Specification, Highways and Bridges; Section 703.31 Crushed Stone.

K. Bedding Stone: 3/4" crushed and washed stone for placement around burial crypts shall be clean, sound gravel material and shall meet the following gradation:

Sieve Size	Percent Passing
¾ inch	85 to 100
½ inch	15 to 55
No. 4	0 to 5

L. Refill Material: 3/4" crushed stone, for refilling excavation below normal grade, rock excavation or refilling excavated unsuitable material, unless otherwise directed by the Architect/Engineer.

M. Select Backfill: Use structural fill or 3/4" crushed stone unless otherwise directed by the Architect/Engineer.

N. Low Permeability Material: Material that when placed and compacted will provide in-situ permeability rate of not more than 1.0×10^{-5} cm/sec.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Comply with:

1. Section 01 73 00 - Execution Requirements: Verification of existing conditions before starting work.

B. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.
C. Verify structural ability of unsupported walls to support loads imposed by fill.
D. Verify survey bench mark and intended elevations for the Work are as indicated on Drawings.

3.2 PREPARATION

A. Locate and mark any and all existing underground and aboveground utilities before beginning any earthwork. Notify Dig Safe at 1-888-344-7233 not less than three working days before performing Work.
B. All earthworks shall be in accordance with the Drawings and any supplemental documents.
C. Ensure that erosion controls are in place and properly functioning prior to any earthwork.
D. Topsoil Excavation:

1. Excavate topsoil from all areas to be further excavated, raised in grade, re-landscaped, or regraded, without mixing with foreign materials for use in finish grading.
2. Do not excavate wet topsoil.
3. Stockpile on Site in area approved by the Engineer and protect from erosion.
4. Remove excess topsoil not intended for reuse, from site.

E. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of materials. Plow, strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.
F. Remove and properly dispose of any pavement, structures, fences, debris, etc. scheduled for removal. Save and store any material scheduled for re-use.
G. Identify required lines, levels, contours, and datum locations.
H. Notify utility company to remove and relocate utilities.
I. Maintain and protect above and below grade utilities indicated to remain.
J. Protect plant life, lawns, rock outcroppings, and other features remaining as portion of final

landscaping.

K. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

L. Establish temporary traffic control and detours when trenching is performed in public right-of-way. Relocate controls and reroute traffic as required during progress of Work.

M. Compact subgrades to density requirements for subsequent backfill materials. If compaction is insufficient, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

N. All foundation subgrades shall be densified using a walk behind compactor capable of imposing a dynamic load of 5 kips.

O. Existing surficial fill encountered beneath the proposed building footprint and paved areas shall be proof-rolled using a vibrator roller-compactor capable of imposing a dynamic load of 15 kips.

P. Any areas that continue to yield after 3 to 5 passes of the compaction equipment should be over-excavated and replaced with Granular Borrow.

Q. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Fill as required in the Fill Schedule of this Section and compact to density equal to or greater than requirements for subsequent fill material.

R. Proof roll to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

3.3 FIELD QUALITY CONTROL

A. Comply with Section 01 40 00 - Quality Requirements.

B. Comply with Section 01 73 00 - Execution Requirements.

C. Testing and Field Observations:

1. The Contractor shall retain and pay for the services of an independent testing and inspection firm and/or a Geotechnical Consultant to perform on-site observation and testing during the various phases of the construction operations. The scope of services will be determined by the Owner and the independent testing and inspection firm and/or the Geotechnical Consultant and will be provided to the contractor. The Owner reserves the right to modify or waive the services of the independent testing and inspection firm and/or the Geotechnical Consultant. The services of a Geotechnical Consultant/Inspection and testing firm may include, but not necessarily be limited to, the following:

    a. Observation during excavation and dewatering of building and controlled fill areas.
    b. Observation during backfilling and compacting operations within that area defined as building area or controlled fill area and other areas as appropriate.

c. Laboratory testing and analysis of fill materials as specified herein and proposed by the Contractor for incorporation into the Work.
d. Observation of construction and performance of water content, gradation and compaction tests at a frequency and locations that he shall select. The results of these tests will be submitted to the Owner, Engineer, and Contractor on a timely basis so that action can be taken to remedy indicated deficiencies. During the course of construction, the Geotechnical Consultant will advise the Owner in writing if at any time in his opinion the Work hereunder is of unacceptable quality. Failure of Geotechnical Consultant to give notice, shall not excuse the Contractor from latent defects discovered in his work.

2. The Contractor shall make provisions for allowing observations and testing of Contractor's Work by the independent testing and inspection firm and/or the Geotechnical Consultant. The Contractor shall assist the testing agency as required and shall deliver samples of all materials required to the testing agency at the Contractor's expense.
3. The presence of the independent testing and inspection firm and/or the Geotechnical Consultant does not include supervision or direction of the actual work of the Contractor, his employees or agents. Neither the presence of the independent testing and inspection firm and /or the Geotechnical Consultant, nor any observations and testing performed by them, nor failure to give notice of defects shall excuse the Contractor from defects discovered in his work.
4. Costs related to retesting due to unacceptable qualities of work and failures discovered by testing shall be paid for by the Contractor at no additional expense to Owner.

D. Contractor will pay for all proposed material gradation testing.
E. Minimum Number of Tests:

1. Footing Subgrade: For each strata of soil on which footings will be placed, conduct at least one test per 50 linear feet of footing to verify required design bearing capacities.
2. Paved Areas and Slab Subgrades: Make at least one field density test of subgrade for every 2,000 square feet of paved area or building slab, but in no case less than three tests for each. In each compacted fill layer, make one field density test for every 2,000 square feet of overlaying slab or paved area, but in no case less than 3 tests for each.
3. Foundation Wall Backfill Outside of Structure: Make at least two field density tests at locations and elevations directed by the Engineer.

F. Proof roll compacted fill surfaces under slabs-on-grade, pavers, and paving.
G. Request visual inspection of subgrades and bearing surfaces by Engineer before installing subsequent work.
H. Slope sides of excavations to comply with OSHA regulations and local codes. Shore and brace where sloping is not possible.

3.4 EXCAVATION

A. Do not excavate wet subsoil or excavate and process wet material to obtain optimum moisture content.
B. Do not excavate or leave soils open for foundations or trenches to freezing conditions.
C. When excavating through roots, perform work by hand and cut roots with sharp axe.
D. Underpin adjacent structures which may be damaged by excavation work.
E. Excavate subsoil to accommodate building foundations, slabs-on-grade paving, site structures, and construction operations.
F. Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity; perform compaction in accordance with this Section.
G. Slope banks with machine to angle of repose or less until shored.
H. Do not interfere with 45 degree bearing splay of foundations.
I. Grade top perimeter of excavation to prevent surface water from draining into excavation.
J. Remove lumped subsoil, boulders, and rock up to 1/3 cy measured by volume.
K. Notify Engineer of unexpected subsurface conditions.
L. Correct areas over-excavated with Crushed Stone.
M. Stockpile subsoil intended for reuse on Site in area approved by the Architect/Engineer and protect from erosion.
N. Remove and dispose of excess unsuitable material from site.
O. Excavated material suitable for common borrow, as determined by the Engineer, and excavated rock and ledge shall be used on site as fill in areas designated by the Engineer.
P. Remove excess subsoil not intended for reuse, from site.
Q. Repair or replace items indicated to remain damaged by excavation.
R. Prepare subgrade for lawn areas 6" below finished grade.

3.5 FILLING, BACKFILLING AND GRADING

A. Fill areas to contours and elevations with appropriate fill material. Frozen materials shall not be used.
B. Backfill excavations as promptly as work permits, but not before completion of the following:

1. Acceptance of construction below finish grade, including dampening, waterproofing, and perimeter insulation.
2. Removal of concrete formwork.
3. Removal of trash and debris.
4. Removal of shoring, bracing, and backfilling of the remaining voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in a manner to prevent settlement of the structure or utilities or leave in place if required.
5. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

C. Use care in backfilling utility trenches to avoid damage or displacement of the utilities.
D. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
E. Place fill material in continuous layers and compact in accordance with the Fill schedule in this section.
F. Burial plot areas shall be backfilled with granular borrow that has been processed to allow for future excavation with cemetery equipment. No rocks greater than three inches shall be used for fill within 7 feet of finish surface.
G. Employ placement method that does not disturb or damage other work.
H. Maintain optimum moisture content of backfill materials to attain required compaction density.
I. Do not backfill against unsupported foundation walls.

1. Backfill concrete structures only after the concrete has developed adequate strength. Do not allow heavy machinery within 5 feet of structures during backfilling and compacting.
2. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.

J. Slope grade away from building minimum 2 percent slope for minimum distance of 10 ft, unless noted otherwise.
K. Make gradual grade changes. Blend slope into level areas.
L. Remove surplus backfill materials from site.
M. Leave fill material stockpile areas free of excess fill materials.
N. Repair or replace items indicated to remain damaged by excavation or filling.
O. Subgrade Preparation for Pavements and Walks:

1. Excavate, form, shape and roll subgrade to conform to cross-section of finished pavement. Roller shall be 10-ton minimum weight.
2. Remove stones greater than 5" measured in any dimension from subgrade to a 12" depth.

Fill depressions with suitable fill as required Fill schedule of the section.

3. When areas become impervious due to concentrations of fines and over-compaction, lightly scarify and re-compact. In severe cases, remove such material and replace with suitable soil as directed.
4. Subgrades shall positively grade and drain in order to keep roadway base and subbase free from water.

P. Any settlement or erosion that occurs prior to acceptance of the Work shall be repaired, and re-graded to the required elevations and slopes.

3.6 TRENCHING

A. Remove lumped subsoil, boulders, and rock up of 1/6 cubic yard, measured by volume.
B. Do not advance open trench more than 200 feet ahead of installed pipe unless approved by the Engineer.
C. Remove water or materials that interfere with Work.
D. Excavate bottom of trenches maximum 2 feet wider than outside diameter of pipe, or as required to meet OSHA safety requirements.
E. Excavate trenches to lines depths indicated on Drawings with sufficient width to enable installation and inspection of the utility.
F. Owner reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.
G. Use laser-beam instrument with qualified operator to establish lines and grades.
H. Provide uniform and continuous bearing and support for bedding material and utilities.
I. Do not interfere with 45 degree bearing splay of foundations.
J. When subsurface materials at bottom of trench are loose or soft, excavate to greater depth as directed by Engineer until suitable material is encountered. Notify Engineer, and request instructions.
K. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Structural Fill and compact to density equal to or greater than requirements for subsequent backfill material.
L. Trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.
M. Correct areas over-excavated with compacted backfill as specified for authorized excavation or replace with flow-able fill concrete as directed by Engineer.
N. Remove excess subsoil not intended for reuse, from site.

O. Stockpile excavated material in area designated on site in accordance with this Section.

3.7 SHEETING AND SHORING

A. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation to comply with OSHA regulations and local codes.
B. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.
C. Design sheeting and shoring to be removed at completion of excavation work. Sheeting and shoring shall not be left in place.
D. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.
E. Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.

3.8 DEWATERING

A. Perform all work in dry weather conditions whenever possible.
B. Dewater soils and excavations as necessary to adequately compact, excavate, and work existing soils.
C. Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding project site and surround areas.
D. Do not allow water to accumulate in excavations. Provide and maintain pumps and dewatering system components necessary to convey water away from excavations.
E. Convey water removed from excavations adequately to prevent soil erosion and downstream sedimentation. Filter pumped water prior to discharge and do not discharge directly to storm drains.
F. Do not use trench excavations as temporary drainage ditches.

3.9 FROST

A. No fill materials shall be placed when the subgrade, the fill material, or the previous lift on which fill is to be placed is frozen. In the event the subgrade or any fill which already has been placed becomes frozen, it shall be thawed, scarified and then re-compacted, or else removed, to meet the compaction requirements of the specifications before the next lift is placed. Any soft spots resulting from frost shall be removed or re-compacted to meet the requirements of compaction specified herein before new fill material is placed.

3.10 ROCK REMOVAL

A. Rock excavation may be encountered as part of the project. Rock excavation shall be defined as: All rock, ledge, or boulders in undisturbed soil that cannot be removed by a mechanical scarifier and power shovel of 1.0 cubic yards capacity, and/or D-8 bulldozer with ripper, without use of line drilling or explosives. Boulders 2 cubic yards or smaller shall be considered to be unclassified material regardless of location. During excavations if stone in excess of 2 cubic yards is encountered and cannot be moved it will be considered as "rock" as herein defined.
B. Refer to Section 31 23 16 – Rock Removal.

3.11 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.
B. Moisture content of fill material as it is being placed shall be within two percent of the optimum moisture content of the material as determined by ASTM D1557 modified.
C. Top Surface of Backfilling around Building Areas: Plus or minus 1 inch from required elevations.
D. Top Surface under Paved Areas and Pavers: Plus or minus 0.5 inches from required elevations.
E. Top Surface of Landscaped and Lawn Areas: Plus or minus 0.10 feet from required elevations.
F. Structural Fill under Slabs:

1. Maximum Variation From Flat Surface: 1/2 inch measured with 10 foot straight edge.
2. Maximum Variation From Elevation: 3/8 inch.

G. Footing Excavations:

1. Maximum Variation From Elevation: 0.10 feet.

3.12 STOCKPILING

A. Stockpile materials on site at locations approved by Engineer.
B. Stockpile in sufficient quantities to meet Project schedule and requirements.
C. Separate differing materials with dividers or stockpile apart to prevent mixing.
D. Prevent intermixing of soil types or contamination.
E. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
F. Unsuitable materials delivered to the Site and materials that become unsuitable during the course of the project shall be stockpiled in a manner to prevent erosion and spreading of this material until it is removed and disposed of off-Site.

3.13 STOCKPILE CLEANUP

A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.
B. When borrow area is indicated, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

3.14 FILL SCHEDULE

A. All fill shall be place in accordance with the drawings and any supplements.
B. The degree of compaction is expressed as a percentage of the maximum dry density at optimum moisture content as determined by ASTM Test D1557, Method C.
C. Footings shall rest on undisturbed native soils, or 6 inches of crushed stone overlying bedrock.
D. Fill shall be place in layers between 6 and 12 inches depending upon size and type of compaction equipment such that the desired density is achieved throughout the lift thickness with 3 to 5 passes of the compaction equipment.
E. Fill shall be placed at the approximate optimum moisture content.
F. Below Foundations and Floor Slabs:

1. Fill Type: Structural Fill and Crushed Stone.
2. Structural Fill shall be placed in horizontal lifts and be compacted. Lift thickness should be such that desired density is achieved throughout the lift thickness with 3 to 5 passes of the compaction equipment.
3. In confined areas, the Structural Fill should be compacted to the same standard except that the maximum particle size should be reduced to 3 inches and loose layer thickness should be reduced to 6 inches, and compaction performed by hand-guided equipment to the same percentage of compaction.
4. Compaction: 95 percent of the maximum dry density, as determined in accordance with ASTM Test Designation D1557 or 100 percent if crushed stone is used as determined by ASTM C-29.
5. Where fill is required below footing grade, the zone of 95 percent compaction shall extend laterally beyond the edge of foundations at least 1 foot for each foot of depth below foundation grade.
6. Where Crushed Stone is used, it should be compacted to 100 percent of its dry rodded unit weight per ASTM C-25.
7. If proper compaction and placement of Structural Fill or Crushed Stone is difficult due to space constraints or other limitations, use of flowable fill for foundation backfill should be considered as recommended by the geotechnical engineer.

G. Entrances and Approaching Sidewalks

1. Fill Type: Gravel Borrow
2. Gravel Borrow shall be placed in horizontal lifts and be compacted. Lift thickness should be such that desired density is achieved throughout the lift thickness with 3 to 5 passes of the compaction equipment.
3. For slab/sidewalk entrances: Gravel Borrow shall be placed to a depth of 4.0 feet below the top of slab/sidewalk, or to the top of bedrock. This thickness of Gravel Borrow should extend horizontally from the building outward to the entire width of the entrance slabs/sidewalks.
4. Gravel Borrow below entrance slab/sidewalks, including those supported on frost walls, shall have a gradual transition up to the bottom of the sidewalk and pavement subbase at a 1V to 3H slope or flatter.
5. Compaction: 95 percent of the maximum dry density, as determined in accordance with ASTM Test Designation D1557.

H. Foundation Backfill (interior and exterior):

1. Fill Type: Structural Fill.
2. Structural Fill shall be placed in horizontal lifts and be compacted. Lift thickness should be such that desired density is achieved throughout the lift thickness with 3 to 5 passes of the compaction equipment.
3. Structural Fill shall extend laterally a minimum of 2 feet from the wall.
4. Compaction: 95 percent of the maximum dry density, as determined in accordance with ASTM Test Designation D1557.
5. Backfill beyond this limit may consist of Gravel Borrow.

I. Driveway and Parking Area Subgrade:

1. Fill Type: Gravel Borrow.
2. Compaction: 92 percent of maximum dry density, as determined in accordance with ASTM Test Designation D1557.

J. Fill Under Lawn and Landscaped Areas:

1. Fill Type: Common Borrow, Granular Borrow for burial plot areas.
2. Compaction: 90 percent of maximum dry density as determined in accordance with D1557.

K. Trench Bedding and Backfill

1. Storm drainage pipe and sanitary sewer pipe bedding:

    a. Pipe Bedding: 3/4" Crushed Stone compacted to 100 percent if crushed stone is used as determined by ASTM C-29.
    b. Fill Above Bedding: Gravel Borrow compacted to 92 percent of the maximum dry density, as determined in accordance with ASTM Test Designation D1557.

2. Water distribution pipe, electric, telephone, and cable utilities:

a. Pipe Bedding: Sand.
b. Fill Above Bedding: Gravel Borrow

3. Pipe Bedding, Footing Drains, Drip Edge Drains, and Underdrains:

   a. Pipe Bedding: 3/4" Crushed Stone compacted to 100 percent if crushed stone is used as determined by ASTM C-29.

4. Fill to Correct Over-excavation:

   a. Fill Type: Crushed Stone flush to required elevation, compact uniformly to 95% of maximum density as determined in accordance with ASTM Test Designation D1557.

5. Stormwater Basin Embankment Material

   a. Low Permeability material compacted to 95% of maximum density as determined in accordance with ASTM Test Designation D1557.

3.15 PROTECTION OF WORK

A. Section 01 73 00 - Execution Requirements: Protection of installed construction.
B. Reshape and re-compact fills subjected to vehicular traffic.
C. Prevent displacement or loose soil from falling into excavation; maintain soil stability.
D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
E. Protect structures, utilities and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth operations.

END OF SECTION 31 20 00

SECTION 31 22 00

GRADING

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. Provide all labor, material, equipment and services required to complete the work specified in this section, and as shown on the drawings.

B. The work of this section includes but is not necessarily limited to:

1. All rough grading and finish grading as required and as indicated on the Drawings, including but not limited to, columbarium foundations, walkways, stairs and site drainage.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit product data for the following items:

1. Material Test Reports: Submit reports on material gradations (sieve analysis) and maximum laboratory moisture density, (proctor) for all soil and gravel materials to be utilized as part of Project. Obtain approval from Architect/Engineer prior to delivery to the site.

2. On-site testing results.

1.4 QUALITY ASSURANCE

A. Comply with the requirements of Section 01 40 00 – Quality Requirements.

B. Documents affecting Work of this Section include, but are not necessarily limited to; the Conditions of the Contract, General Conditions, Supplementary Conditions, Addenda, and all Sections of Division 1 are hereby made a part of this Section.

C. Coordinate Work with that of other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of the Work.

D. Construct rough-graded surfaces to plus or minus 1.0 inch of elevations indicated, creating

smooth, even surfaces.

E. Construct fine-graded surfaces to plus or minus 3/8 inch of elevations indicated, creating smooth, even surfaces.

F. Standards: 29 CFR 1926/1910 - OSHA Safety and Health Standards.

G. Testing and Inspection: See Sections 01 40 00 and 31 20 00 for general requirements. The Owner shall be responsible for all in-place compaction testing, unless otherwise noted. The Contractor shall be responsible for quality control coordinating with Architect/Engineer to allow for testing to be performed at the frequencies specified. A minimum of 48 hours notice for in-place testing shall be given to allow proper scheduling by Architect/Engineer and/or Independent Testing Laboratory.

H. Laboratory and Field Testing: Procedures for testing earthwork shall be performed in accordance with the following standards:

1. Sieve Analysis…….ASTM D422
2. Field Density……..…. ASTMD2923
3. Field Moisture Content ……. ASTM D3017
4. Moisture/Density (Standard Proctor) Tests ……. .ASTM D6698

I. The Contractor shall notify the Owner's Representative at the time the property is cut to subgrade to schedule an inspection by the Geotechnical Engineer.

1.5 SITE 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 traffic ways if required by Owner or authorities having jurisdiction.

B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where directed.

C. Utility Locator Service: The Contractor shall notify utility locator service for area where Project is located and perform the following actions prior to site clearing.

1. Pre-mark the boundaries of your planned excavation with white paint, flags or stakes, so utility crews know where to mark their lines.
2. Call Dig Safe, at 1-888-DIGSAFE, at least three business days, but no more than 30 calendar days, before starting work.
3. If blasting, notify Dig Safe at least one business day in advance.
4. Wait three business days for lines to be located and marked with color-coded paint, flags

or stakes. Note the color of the marks and the type of utilities they indicate. Transfer these marks to the As-Built drawings.

5. Contact the landowner and other non-member utilities (water, sewer, gas, etc.), for them to mark the locations of their underground facilities. Transfer these marks to the As-Built drawings.
6. Re-notify Dig Safe and the non-member utilities if the digging, drilling or blasting does not occur within 30 calendar days, or if the marks are lost due to weather conditions, site work activity or any other reason.
7. Hand dig within 18 inches in any direction of any underground line until the line is exposed. Mechanical methods may be used for initial site penetration, such as removal of pavement or rock.
8. Dig Safe requirements are in addition to town, city and/or state DOT street opening permit requirements.
9. For complete Dig Safe requirements, call the PUC or visit their website.
10. If damage, dislocation, or disturbance of any underground utility line is observed, immediately notify the affected utility. If damage creates safety concerns, call the fire department and take immediate steps to safeguard health and property.
11. Any time an underground line is damaged or disturbed, or if lines are improperly marked, the Contractor must file an Incident Report with the PUC. For an Incident Report form visit www.state_me.us/mpuc or call the PUC at 800-452-4699.

D. Soil Stripping, Handling, and Stockpiling: Perform when the topsoil is dry or slightly moist.

E. A topographic and existing conditions survey of the site is included within the Plan Set; refer to the following Plans:

"Southern Maine Veterans' Cemetery, Burial Crypts; Section H" dated April 24, 2015, prepared by Walsh Engineering Associates.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Erosion and sedimentation control materials and methods are shown on the plans and described in these specifications. Contractor shall:

1. Comply with Section 31 25 00 – Erosion Control
2. Comply with Section 01 40 00 - Quality Requirements

B. The Contractor shall pay for all gradation and proctor testing to prove compliance with specifications. Testing responsibility shall be as outlined in Section 01 40 00. This shall be performed each time soil is obtained from a new source, or the material characteristics change or as determined by the Architect/Engineer.

1. Suitable Materials: Materials complying with ASTM D2487 soil classification groups

GW, SM, SW, and SP or AASHTO M145 soil classification groups A-1, A-2-4, A-2-5, and A-3.

2. Unsuitable Materials: Material containing excessive amounts of water, blue or plastic clay, vegetation, organic matter, debris, pavement, stones or boulders greater than 12 inches in any dimension, frozen material, and material which, in the opinion of the Architect/Engineer, will not provide a suitable foundation or subgrade.

3. On-Site Material: Any suitable material from on-site excavation.

4. Material for embankments and general fills may contain pieces of excavated ledge having a greatest dimension of up to 18 inches, if approved by the Architect/Engineer.

5. Sieve Analysis: Performed in accordance with ASTM D422-63.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Identify all lines, grades and elevations necessary to construct columbarium foundation subgrade, walkway subgrade, rough grading, etc. as shown on the plans.

B. Protect all survey control points.

C. Over-excavate and properly prepare areas of subgrade not capable of supporting the proposed improvements. Areas of over excavation shall be filled and compacted with granular borrow material or suitable common borrow.

D. Dewater soils as necessary to adequately compact, excavate and work existing soils.

E. Paved surfaces: Do not operate equipment on paved surfaces. Paved surfaces outside the specified limits of Work that become damaged shall be repaved by the Contractor at no additional cost to Owner.

F. Maintain excavations with approved barricades, lights, and signs to protect life and property until excavation is filled and graded to a condition acceptable to the Architect/Engineer.

G. Protect structures, utilities, sidewalks, pavements, property monuments, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations. The Contractor shall be responsible for actual cost of repair or replacement of any items damaged as a result of construction activities. This cost shall include any professional services required for inspection of repairs or replacement.

3.2 ROUGH GRADING:

A. Rough grading of all areas within the project, including excavated and filled sections and adjacent transition areas, shall be reasonably smooth, compacted and free from irregular surface changes; the degree of finish shall be that ordinarily obtainable from skilled blade bulldozer or scraper operations except as otherwise specified. All ditches, swales and gutters shall be

finished to drain readily. Provide smooth, roundings or sharp edges at top and bottom of banks and at other breaks in grade as shown on the plans.

B. Protection: Protect newly graded areas from the action of the elements. Any settlement or erosion that occurs prior to acceptance of the Work shall be repaired, and grades re-established to the required elevations and slopes. Fill to required subgrade levels any areas where settlement occurs.

3.3 SUBGRADE PREPARATION FOR PAVEMENTS AND WALKS:

A. Excavate, form, shape and roll subgrade to conform to cross-section of finished pavement. Roller: ten-ton minimum weight in all open areas; suitable equipment in confined spaces.

B. Remove stones greater than 5" from subgrade to 12" depth. Fill depressions with suitable granular borrow material. When surface areas become impervious due to concentrations of fines, lightly scarify and re-compact. In severe cases, remove such material and replace with suitable soil as directed.

C. Refer to Section 32 11 23 for compaction requirements.

3.4 FINE GRADING:

A. Fine grading of gravel bases in areas to receive pavement or concrete slab-on-grade shall be accomplished by the use of a suitable motor-grader, or by hand-raking in areas too small to allow machine grading. Finish grading shall be carried out after the base material has been thoroughly compacted as specified. Use screeds, grade stakes, string-lines, etc. as necessary to maintain specified finish sub-grades and tolerances.

B. Finish-tolerance for all areas to receive pavements or slab-on-grade shall not exceed 1/4 of an inch above or below the required finished subgrade of the gravel base material.

C. The Contractor shall use care in all finish grading operations for loam areas to assure conformance with the grades shown on the drawings. Correct or revise finish grades as directed by the Owner's Representative to make the finish grades conform to the plans and details.

D. Loamed areas shall be fine-graded using hand raking and/or tractor-mounted rakes, in conjunction with removal of stones and debris, etc. Tolerance on slopes, field areas, etc. shall be within ¾ of an inch of specified finished grades.

E. Protection and Restoration: Protect finish-graded areas from the action of the elements. Any settlement or erosion that occurs prior to acceptance of the Work shall be repaired, and grades re-established to the required elevations and slopes. Fill to required finish-grade levels any areas where settlement occurs.

END OF SECTION 31 22 00

SECTION 31 23 16

ROCK REMOVAL

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 DESCRIPTION OF WORK

A. Provide labor, equipment, materials and services necessary for the complete removal of ledge located in proposed locations of driveways, parking areas, walkways, utility trenches, building foundations and/or areas of other site improvements as indicated on the drawings and specified herein:

1. Rock Removal:

a. Surface boulders/rocks. Removal of surface boulders from all areas within the developed area.

b. Removal of open and trench ledge necessary for all utilities, piping, structures, roads, burial plots, lawn areas, sidewalks and general grading as required to complete the work of the drawings.

c. Provide all necessary shielding, covering, matting and undertake all measures necessary to protect the work and assure the safety of workers, adjacent property, utilities and the public.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Explosives: As recommended by the blasting Contractor based on seismic survey, and as permitted by NFPA 495 and the Maine State Fire Marshall.

B. Delay Device: As recommended by the blasting Contractor and as permitted by NFPA 495, and the Maine State Fire Marshall.

C. Blast Mat Materials: As recommended by the blasting Contractor.

PART 3 - EXECUTION

3.1 PREPARATION

A. Notify "Dig-Safe" (1-888-344-7233) at least 3 days prior to beginning any excavation or blasting work.

B. Verify site conditions and excavate exploratory test pits, note any subsurface irregularities affecting Work of this Section.

C. Identify required lines, levels, contours, and datum.

D. Accurately locate any existing utilities before beginning drilling or blasting; contact local utility companies.

E. Check for conflict with underground utilities or structures. The Blasting Contractor shall notify the General Contractor of any and all possible conflicts or potentially hazardous conditions before proceeding with the Work.

F. Conduct a pre-blast survey of all structures within 600-ft of the blasting.

3.2 ROCK EXCAVATION (Blasting Method)

A. Rock excavation may be encountered at this site. Rock excavation shall be defined as: All rock, ledge, or boulders in undisturbed soil that cannot be removed by a mechanical scarifier and power shovel of 1.0 cubic yards capacity, and/or D-8 Bulldozer with ripper, without use of line drilling or explosives. Boulders 2 cubic yards or smaller shall be considered to be unclassified material regardless of location. Cut stone encountered in excavations in excess of 2 cubic yards will be considered as "rock" as herein defined, concrete will not.

1. All rock and ledge removal for installation of crypts and drainage structures in Area A shall be included in Contractor's Base Bid.

B. Blasting:

1. The Blasting Contractor shall conduct a Pre-Blast Survey, including photographs, of all structures within the Blasting Area, and shall provide the Architect/Engineer with a written report of the Survey. A Pre-Blast Survey shall be performed for all structures within 600 feet of any blast site. The Pre-Blast Survey shall encompass and reflect the U.S. Department of Interior, "Rules for Pre-Blast Surveys", cited in the Site Location of Development Law of the State of Maine.

2. All drilling equipment will be equipped with suitable dust control apparatus, which must be kept in operation and used during all drilling operations.

3. All blasting operations, including the transport, handling, and storage of explosives, shall be conducted in full compliance with all Federal and State laws and regulations and all

local ordinances, and with all possible care so as to avoid injury to persons and property.

a. Contractor shall limit ground vibrations to less than l.9 in. per sec. peak particle velocity, and peak air over pressures to less than 0.0l8 psi, measured at the location of the nearest structure.

b. Contractor shall provide protection against flying rock; the rock shall be well covered, and sufficient warning shall be given to all persons in the vicinity of the Work before blasting. Care shall be taken to avoid injury to all utilities, above and below ground, to other buildings (including foundations) and structures, and to private property.

c. The Contractor, in addition to observing all state and municipal ordinances relating to the storage and handling of explosives, shall also conform to any further regulations which the Owner or Architect/Engineer shall deem necessary.

d. Responsibility for all damages to persons or property shall rest with the Contractor. Only personnel qualified in the use of explosives shall be employed for blasting.

4. Blasting shall be performed only after approval has been given by the Owner for such operation.

5. All transportation, storage and handling of explosives, and all drilling and blasting operations shall be performed in accordance with M.R.S.A. Title 25, Section 2442, and all pertinent provisions of: the "Manual of Accident Prevention in Construction", issued by the Associated General Contractors of America, Inc.; the "Construction Safety Rules and Regulations", as adopted by the State Board of Construction Safety, Augusta, Maine; the Maine Department of Transportation "Safety Specifications", Section 107.12, "Use of Explosives"; and the U.S. Dept. of Interior "Blasting Guidance Manual."

6. Any site where electric blasting caps are located, or where explosive charges are being placed or have been placed, shall be designated as a "Blasting Area."

7. Bring explosives to the Work site only as needed and in small quantities.

8. A "Blasting Area" within three hundred (300) feet of any traveled way shall be marked in both directions by approved signs, with information similar to the following:

"BLASTING AREA. TURN OFF TRANSMITTERS"

and on the reverse side:

"END OF BLASTING AREA"

9. Notify each public utility company having structures in proximity to the site of the Work of the impending use of explosives, and give such notice sufficiently in advance to enable each company to take such steps as it may deem necessary to protect their property from injury. Such notice shall not relieve the Contractor of responsibility for any damage resulting from his blasting operations.

10. The Contractor shall be liable for all damages to persons or property caused by blasting or explosions, or arising from neglect to properly guard and protect the excavations and all portions of the Work, and the Contractor shall wholly indemnify the Owner against claims

on such account.

11. No compensation will be allowed the Contractor in any event, or under any circumstances, for loss incurred by the Contractor or arising from the Contractor's neglect to fully comply with these or other applicable requirements.

12. Provide the Architect/Engineer with a Blasting Log for the Work, containing the following information:

    a. Location

    b. Time and date

    c. Number of holes

    d. Amount and type of explosives used per hole

    e. Measurement of peak particle velocity and frequency, at nearest structure.

    f. Air-blast monitoring results.

    g. The names of persons, companies, corporations, or public utilities contracting, owning, leasing or occupying property or structures in proximity to the site of the blasting Work.

13. Copies of blasting records, together with an explanatory narrative of the blasting, shall be submitted to the Architect/Engineer, with a copy for submission to the Department of Environmental Protection.

C. Excavation:

1. All disturbed, broken or shattered rock fragments shall be excavated and removed from the final subgrade prior to placement of structural fill or foundations. Under footings, foundation bases, stairs or walls, fill over-excavated areas by extending indicated bottom elevation of footing or base to clean excavation bottom. When acceptable to the Architect/Engineer, concrete fill may be used to bring elevations to proper position.

2. Use of Excavated Materials: Excavated rock suitable for use as embankment fill, rip-rap, or other use, as shown on the Drawings or as directed by the Architect/Engineer, shall be immediately utilized for such use where possible. Where excess quantities or scheduling conflicts make such immediate use impossible, the materials shall be removed from the area and properly disposed of off-site, or stored for later use at a location as directed by the Architect/Engineer.

3. Unsuitable Excavated Materials: All non-salvageable rock, unsuitable subsurface material, refuse, and debris which accumulates as a result of Work under this Section shall become the property of the Contractor and shall be removed from the site. No refuse or debris of any nature shall be allowed to accumulate to the detriment of the Work or to the good appearance of the site. All such materials shall be gathered and disposed of at frequent, regular intervals in a legal manner.

D. Basis of Payment:

1. The total amount of rock excavation will be based upon the in-place volume of rock

excavated below the cross-sectioned ledge surface and within and/or above the lines referred to below as "payment lines." Limits of excavation are as shown on the drawings and/or otherwise specified herein.

2. The payment lines are only to be used as a basis of payment for any requested work, and are not necessarily to be used as limits of excavation. Limits of excavation are as shown on the Drawings and/or as otherwise specified herein.

E. Payment Lines for Rock Excavation:

1. Open Rock:

a. Payment lines for structures, footings and grade beams, including foundation drains, shall be a vertical line 18 inches from the toe of the structure, or 18 inches outside of structure. The depth shall be measured at 6 inches below the bottom elevations shown on the Drawings for foundations that do not bear directly on ledge, or at the pressured rock face for foundations bearing directly on ledge. Payment lines for structures to be damp-proofed shall be a vertical line 2 feet outside the walls of the structure.

b. Payment lines for rock excavation under slabs on grade shall be the specified subgrade elevation beneath gravel base material.

c. Payment lines for rock excavation at paved areas and lawns shall be 6 inches below respective subgrade materials, as detailed and specified.

d. Payment for rock excavation at tree and shrub beds shall be full depth of required excavation for bed, or a minimum of 4 feet, whichever is greater, and 6 inches beyond vertical edge of beds.

2. Trench Rock:

a. Payment lines for manholes and catch basins shall be one foot outside each of the outer walls, and 6 inches beneath the structure (subgrade elevation).

b. Payment lines for rock excavation under pipes and for utility trenches outside the building lines shall in no case be calculated as greater in width than the outside diameter of the pipe plus 2 feet for pipes up to l8 inches. For pipes l8 inches and larger, payment lines shall in no case be calculated as greater in width than the outside diameter of the pipe plus 3 feet. Payment lines at bottom of all pipe and utility trenches shall be 6 inches below the pipe bearing elevation.

c. Payment lines for spot ledge excavation for small structures such as bollards, light pole bases, transformer pads, etc., shall be 6 inches below the bottom of the structure, and 12 inches outside the exterior vertical face of the structure.

d. Payment lines for communication and electrical conduit trench shall be according to the payment lines indicated in 3.2 E.2.b. above.

e. Payment lines for rock excavation for communication vault/manhole shall be one foot outside each of the outer walls of the vault/manhole and 6 inches below the structure and bottom.

3.3 PAYMENT:

A. The Contractor agrees to the payment of rock and ledge removal according to the following:

1. Surface Boulders/Rocks: Payment shall be made on a lump sum basis and included as part of the Base Bid.

2. The Bidder/Contractor agrees to include Unit Prices for each rock type, open or trench. Final payment will be made on the quantified, in place rock quantity removed based on the stated Unit Price, whether added or deducted from the bid quantity.

END OF SECTION 31 23 16

SECTION 31 23 19

DEWATERING

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 DESCRIPTION

A. This section specifies performance of dewatering work required to lower and control ground water table levels and hydrostatic pressures to permit excavation, backfill, and construction work to be performed in the dry. Control of surface water shall be considered as part of the work under this specification.

1.3 SUMMARY

A. The work to be completed by the Contractor includes, but is not necessarily limited to the following:

1. Implementation of the Erosion and Sedimentation Control Plan.
2. Dewater excavations, including seepage and precipitation.

B. The Contractor shall be responsible for providing all labor, materials, tools, equipment, power and services necessary for care of water and erosion control. Excavation work shall not begin before the approved Erosion and Sedimentation Control Plan is in place.

1.4 REQUIREMENTS

A. Dewatering system shall be of suitable facilities with sufficient size and capacity necessary to lower and maintain ground water table to an elevation at least 1 foot below lowest foundation subgrade or bottom of pipe trench and to allow material to be excavated in a reasonably dry condition. Materials to be removed shall be sufficiently dry to permit excavation to grades shown and to stabilize excavation slopes where sheeting is not required. Operate dewatering system continuously until backfill work has been completed.

B. Prevent loss of fines, seepage, boils, quick conditions or softening of foundation strata.

C. Maintain stability of sides and bottom of excavation.

D. Construction operations are performed in the dry.

E. Control of surface and subsurface water is part of dewatering requirements. Maintain adequate control so that:

1. The stability of excavated and constructed slopes are not adversely affected by saturated soil, including water entering prepared subbase and subgrades where underlying materials are not free draining or are subject to swelling or freeze-thaw action.
2. Erosion is controlled.
3. Flooding of excavations or damage to structures does not occur.
4. Surface water drains away from excavations.
5. Excavations are protected from becoming wet from surface water, or insure excavations are dry before additional work is undertaken.

F. Permitting Requirements: The contractor shall comply with and obtain the required State and Local permits where the work is performed.

1.5 SUBMITTALS

A. Comply with Section 01 33 00 - Submittal Procedures.

B. Drawings and Design Data:

1. Submit drawings and data showing the method to be employed in dewatering excavated areas 10 business days prior to commencement of excavation.
2. Material shall include: location, depth and size of wellpoints, headers, sumps, ditches, size and location of discharge lines, capacities of pumps and standby units, and detailed description of dewatering methods to be employed to convey the water from site to adequate disposal. Details of the dewatering facilities, including equipment and erosion protection facilities shall be submitted. The submittal materials shall include facilities and procedures for insuring discharge water quality in accordance with the applicable provisions of the Erosion Control Plan requirements.
3. Include a written report outlining control procedures to be adopted if a dewatering problem arises.
4. Materials submitted shall be in a format acceptable for inclusion in required permit applications to any and all regulatory agencies for which permits for discharge water from the dewatering system are required due to the discharge reaching regulated bodies of water.

C. Inspection Reports.

D. All required permits.

PART 2 - PRODUCTS (Not used)

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install a dewatering system to lower and control ground surface water in order to permit excavation, construction of structure, and placement of backfill materials to be performed under dry conditions. Make the dewatering system adequate to pre-drain the water-bearing strata above and below the bottom of structure foundations, utilities and other excavations.

3.2 OPERATION

A. Prior to any excavation below the ground water table, place system into operation to lower water table as required and operate it continuously 24 hours a day, 7 days a week until utilities and structures have been satisfactorily constructed, which includes the placement of backfill materials and dewatering is no longer required.

B. Place an adequate weight of backfill material to prevent buoyancy prior to discontinuing operation of the system.

3.3 WATER DISPOSAL

A. Dispose of water removed from the excavations in such a manner as:

1. Will not endanger portions of work under construction or completed.
2. Will cause no inconvenience to site occupants or to others working near site.
3. Will comply with the stipulations of required permits for disposal of water.
4. Will Control Runoff: The Contractor shall be responsible for control of runoff in all work areas including but not limited to: excavations, access roads, parking areas, laydown, and staging areas. The Contractor shall provide, operate, and maintain all ditches, basins, sumps, culverts, site grading, and pumping facilities to divert, collect, and remove all water from the work areas. All water shall be removed from the immediate work areas and shall be disposed of in accordance with applicable permits.

B. Excavation Dewatering:

1. The Contractor shall be responsible for providing all facilities required to divert, collect, control, and remove water from all construction work areas and excavations.
2. Drainage features shall have sufficient capacity to avoid flooding of work areas.
3. Drainage features shall be so arranged and altered as required to avoid degradation of the final excavated surface(s).
4. The Contractor shall utilize all necessary erosion and sediment control measures as

described herein to avoid construction related degradation of the natural water quality.

C. Dewatering equipment shall be provided to remove and dispose of all surface and ground water entering excavations, trenches, or other parts of the work during construction. Each excavation shall be kept dry during subgrade preparation and continually thereafter until the structure to be built, or the pipe to be installed therein, is completed to the extent that no damage from hydrostatic pressure, flotation, or other cause will result.

3.4 Standby Equipment

A. Provide complete standby equipment, installed and available for immediate operation, as may be required to adequately maintain de-watering on a continuous basis and in the event that all or any part of the system may become inadequate or fail.

3.5 CORRECTIVE ACTION

A. If dewatering requirements are not satisfied due to inadequacy or failure of the dewatering system (loosening of the foundation strata, or instability of slopes, or damage to foundations or structures), perform work necessary for reinstatement of foundation soil and damaged structure resulting from such inadequacy or failure by Contractor, at no additional cost to the Owner.

3.6 DAMAGES

A. Immediately repair damages to adjacent facilities caused by dewatering operations to at least the same condition prior to damage.

3.7 Removal

A. Insure compliance with all conditions of regulating permits and provide such information to the Resident Engineer. Obtain written approval from Engineer before discontinuing operation of dewatering system.

END OF SECTION 31 23 19

SECTION 31 25 00

EROSION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions (if any) and all required and applicable local, state and federal erosion and sedimentation control regulations and guidelines apply to this Section.

1.2 SUMMARY

A. Provide all labor, material, equipment, and services required to complete the work specified in this section, and as shown on the drawings.

B. The work of this section includes but is not necessarily limited to:

1. Provide and install erosion and sedimentation controls as shown on the Drawings, as specified herein, and as required to minimize erosion at the Site.
2. Provide work to control erosion and sedimentation as required by the Maine Department of Environmental Protection standards, the York County Soil & Water Conservation District Standards, the U.S. Environmental Protection Agency, and the City of Sanford, Maine standards.
3. Temporary seeding and mulching as required for disturbed areas including stockpiles.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit product data for the following items:

1. Silt fence.

1.4 QUALITY ASSURANCE

A. Comply with the requirements of Section 01 40 00 – Quality Requirements.

B. Documents affecting Work of this Section include, but are not necessarily limited to; the Conditions of the Contract, General Conditions, Supplementary Conditions, Addenda, and all Sections of Division 1 are hereby made a part of this Section.

C. Coordinate Work with that of other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of the Work.

D. All Work shall comply with the requirements of the applicable Maine Department of Environmental Protection standards, the York County Soil & Water Conservation District Standards, the City of Sanford, Maine Standards, to minimize adverse environmental impacts. Strict adherence to the Specifications and Plans is required in order to prevent adverse downstream impacts.

E. All Work shall be in conformance with the requirements of the York County Soil and Water Conservation District and the Maine Department of Environmental Protection Erosion and Sediment Control Best Management Practices (BMPs).

F. All Work shall comply with the conditions of the enclosed permits.

G. Work shall be accomplished in accordance with regulations of local, county and state agencies and national or utility company standards as they apply.

H. The Contractor shall protect structures, utilities, sidewalks, pavements, property monuments, monitoring wells, and other facilities from damages caused by settlement, lateral movement, undermining, washout, and other hazards created from earthwork operation.

I. The Contractor shall bear all cost associated with correcting any Work that does not meet the requirements of this Section or any damaged items due to construction activities. These costs include any professional services required for inspection of repairs or replacements.

J. Paved surfaces: Do not operate equipment on paved surfaces. Paved surfaces outside the limits of Work which become damaged shall be repaved by the Contractor.

K. Contractor shall be responsible for notifying all affected utility companies and Dig Safe before starting work.

L. The Contractor shall pay all fines issued to the Owner as a result of poor erosion control practices by the Contractor.

M. Requirements of Regulatory Agencies: The Contractor shall be familiar and comply with the requirements of all regulatory permits and applications, including the following:

1. York County Soil and Water Conservation District
2. Maine Department of Environmental Protection
    a. Current edition of Erosion and Sediment Control Best Management Practices (BMPs)

1.5 PRE-INSTALLATION MEETINGS

A. Section 01 31 00 – Project Management and Coordination: Pre-installation conferences.

B. Convene minimum one week prior to commencing work of this section.

PART 2 - PRODUCTS

2.1 EROSION AND SEDIMENTATION CONTROLS

A. Silt Fence: Material shall comply with MDOT 656.02 and shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0 to 120 degrees F. Post spacing shall not exceed 8 feet.

B. Mulch: Hay or straw mulches that are dry and free from undesirable seeds and course materials. Application rate must be 2 bales (70-90 lbs.) per 1,000 square feet or 1.5 to 2 tons (90-100 bales) per acre to cover 75 to 90% of the ground surface.

C. Mulch Binder: May be emulsified asphalt, or approved equivalent.

D. Temporary Seeding: Conservation Mix of 100% perennial rye grass.

E. Erosion Control Blanket: Curlex II Erosion Control Blanket as manufactured by American Excelsior, or approved equal.

F. GRASS SEED MIXTURE FOR EROSION CONTROL:

1. Grass seed mixture for both temporary and permanent control shall be in accordance with Section 3.03 A-5 (temporary seeding) or 3.03 C-1 (permanent seeding).

PART 3 - EXECUTION

3.1 GENERAL:

A. The Contractor shall provide for the diversion of surface water from the construction areas and install siltation and erosion control structures.

B. The Contractor shall install all siltation fencing, mulches, grasses, seeding, ditches, channels, riprap, grading, and all other work necessary to control water pollution, surface runoff, and soil erosion.

C. The Contractor shall provide temporary seeding, mulching, or other protective coverings to exposed earth surfaces or stockpiles which will be exposed to rain or wind elements through the fall and winter seasons.

D. The Contractor shall maintain all facilities necessary to control water pollution, surface runoff, and soil erosion until permission is given by the Landscape Architect to discontinue the use of

the facilities.

E. The Contractor shall make provisions on the site to detain and filter water from excavation operations so that sediments from the dewatering operation are contained. In no case shall direct discharge from the dewatering operations to offsite drainage facilities be allowed.

3.2 LOAMING:

A. Loaming shall be performed as specified in Section 02900.

B. It shall be the Contractor's responsibility to restore to the line, grade, and surface all eroded areas with approved material and to keep topsoiled areas in acceptable condition until turf is established and accepted by the Landscape Architect.

3.3 TEMPORARY AND PERMANENT EROSION AND SEDIMENTATION CONTROL:

A. General procedure:

1. All soil erosion and sediment control shall be done in accordance with all local, state and federal erosion and sedimentation control standards.

2. Contractor shall be responsible for the repair/replacement/ maintenance of all erosion control measures until all disturbed areas are stabilized.

3. Disturbed areas shall be permanently stabilized within 15 days of final grading, or temporarily stabilized within 7 days of initial disturbance of soil.

4. In all areas, removal of trees, bushes and other vegetation, as well as disturbance of topsoil shall be kept to a minimum while allowing proper site operations.

5. Any suitable topsoil shall be stripped and stockpiled for reuse in final grading. Topsoil will be stockpiled in a manner such that natural drainage is not obstructed and no off-site sediment damage will result. If a stockpile is necessary, the side slopes of the topsoil stockpile will not exceed 2:1. Topsoil stockpiles will be temporarily seeded with Aroostook Rye, Annual or Perennial Ryegrass, within 7 days of formation, or temporarily mulched if seeding cannot be done within the recommended seeding dates. Recommended seeding dates and application rates are as follows:

Aroostook Rye:	Recommended Seeding Dates:	8/15 - 10/1
	Application Rate:	112 lbs/acre

Annual Ryegrass	Recommended Seeding Dates: Application Rate:	4/1 - 7/1 40 lbs/acre
Perennial Ryegrass	Recommended Seeding Dates: Application Rate:	8/15 - 9/15 40 lbs/acre
Mulch:	Hay or Straw Application Rate: 1.5 - 2.0 tons/acre. Anchor with mulch netting (install per manufacturer's recommendations). Wood Fiber Cellulose Application Rate: 4,000 lbs/acre. Anchoring not required.	

B. Temporary measures:

1. Silt fence installation:

a. Silt fences will be installed prior to any soil disturbance of the contributing drainage area above them.

b. The height of a silt fence will not exceed 36 inches.

c. The filter fabric will be purchased in a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are necessary, filter cloth will be spliced together only at a support post, with a minimum 6-inch overlap, and securely sealed.

d. Posts will be spaced a maximum of 10 feet apart at the barrier location and driven securely into the ground (minimum of 12 inches). When extra strength fabric is used without the wire support fence, post spacing will not exceed 6 feet.

e. A trench will be excavated approximately 4 inches wide and 4 inches deep along the line of posts and upslope from the barrier.

f. When standard strength filter fabric is used, a wire mesh support fence will be fastened securely to the upslope side of the posts using heavy duty wire stapled at least 1 inch long, tie wires or hog rings. The wire will extend more than 36 inches above the original ground surface.

g. The standard strength of filter fabric will be stapled or wired to the fence, and 8 inches of the fabric will be extended into the trench. The fabric will not extend more than 36 inches above the original ground surface. Filter fabric will not be stapled to existing trees.

h. When extra strength filter fabric and closer post spacing are used, the wire mesh support fence may be eliminated. In such a case, the filter fabric will be stapled or wired directly to the posts with all other provisions of item (g) applying.

i. The trench will be backfilled and the soil compacted over the filter fabric.

j. Silt fences will be removed when they have served their useful purpose, but not

before the upslope areas have been permanently stabilized.

k. Silt fences will be inspected immediately after each rainfall and at least daily during prolonged rainfall. They will be inspected if there are any signs of erosion or sedimentation below them. Any required repairs will be made immediately. If there are signs of undercutting at the center or the edges, or impounding of large volumes of water behind them, they will be replaced with a temporary crushed stone check dam.

l. Should the fabric on a silt fence decompose or become ineffective prior to the end of the expected usable life, and the barrier still be necessary, the fabric will be replaced promptly.

m. Sediment deposits should be removed after each storm event.

n. In lieu of providing the 4" x 4" trench, the bottom 8" - 12", of the fabric may be laid on existing grade and backfilled with stone anchoring material.

C. Permanent measures:

1. Topsoil application:

a. Topsoil: Use stockpiled materials spread to a depth of 4 inches, if available. Approved topsoil substitutes may be used.

b. Mix topsoil with the subsoil to a minimum depth of 6 inches.

2. Seeding and Mulching:

a. Seeding should be completed by May 15 of each year. Late season seeding may be done between August 15 and September 15. Areas not seeded or which do not obtain a satisfactory growth by October 20, will be reseeded with the specified application rates increased by 50%.

b. Seed mixture:

Species	Application Rate
Kentucky Bluegrass	20 lbs/acre
Creeping Red Fescue	20 lbs/acre
Perennial Ryegrass	5 lbs/acre

3. Fertilizer: Apply 800 pounds per acre of 10-20-20 fertilizer or equivalent per acre (18.4 lbs/1,000 sq. ft.).

4. Lime: Apply ground limestone at a rate of 3 tons per acre (138 lbB/1,000 sq. ft.).

5. Mulch: Mulch with weed free hay or straw at 1.0 - 2.0 tons per acre.

6. Anchor mulch with mulch netting installed per manufacturers recommendations.

7. If permanent vegetated stabilization cannot be established due to the season of the year, all exposed and disturbed areas not to undergo further disturbance are to have dormant seeding applied and be temporarily mulched to protect the site.

D. The following methods may be used to perform a dormant seeding:

1. Prepare the seedbed, add the required amounts of lime and fertilizer, then mulch and anchor. After the first killing frost and before snow fall, broadcast or hydroseed the selected seed mixture. Double the regular seeding rates for this type of seeding.

2. When soil conditions permit, between the first killing frost and before snow fall, prepare the seedbed, lime and fertilize, apply the selected seed mixture, and mulch and anchor. Double the regular seeding rates for this type of seeding.

3. Dormant seedings need to be anchored extremely well on slopes, ditch bases and areas of concentrated flows.

4. Dormant seeding requires inspection and reseeding as needed in the spring. All areas where cover is inadequate must be immediately reseeded and mulched as soon as possible.

3.4 EXAMINATION

A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.

B. Inspections shall be undertaken by the Contractor's qualified personnel to ensure that temporary and permanent erosion and sedimentation controls are properly installed and correctly functioning, and that additional erosion control measures are installed if needed. Such inspections will occur bi-weekly and after each significant rainfall event (1 inch or more within a 24-hour period) during construction until permanent erosion control measures have been properly installed and the site is stabilized. Written reports should be submitted to the Landscape Architect within one week of completion of each inspection.

3.5 SITE STABILIZATION

A. Install all erosion and sedimentation controls in conformance with Erosion & Sedimentation Control Plan.

B. Incorporate erosion control devices indicated on the Drawings into the Project at the earliest practicable time prior to grubbing, stripping, or other construction operations.

C. Construct, stabilize and activate erosion controls before site disturbance within tributary areas of those controls.

D. Stockpile and waste pile heights shall not exceed 35 feet. Slope stockpile sides at 2:1 or flatter.

E. Stabilize diversion channels, sediment traps, and stockpiles immediately.

3.6 FIELD QUALITY CONTROL

A. Comply with Section 01 40 00 - Quality Requirements.

B. Comply with Section 01 73 00 - Execution Requirements.

C. Inspect erosion control devices on a weekly basis and after each rain event. Make necessary repairs to ensure erosion and sediment controls are in good working order.

3.7 MAINTENANCE AND CLEANING

A. Comply with Section 01 73 00 - Execution Requirements: Requirements for cleaning.

B. Comply with Erosion and Sedimentary Control Plan.

C. When sediment accumulation in sedimentation structures has reached a point one-third depth of sediment structure or device, remove and dispose of sediment.

D. Do not damage structure or device during cleaning operations.

E. Do not permit sediment to erode into construction or site areas or natural waterways.

F. Clean channels when depth of sediment reaches approximately one half channel depth.

G. Routine Maintenance

1. Inspection shall be performed annually by a qualified person during wet weather to ensure that the facility performs as intended. Inspection priorities shall include checking erosion controls for accumulation of sediments.

H. Grassed Areas

1. Lime according to a soil test or at a minimum of every five years using a rate of 2 tons per acre (100 pounds per 1,000 sq. ft.)

2. Top dress with fertilizer in the early spring (before May 15) one year after planting with a balanced fertilizer, applying 50 pounds of nitrogen/acre (500 pounds of 10-20-20 per acre). Thereafter, fertilize according to a soil test or broadcast biennially, 300 pounds of 10-10-10 or equivalent per acre (7.5 pounds per 1,000 sq. ft.).

3.8 PROTECTION

A. Section 01 73 00 - Execution Requirements: Requirements for protecting finished Work.

END OF SECTION 31 25 00

SECTION 32 11 23

AGGREGATE BASE COURSES

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. Provide all labor, material, equipment, and services required to complete the work specified in this section, and as shown on the drawings.

B. The work of this section includes but is not necessarily limited to:

1. Preparation of subgrade.
2. Construction of base and subbase course materials under, pavements, curbs, walks including pavers, and exterior slabs.
3. Geotextile installation as necessary.
4. Material testing and compaction retesting as required.

1.3 SUBMITTALS

A. Comply with Section 01 33 00 - Submittal Procedures.

B. Comply with Section 01 40 00 – Quality Requirements.

C. Test Reports: Submit the following reports:

1. Reports on material gradations (ASTM D422).
2. Field density test reports (ASTM D2922) for retesting.
3. One optimum moisture-maximum density curve for each type of material used in the Work (ASTM D-1557 modified).

D. Materials Source: Submit name of imported materials source.

E. Material Certifications: Submit materials certificate signed by the material supplier and Contractor, certifying that materials comply with, or exceed, the requirements herein.

F. Product Data: Submit data for geotextile fabric indicating fabric and construction.

G. A mechanical analysis test and moisture-density curve test shall be submitted and approved by

the Engineer for all materials used in this section prior to placement of the material.

H. Product Data: Submit manufacturer's data for geotextile fabric.

1.4 QUALITY ASSURANCE

A. Comply with the requirements of Section 01 40 00 – Quality Requirements.

B. Furnish each aggregate material from single source throughout the Work.

C. All materials used for the Work in this Section must be reviewed and approved by the Engineer prior to delivery to the Site.

D. Documents affecting Work of this Section include, but are not necessarily limited to; the Conditions of the Contract, General Conditions, Supplementary Conditions, Addenda, and all Sections of Division 1 are hereby made a part of this Section.

E. Coordinate Work with that of other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of the Work.

F. All Work shall comply with the requirements of the Maine Department of Environmental Protection, the York County Soil & Water Conservation District Standards, and the City of Sanford, Maine, to minimize adverse environmental impacts. Strict adherence to the Specifications and Plans is required in order to prevent adverse downstream impacts.

G. All Work shall comply with the conditions of any and all site permits including the town Site Plan Approval.

H. Work shall be accomplished in accordance with regulations of local, county and state agencies, and national or utility company standards as they apply.

I. The Contractor shall protect structures, utilities, sidewalks, pavements, property monuments, monitoring wells, and other facilities from damages caused by settlement, lateral movement, undermining, washout, and other hazards created from earthwork operation.

J. The Contractor shall bear all cost associated with correcting any Work that does not meet the requirements of this Section or any damaged items due to construction activities. These costs include any professional services required for inspection of repairs or replacements.

K. Costs related to retesting due to unacceptable qualities of work and failures discovered by testing shall be paid for by the Contractor at no additional expense to Owner, and the costs thereof will be deducted by the Owner from the Contract Sum.

L. Paved surfaces: Do not operate equipment on paved surfaces. Paved surfaces outside the limits of Work which become damaged shall be repaved by the Contractor.

M. Contractor shall be responsible for notifying all affected utility companies and Dig Safe before starting work.

N. Field Measurements:

1. Verify that survey horizontal and vertical control reference points are present and correct as indicated. Protect these points from disturbance during the course of the Work, or correctly re-establish as necessary.

2. During construction, provide all necessary line and grade staking to properly control the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Crushed Ledge or Crushed Gravel for Pavement Base: Material shall be crushed ledge or crushed gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances meeting Maine DOT Standard Specification, Highways and Bridges; Section 703.06a, Type A, conforming to the following gradation:

Sieve Size	Percent Finer by Weight
3 Inch	100
½ Inch	45 to 70
¼ Inch	30 to 55
No. 40	0 to 20
No. 200	0 to 6.0

B. Sand or Gravel for Pavement Subbase: Material shall be sand or gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances meeting Maine DOT Standard Specification, Highways and Bridges; Section 703.06c, Type D conforming to the following gradation:

Sieve Size	Percent Finer by Weight
3 Inches	100
½ Inch	35 to 80
¼ Inch	25 to 65
No. 40	0 to 30
No. 200	0 to 7.0

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 - Execution: Verification of existing conditions before starting work.

B. Verify substrate has been inspected, gradients and elevations are correct, and are dry.

3.2 PREPARATION

A. Verify subgrade has been inspected, gradients and elevations are correct, and is dry.

B. Prior to placement of subbase, the Engineer shall review subgrade conditions.

C. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

D. Do not place fill on soft, muddy, or frozen surfaces.

E. Verify that subgrade has been prepared according to Section 31 20 00.

F. Refer to Section 31 20 00 for testing requirements.

3.3 FIELD QUALITY CONTROL

A. Comply with Section 01 40 00 - Quality Requirements.

B. Comply with Section 01 73 00 - Execution Requirements.

C. Testing and Field Observations:

1. The Owner may retain and pay for the services of an independent testing and inspection firm and/or a Geotechnical Consultant to perform on-site observation and testing during the various phases of the construction operations. The scope of services will be determined by the Owner and the independent testing and inspection firm and/or the Geotechnical Consultant and will be provided to the contractor. The Owner reserves the right to modify or waive the services of the independent testing and inspection firm and/or the Geotechnical Consultant. The services of a Geotechnical Consultant/Inspection and testing firm may include, but not necessarily be limited to, the following:

    a. Observation during backfilling and compacting operations.

    b. Laboratory testing and analysis of fill materials as specified herein and proposed by the Contractor for incorporation into the Work.

    c. Observation of construction and performance of water content, gradation and compaction tests at a frequency and locations that he shall select. The results of these tests will be submitted to the Owner, Engineer, and Contractor on a timely basis so that action can be taken to remedy indicated deficiencies. During the course of construction, the Geotechnical Consultant will advise the Owner in writing if at any time in his opinion the Work hereunder is of unacceptable quality. Failure of Geotechnical Consultant to give notice, shall not excuse the Contractor from latent defects discovered in his work.

2. The Contractor shall make provisions for allowing observations and testing of Contractor's

Work by the independent testing and inspection firm and/or the Geotechnical Consultant. The Contractor shall assist the testing agency as required and shall deliver samples of all materials required to the testing agency at the Contractor's expense.

3. The presence of the independent testing and inspection firm and/or the Geotechnical Consultant does not include supervision or direction of the actual work of the Contractor, his employees or agents. Neither the presence of the independent testing and inspection firm and /or the Geotechnical Consultant, nor any observations and testing performed by them, nor failure to give notice of defects shall excuse the Contractor from defects discovered in his work.

4. Costs related to retesting due to unacceptable qualities of work and failures discovered by testing shall be paid for by the Contractor at no additional expense to Owner, and the costs thereof will be deducted by the Owner from the Contract Sum.

D. Contractor will pay for all proposed material gradation testing. Owner will pay for initial field compaction tests.

E. Minimum Number of Tests:

1. Paved areas and Precast paver areas: In each compacted fill layer, make one field density test for every 2,000 square feet of overlaying slab or paved area, but in no case less than 3 tests for each.

3.4 AGGREGATE PLACEMENT

A. Place aggregate in maximum 8 inch layers and compact each course to 95 percent of the maximum dry density as determined by ASTM D-1557 with self-propelled vibratory compaction equipment.

B. Course thicknesses shown on the Drawings are compacted thicknesses.

C. Construction methods shall conform to MDOT Standard Specifications, Section 304.03 and 304.04.

D. Coordinate aggregate placement with curb installation.

E. Level and contour surfaces to elevations and gradients indicated.

F. Maintain optimum moisture content of fill materials to attain required compaction density.

G. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.5 TOLERANCES

A. Maximum Variation From Flat Surface: 1/2 inch measured with 10 foot straight edge.

B. Maximum Variation From Thickness: 1/4 inch.

C. Maximum Variation From Elevation: 1/2 inch.

END OF SECTION 32 11 23

SECTION 32 12 16

ASPHALT PAVEMENT

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. Description of Work: Provide labor, materials, equipment, and services necessary for proper and complete installation of all paving and related items as indicated on the drawings and as herein specified including the following items:

1. Bituminous concrete paving, base and top course.
2. Testing.
3. Pavement repair.
4. Accessible curb cuts/ramps.

1.3 REFERENCES

A. Comply with applicable requirements of the following standards.

1. State of Maine, Department of Transportation Standard Specifications latest edition. Substitute all references to the "Department" with "Owner" and all references to "Resident" with "Engineer".
2. American Society for Testing Materials (ASTM):

a. C 131: Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

1.4 SUBMITTALS

A. Comply with the requirements of Section 01 33 00 - Submittal Procedures.

B. Perform Work in accordance with the following, unless otherwise noted herein:

1. American Society for Testing and Materials (ASTM), Standard Specifications and Methods of Testing.
2. State of Maine, Department of Transportation, Standard Specifications, Highways and Bridges, Latest Edition.

C. Product Data: Before any paving is constructed, submit actual design mix to the Engineer for review and approval.

D. Manufacturer's Certificate: Submit materials certificate signed by the material producer and Contractor, to the independent testing laboratory certifying that materials comply with, or exceed, the requirements herein.

E. Test Reports: Submit test reports as required according to the following standards:

1. Mechanical analysis ASTM D421
2. Asphalt content ASTM D2172
3. In-place density ASTM D2041 and ASTM D2726

1.5 QUALITY ASSURANCE

A. Comply with the requirements of Section 01 40 00 – Quality Requirements.

B. Perform Work in accordance with the following, unless otherwise noted herein:

1. American Society for Testing and Materials (ASTM), Standard Specifications and Methods of Testing.
2. State of Maine, Department of Transportation, Standard Specifications, Highways and Bridges, Latest Edition.

C. Obtain materials from same source throughout.

D. Documents affecting Work of this Section include, but are not necessarily limited to; the Conditions of the Contract, General Conditions, Supplementary Conditions, Addenda, and all Sections of Division 1 are hereby made a part of this Section.

E. Coordinate Work with that of other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of the Work.

F. The Contractor shall coordinate paving with all other work, especially underground utility construction, to prevent covering up unfinished or uninspected work and loss of time or labor by improper scheduling. Any repaving required shall be done at no cost to Owner.

G. All Work shall comply with the requirements of the Maine Department of Environmental Protection standards, the York County Soil & Conservation District Standards, and City of Springvale, Maine requirements, to minimize adverse environmental impacts. Strict adherence to the Specifications and Plans is required in order to prevent adverse downstream impacts

H. Work shall be accomplished in accordance with regulations of local, county and state agencies and national or utility company standards as they apply.

I. Maintain one copy of the Construction Documents on Site including the Drawings and Specifications.

J. The Contractor shall bear all cost associated with correcting any work that does not meet the

requirements of this Section or any damages to property outside the limits of Work.

1.6 QUALIFICATIONS

A. Installer: Company specializing in performing work of this section.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

B. All asphalt materials and mixes shall be applied at temperatures within their optimum range as defined by MDOT Standard Specifications.

C. Weather Limitations for Bituminous Placement: Apply asphalt prime and tack coats when ambient temperature is above 50 degrees F (10 degrees C), and when temperature has not been below 40 degrees F (1 degree C) for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture.

D. Construct asphalt concrete surface course or leveling course when atmospheric temperature is above 50 degrees F (4 degrees C) and when base is dry. Base course may be placed when air temperature is above 40 degrees F (1 degrees C) and rising. Do not place pavement on frozen gravel base.

1.8 TRAFFIC CONTROL

A. Maintain access for vehicular and pedestrian traffic as required for normal activities and other construction activities.

B. Utilize flagmen, barricades, warning signs and warning lights as may be required. Two uniformed flaggers required when working in Main Street.

C. The construction of all pavements within public rights-of-way shall be in accordance with the rules, regulations and requirements of the Public Agency having control and ownership of such rights-of-way.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Asphalt Cement for Base Course, Top Course, and Sidewalks: Bituminous material conforming to Maine DOT Specifications.

B. Asphalt Cement for Curbs: Bituminous material conforming to Maine DOT Specifications, Section 712.36.

C. Aggregate for Base Course Mix: In accordance with MDOT Specifications, 19.0mm Superpave

HMA.

D. Aggregate for Top Course Mix: In conformance with MDOT Specifications, 9.5mm Superpave HMA.

E. Aggregate for Sidewalk Top Course: In conformance with MDOT specifications, 9.5mm Superpave HMA.

F. Mineral Filler: Shall conform to the requirements of AASHTO M17.

G. Tack Coat: Shall conform to MDOT Specifications.

2.2 ASPHALT PAVING MIX

A. Use dry material to avoid foaming. Mix uniformly.

B. Nominal Asphalt content shall be 6% for base course, top course, curbing, and sidewalk courses.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 – Execution Requirements: Verification of existing conditions before starting work.

B. Verify compacted subgrade, Subbase, and base is dry and ready to support paving and imposed loads.

C. Verify gradients and elevations of base are correct.

D. Verify gutter drainage grilles and frames, manhole frames and water valve boxes are installed in correct position and elevation.

3.2 SUBBASE

A. Aggregate Base and Subbase: Install as specified in Section 32 11 23 – Aggregate Base Courses.

3.3 PLACING ASPHALT PAVEMENT

A. Install Work in accordance with MDOT Specifications, Section 401.16, 401.17, 401.18, and 401.20.

B. Construct pavement to lines, grades, sections, compacted thicknesses as shown on the Drawings.

C. Edge of pavement shall be clean and true. Raveled edges are not acceptable. Hand tamp edged and bevel if forms or screed strips are not used.

D. Spread and strike-off asphalt concrete mix with a self-propelled finishing machine. At inaccessible or irregular areas, pavement may be placed by hand methods. If hand methods are used, the hot mixture shall be spread uniformly to the required depth with hot shovels and rakes. After spreading, the hot mixture shall be carefully smoothed to remove all segregated coarse aggregate and rake marks. Rakes and lutes used for hand spreading shall be of the type designed for this use. Material loads shall not be dumped faster that they can be properly spread. Workers shall not stand on the loose mixture while spreading.

E. Paving Machine Placement: In the larger parking fields, the binder course shall be placed in a transverse direction to the top course. The top course shall be placed in the direction of surface-water flow. Place in typical strips not less than 10 feet wide.

F. Spread mixture at Minimum temperature of 225 degrees F (107 degrees C).

G. Joints: Make joints between old and new pavements, and between successive days' work, to ensure continuous bond between adjoining works. Construction joints shall have same texture, density, and smoothness as other sections of paving. Clean contact surfaces and apply tack coat.

H. Place top course within 24 hours of placing and compacting the base course. When binder course is placed more than 24 hours before placing wearing course, clean surface and apply tack coat before placing wearing course.

I. If a tack coat is required, place top course within 24 hours of applying tack coat.

3.4 ROLLING

A. After the pavement has been spread as described in 3.3 of this Section, it shall be thoroughly compacted by rolling with a powered steel wheel tandem roller weighing not less than 2 or more than 10 tons. Begin rolling as soon as mixture will bear roller weight without excessive displacement.

B. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

C. Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling, and repair displaced areas by loosening and filling, if required, with hot material.

D. Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.

E. Any displacement or irregularities occurring as the result of the reversing of the direction of a roller, or from other causes, shall be corrected once by the use of rakes or lutes and addition of fresh mixture when required. Care shall be exercised in rolling not to displace the line and grade of the edges of the bituminous mixture.

F. Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density.

G. Compaction Tests: After construction, the Project Representative will designate locations for in-place nuclear density tests.

H. Remove and replace paving areas mixed with foreign materials and defective areas and fill with fresh, hot top or binder course material. Compact by rolling to maximum surface density and smoothness.

I. Protect the asphaltic concrete paved areas from traffic until the sealer is set and cured and does not pick up under foot or wheeled traffic.

3.5 TOLERANCES

A. Smoothness:

1. Top Course: maximum variation of 1/4inch measured with 10 foot straight edge.
2. Base Course: maximum variation of 3/8inch measured with 10 foot straight edge.

B. Scheduled Compacted Thickness: Within 1/8 inch.

C. Variation from Indicated Elevation: Within 1/2 inch.

3.6 FIELD QUALITY CONTROL

A. Comply with Section 01 40 00 - Quality Requirements.

B. Comply with Section 01 73 00 - Execution Requirements.

C. See item 1.3 - Submittals of this Section for required tests and reports.

D. Test in-place bituminous concrete courses for compliance with requirements of this Section.

E. After Construction, the Engineer will designate locations for in-place nuclear density tests to be performed by an independent testing agency.

F. Contractor will pay for all proposed material gradation testing. Owner will pay for initial field compaction tests.

G. In-place compacted thickness shall not be less than thickness specified on the drawings within a tolerance of 1/8 inch as determined by ASTM D-3549. Areas of deficient paving thickness shall be cleaned and receive a tack coat a minimum 1 inch compacted thickness overlay; or shall be removed and replaced to the proper thickness, at the discretion of the Engineer, until specified thickness of the course is met or exceeded, at no additional cost to the Owner.

H. Field density test for in-place materials shall be performed by nuclear density tests and shall have a compacted density of between 95% and 97% of the theoretical maximum density as determined by ASTM D-2041.

I. Areas of insufficient compaction shall be delineated, removed, and replaced in compliance with

the specifications.

J. Check all finished surfaces of each asphalt concrete course for smoothness using 10-foot straightedge applied parallel with, and at right angles to centerline of paved area. The results of these tests shall be made available to the Owner upon request. Surfaces will not be acceptable if they exceed the tolerances listed in 3.6 - Tolerances of this Section. Remove and replace unacceptable paving as directed by Engineer.

K. Check surface areas at intervals necessary to eliminate ponding areas. Remove and replace unacceptable paving as directed by Engineer.

L. If, at any time before the final acceptance of the Work, any damaged, soft, or imperfect places, or spots shall develop in the surface, all such places shall be removed and replaced with new materials and then compacted until the edges at which the new Work connects with the old become invisible.

3.7 PROTECTION OF FINISHED WORK

A. Section 01 73 00 - Execution Requirements: Protecting finished work.

B. Protect all pavement areas including curbs from damage during construction operations.

3.8 MEETING EXISTING PAVEMENTS

A. Full-Depth Pavement: Sawcut by approved method to the full depth of the pavement prior to placement of any new pavement. The sawcut surface shall be a neat true line with straight vertical edges free from irregularities. The sawcut surface shall be tack coated immediately prior to the installation of the new abutting bituminous concrete material to provide a bond between the old and new pavement. The new compacted pavement surface shall be finished flush with the abutting pavement.

B. Bituminous Concrete Overlays: The existing bituminous pavement shall be sawcut to a neat true line with straight vertical edges free of irregularities for a minimum depth of one and one half inches. Prior to completing overlays, existing pavements shall be tapered by grinding. The taper, along the entire length of the joint, shall be one and one-half inches deep at the sawcut face and shall taper to zero inches deep at a distance of two feet from the sawcut face in driveways and at a distance of six feet in roadways and parking areas. The taper shall be cleaned and shall receive an asphalt emulsion tack coat immediately prior to placement of the overlay. The new compacted surface at the joint shall be flush with the abutting existing pavement.

C. Immediately prior to the placement of the bituminous concrete overlay, the sawcut edges of the existing pavement shall be tack coated to bond the new pavement to the old pavement. The new pavement surface shall be finished flush with the abutting pavement. The surface seam of the pavement joint shall be sealed with tack coat and back sanded.

END OF SECTION 32 12 16

SECTION 32 13 13

CONCRETE PAVING

PART 1- GENERAL

1.1 RELATED DOCUMENTS

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. Exterior walks and plazas.
2 Exterior equipment pads on grade_

Exterior cast-in-place concrete walk or equipment pad material, forming, and placement is covered under Division 03, and is NOT included in Division 32 work. Site preparation, grading, soil fill materials, and compaction is included in Divisions 31 and 32_ (Buried concrete items, such as posts, thrust-blocking, pipe encasement, and temporary concrete is included wholly in Divisions 31, 32, and 33).

C. Related Sections:
1. Division 03 Section " Concrete Work" for general building applications of concrete. Division 31 Section "Earth Moving" for subgrade preparation, grading, and subbase course.

L3 DEFINITIONS

Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 ACTION SUBMITTALS

Shop Drawings: Indicate construction joint and control joint layout and details .

1_5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified ready-mix concrete manufacturer and installer.

B. Field quality-control reports.

END SECTION 32 13 13

SECTION 32 14 13

PRECAST CONCRETE UNIT PAVING

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. Pre-cast concrete pavers set in aggregate setting beds.
2. Edge restraints.

1.3 ACTION SUBMITTALS

A. Product Data: For materials other than water and aggregates, including the following:

1. Pre-cast concrete pavers.
2. Edge restraints.

B. Samples:

1. Full-size units of each type of unit paver indicated.

C. Mock-Ups:

1. Install a 7 ft. x 7 ft. (2 m x 2 m) mock-up paver area for each paver size, color and pattern. This area will be used to determine, joint sizes, lines, laying pattern(s), color(s), and texture of the job. This area shall be the standard from which the work will be judged.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and installer.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of unit paver from single source with resources to provide materials and products of consistent quality in appearance and physical properties.

B. Preinstallation Conference: Conduct conference at Project site in accordance with requirements of Division 01 Section "Project Management and Coordination". Notify Architect at least two

weeks before paving unit installation begins. Schedule a meeting on-site with paver installation crew, contractor, Architect, and Owner, after the Mock-Up section (See Article 1.3.C) of pavers is installed.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store pavers on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied.

1.7 PROJECT CONDITIONS

A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.

PART 2 - PRODUCTS

2.1 CONCRETE PAVERS

A. Pedestrian Walks: Solid paving units manufactured of concrete compressed to at least 8,000 psi during manufacture. The pavers shall be of colors selected by the Architect, and to match existing pavers located at the Columbarium Niche Walls Phase I. Subject to compliance with requirements, products that may be incorporated into the Work include only the following:

1. "Courtyard Squares", colors: as determined by Owner/Architect, as shown on the drawings; size: 12" x 12", 2-3/8" thick, by Genest Concrete Works Inc., P. O. Box 151, Wilson Street, Sanford, Maine, 04073 (1-800-649-4773) or approved equivalent.
2. "Hollandstone", colors: as determined by Owner/Architect, as shown on the drawings; size: 4" x 8", 2-3/8" thick, by Genest Concrete Works Inc., P. O. Box 151, Wilson Street, Sanford, Maine, 04073 (1-800-649-4773) or approved equivalent.

2.2 EDGE RESTRAINTS

A. Edge Restraints: Heavy duty 1-5/8" StructurEdge, as manufactured by Permaloc, or approved equal. Edge restraint shall be invisible when in place, resistant to frost heaving. Stake edging at 12" o.c. with 10" x 3/8" diameter spiral steel spikes.

2.3 AGGREGATE SETTING BED MATERIALS AND JOINT SAND

A. Bedding and joint sand shall be clean, non-plastic, free from deleterious or foreign matter. The sand shall be natural or manufactured from crushed rock. Limestone screenings or stone dust that does not conform to the grading requirements in Table 1 shall not be used.

B. Grading of sand samples for the bedding course shall be done according to ASTM C 136. The bedding sand shall conform to the grading requirements of ASTM C 33 as shown in Table 1.

Table 1
Grading Requirements for Bedding Sand - ASTM C 33

Sieve Size	Percent Passing
3/8 in. (9.5 mm)	100
No. 4 (4.75 mm)	95 to 100
No. 8 (2.36 mm)	85 to 100
No. 16 (1.18 mm)	50 to 85
No. 30 (0.600 mm)	25 to 60
No. 50 (0.300 mm)	10 to 30
No. 100 (0.150 mm)	2 to 10

C. The joint sand shall be Gator XP Sand Bond Polymeric sand manufactured by Alliance Designer Products, or approved equal. Polymeric sand shall be installed per manufacturers installation instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Proof-roll prepared subgrade according to requirements in Section 31 20 00 "Earth Moving" to identify soft pockets and areas of excess yielding. Proceed with unit paver installation only after deficient subgrades have been corrected and are ready to receive subbase and base course for unit pavers.

3.3 INSTALLATION, GENERAL

A. Do not use unit pavers with chips, cracks, voids, discolorations, or other defects that might be visible or cause staining in finished work.

1. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.

2. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.

3. For concrete pavers, a block splitter may be used.

4. Joint Pattern: As shown

5. Joint Tolerances: Joints between the pavers on average shall be between 1/16 in. and 1/8 in. (2 mm to 4 mm) wide.

6. Surface Elevation Tolerances: The final surface elevations shall not deviate more than 3/8 in. (10 mm) under a 10 ft. (3 m) long straightedge.

7. Provide edge restraints as indicated. Install edge restraints before placing unit pavers.

   a. Install edge restraints to comply with manufacturer's written instructions. Install stakes at intervals required to hold edge restraints in place during and after unit paver installation.

3.4 AGGREGATE SETTING-BED APPLICATIONS

A. Compact soil subgrade uniformly to at least 95 percent of ASTM D 1557 laboratory density. Proof-roll prepared subgrade to identify soft pockets and areas of excess yielding. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rotting, as determined by Architect, and replace with compacted backfill or fill as directed.

B. Place aggregate sub base and base, compact to 95 percent of ASTM D 1557 maximum laboratory density, and screed to depth indicated.

C. Place leveling course and screed to a thickness of 1 to 1 ½ inches, taking care that moisture content remains constant and density is loose and uniform until pavers are set and compacted.

D. Set pavers with a minimum joint width of 1/16 and a maximum of l/8 inch being careful not to disturb leveling base. If pavers have spacer bars, place pavers hand tight against spacer bars. Use string lines to keep straight lines. Fill gaps between units that exceed inch with pieces cut to fit from full-size unit pavers.

E. Vibrate pavers into leveling course with a low-amplitude plate vibrator capable of a 3500- to 5000-lbf to compaction force at 80 to 90Hz. Use vibrator with neoprene mat on face of plate or other means as needed to prevent cracking and chipping of pavers. Perform at least three passes across paving with vibrator.

   1. Before ending each day's work, compact installed concrete pavers except for 36-inch width of uncompacted pavers adjacent to temporary edges (laying faces).

   2. As work progresses to perimeter of installation, compact installed pavers that are adjacent to permanent edges unless they are within 36-inch width of laying face.

   3. Before ending each day's work and when rain interrupts work, cover pavers that have not been compacted and cover leveling course on which pavers have not been placed with non-staining plastic sheets to protect them from rain.

F. Spread joint sand and fill joints immediately after vibrating pavers into leveling course.

Installation shall be per manufacturers installation instructions.

1. Do not allow traffic on installed pavers until sand has been vibrated into joints.
2. Repeat joint-filling process 30 days later.

END SECTION 32 14 13

SECTION 32 30 00
SITE IMPROVEMENTS

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. Precast paver walkway at POW/MIA Monument.

B. Related Sections include the following:

1. Division 04 "Unit Masonry Assemblies"

1.3 SUBMITTALS

A. Shop Drawings: None

B. Samples:

1. Aluminum Edging used at Stone Edging.
2. 1" – 3" Rounded River Stones.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the site in an undamaged condition.

B. Carefully store materials off the ground to provide proper protection against oxidation, and other damage caused by ground contact.

PART 2 - PRODUCTS

2.1 STONE EDGING:

A. Edging at precast pavers: Shall be aluminum edging 1/8" x 1-5/8". Sections to include 10" stakes at 12" on center. 90º corners shall be welded to provide continuous edge. Edging to be manufactured by Permaloc Corporation or approved equivalent.

PART 3 - EXECUTION

3.1 PRECAST PAVER STONE EDGE:

A. Install the edging in the location shown on the plans; drive the stakes vertically and backfill the edging with the stone as work progresses to avoid the edge waving. Weld edging at 90° joints.

END OF SECTION 32 30 00

SECTION 32 93 00

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 1.2 SUMMARY

A. Section Includes: Plants

1. Tree Protection
2. Planting soils
3. Tree stabilization
4. Organic and Mineral mulches
5. Locate, purchase, deliver and install all specified plants.
6. Water all specified plants.
7. Mulch, fertilize, stake, and prune all specified plants.
8. Maintenance of all specified plants until the beginning of the warranty period.
9. Plant warranty.
10. Clean up and disposal of all excess and surplus material.
11. Maintenance of all specified plants during the warranty period.

B. The scope of work includes all labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for, and incidental to performing all operations in connection with furnishing, delivery, and installation of plant (also known as "landscaping") complete as shown on the drawings and as specified herein.

C. Contract documents

1. Shall consist of specifications and general conditions and the construction drawings. The intent of these documents is to include all labor, materials, and services necessary for the proper execution of the work. The documents are to be considered as one. Whatever is called for by any parts shall be as binding as if called for in all parts.

1.3 RELATED DOCUMENTS AND REFERENCES

A. Related Documents:

1. Drawings and general provisions of contract including general and supplementary conditions and Division I specifications apply to work of this section

B. References: The following specifications and standards of the organizations and documents listed in this paragraph form a part of the specification to the extent required by the references thereto. In the event that the requirements of the following referenced standards and specification conflict with this specification section the requirements of this specification shall prevail. In the event that the requirements of any of the following referenced standards and specifications conflict with each other the more stringent requirement shall prevail or as determined by the Owners Representative.

a. Massachusetts Standard Specification - Latest edition of the, Standard Specifications for Highways. Bridges and Waterways, The Commonwealth of Massachusetts, Department of Public Works, latest Edition.

b. ANSI Z60.1 American Standard for Nursery Stock, most current edition.

c. ANSI A 300 – Standard Practices for Tree, Shrub and other Woody Plant Maintenance, most current edition and parts.

C. Interpretation of plant names and descriptions shall reference the following documents. Where the names or plant descriptions disagree between the several documents, the most current document shall prevail.

a. USDA - The Germplasm Resources Information Network (GRIN) http://www.ars-grin.gov/npgs/searchgrin.html

b. Manual of Woody Landscape Plants; Michael Dirr; Stipes Publishing, Champaign, Illinois; Most Current Edition.

c. The New Sunset Western Garden Book, Oxmoor House, most current edition.

d. Pruning practices shall conform to recommendations "Structural Pruning: A Guide For The Green Industry" most current edition; published by Urban Tree Foundation, Visalia, California.

e. Glossary of Arboricultural Terms, International Society of Arboriculture, Champaign IL, most current edition.

f. "STANDARDIZED PLANT NAMES," 1942 Edition, American Joint Committee on Horticultural Nomenclature.

1.4 Verification

A. All scaled dimensions on the drawings are approximate. Before proceeding with any work, the Contractor shall carefully check and verify all dimensions and quantities, and shall immediately inform the Owner's Representative of any discrepancies between the information on the drawings and the actual conditions, refraining from doing any work in said areas until given approval to do so by the Owner's Representative.

B. In the case of a discrepancy in the plant quantities between the plan drawings and the plant call outs, list or plant schedule, the number of plants or square footage of the planting bed actually drawn on the plan drawings shall be deemed correct and prevail.

1.5 PERMITS AND REGULATIONS

A. The Contractor shall obtain and pay for all permits related to this section of the work unless previously excluded under provision of the contract or general conditions. The Contractor shall comply with all laws and ordinances bearing on the operation or conduct of the work as drawn and specified. If the Contractor observes that a conflict exists between permit requirements and the work outlined in the contract documents, the Contractor shall promptly notify the Owner's Representative in writing including a description of any necessary changes and changes to the contract price resulting from changes in the work.

B. Wherever references are made to standards or codes in accordance with which work is to be performed or tested, the edition or revision of the standards and codes current on the effective date of this contract shall apply, unless otherwise expressly set forth.

C. In case of conflict among any referenced standards or codes or between any referenced standards and codes and the specifications, the more restrictive standard shall apply or Owner's Representative shall determine which shall govern.

1.6 PROTECTION OF WORK, PROPERTY AND PERSON

A. The Contractor shall adequately protect the work, adjacent property, and the public, and shall be responsible for any damages or injury due to his/her actions.

1.7 CHANGES IN THE WORK

A. The Owner's Representative may order changes in the work, and the contract sum should be adjusted accordingly. All such orders and adjustments plus claims by the Contractor for extra compensation must be made and approved in writing before executing the work involved.

B. All changes in the work, notifications and contractor's request for information (RFI) shall conform to the contract general condition requirements.

1.8 CORRECTION OF WORK

A. The Contractor, at their own cost, shall re-execute any work that fails to conform to the

requirements of the contract and shall remedy defects due to faulty materials or workmanship upon written notice from the Owner's Representative, at the soonest as possible time that can be coordinated with other work and seasonal weather demands**.**

1.9 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 American Standard for Nursery Stock (ANSI) Z60.1-2004 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 Z60.1-2004.

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.l 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, including boxed trees. 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. Defective plant: Any plant that fails to meet the plant quality requirement of this specification.

G. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

H. End of Warranty Final Acceptance: The date when the Owner's Representative accepts that the plants and work in this section meet all the requirements of the warranty. It is intended that the materials and workmanship warranty for Planting, Planting Soil, and Irrigation work run concurrent with each other.

I. 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.

J. Field grown trees (B&B): Trees growing in field soil for at least 12 months prior to harvest.

K. Finish Grade: Elevation of finished surface of planting soil.

L. Healthy: Plants that are growing in a condition that expresses leaf size, crown density, color; and with annual growth rates typical of the species and cultivar's horticultural description, adjusted for the planting site soil, drainage and weather conditions.

M. Maintenance: Actions that preserve the health of plants after installation and as defined in this

specification.

N. Maintenance period: The time period, as defined in this specification, which the Contractor is to provide maintenance.

O. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

P. Owner's Representative: The person appointed by the Owner to represent their interest in the review and approval of the work and to serve as the contracting authority with the Contractor. The Owner's Representative may appoint other persons to review and approve any aspects of the work.

Q.

R. 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.

S. 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.

T. Planting Area: Areas to be planted.

U. 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.

V. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.

W. Reasonable and reasonably: When used in this specification relative to plant quality, it is intended to mean that the conditions cited will not affect the establishment or long term stability, health or growth of the plant. This specification recognizes that it is not possible to produce plants free of all defects, but that some accepted industry protocols and standards result in plants unacceptable to this project.

When reasonable or reasonably is used in relation to other issues such as weeds, diseased, insects, it shall mean at levels low enough that no treatment would be required when applying recognized Integrated Plant Management practices.

This specification recognizes that some decisions cannot be totally based on measured findings and that professional judgment is required. In cases of differing opinion, the Owner's Representative's expert shall determine when conditions are judged as reasonable.

X. Root ball: The mass of roots including any soil or substrate that is shipped with the tree within the root ball package.

Y. Root ball package. The material that surrounds the root ball during shipping. The root package may include the material in which the plant was grown, or new packaging placed around the root ball for

Z. Root Flare: Also called "trunk flare": The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

AA. Shrub: Woody plants with mature height approximately less than 15 feet.

BB. Stem Girdling Roots: Any root more than ¼ inch diameter currently touching the trunk, or with the potential to touch the trunk, above the root collar approximately tangent to the trunk circumference or circling the trunk. Roots shall be considered as Stem Girdling that have, or are likely to have in the future, root to trunk bark contact.

CC. Structural root: One of the largest roots emerging from the root collar.

DD. 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.

EE. Subsoil: Soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

FF. 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.

GG. Tree: Single and multi-stemmed plants with mature height approximately greater than 15 feet.

1.10 ACTION SUBMITTALS

A. Product Data: For each type of product used, including soils.

1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
2. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to the Project. Contractor must receive written permission by Owner prior to application of pesticide and/or herbicide products.
3. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to the Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

B. Samples for Verification: For each of the following:

1. Trees and Shrubs: Three samples of each variety and size delivered to the site for review. Maintain approved samples on-site as a standard for comparison.
2. Sod: The species of grasses or wild sods and location of the sod farm/source.
3. Organic Mulch: Sample of each type of organic mulch is required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation

of color, texture, and organic makeup.

4. Weed Control Barrier: Sample of proposed product.

1.11 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.

B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:

1. Manufacturer's certified analysis of standard products.
2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
3. Submit plant growers' certificates for all plants indicating that each meets the requirements of the specification, including the requirements of tree quality, to the Owner's Representative for approval. Provide submittal several weeks before the installation of plants.

C. Material Test Reports: For existing native surface topsoil and imported or manufactured topsoil.

D. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before start of required maintenance periods.

E. Warranty: Sample of special warranty.

1.12 QUALITY ASSURANCE

A. Installer Qualifications: The installer shall be a firm having at least 5 years of successful experience of a scope similar to that required for the work, including the handling and planting of large specimen trees in urban areas when appropriate to project context. The same firm shall install planting soil (where applicable) and plant material.

1. The bidders list for work under this section shall be approved by the Owner's Representative.
2. Installer Field Supervision: When any planting work is in progress, installer shall maintain, on site, a full-time supervisor who can communicate in English with the Owner's Representative.
3. Installer's field supervisor shall have a minimum of five years experience as a field supervisor installing plants and trees of the quality and scale of the proposed project, and can communicate in English with the Owner's Representative.
4. The installer's crew shall have a minimum of 3 years experienced in the installation of Planting Soil, Plantings, and Irrigation (where applicable) and interpretation of soil plans, planting plans and irrigation plans.
5. Submit references of past projects, employee training certifications that support that the

Contractors meets all of the above installer qualifications and applicable licensures.

B. Soil-Testing Laboratory Qualifications: An independent or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant- nutrient content of the soil.

1. Testing methods and written recommendations shall comply with USDA's Handbook No 60.
2. The soil-testing laboratory shall oversee soil sampling; with depth, location, and number of samples to be taken per instructions from Architect. A minimum of ten representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
3. Report suitability of tested soil for plant growth.

    a. Based upon the test results, state recommendations for soil treatments and soil amendments to be incorporated State recommendations in weight per 1000 sq. ft. sq. or volume per cubic feet for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.

    b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

    c. Forward to the Architect two copies of analysis and recommendations of the testing agencies.

1.13 Plant Warranty

A. Plant Warranty:

1. The Contractor agrees to replace defective work and defective plants. The Owner's Representative shall make the final determination if plants meet these specifications or that plants are defective.

    Plants warranty shall begin on the date of Substantial Completion Acceptance and continue for the following periods, classed by plant type:

    a. Trees – 1 Year(s).

    b. Shrubs – 1 Year(s).

    c. Sods – 1 year

    d. Wildflower / meadow seedings. – 2 years from time of seeding, not soil preparation

    e. Ground cover and perennial flower plants – 1 Year(s).

f. Bulbs, annual flower and seasonal color plants – for the period of expected bloom or primary display. – 3 months

2. When the work is accepted in parts, the warranty periods shall extend from each of the partial Substantial Completion Acceptances to the terminal date of the last warranty period. Thus, all warranty periods for each class of plant warranty, shall terminate at one time.

3. All plants shall be warrantied to meet all the requirements for plant quality at installation in this specification. Defective plants shall be defined as plants not meeting these requirements. The Owner's representative shall make the final determination that plants are defective. See section 2.1.D for quality parameters.

4. Plants determined to be dead or defective shall be removed immediately upon notification by the Owner's Representative and replaced without cost to the Owner, as soon as weather conditions permit and within the specified planting period. A limit of one replacement of each plant will be required except for losses or replacements due to failure to comply with requirements. Replace plants that are more than 25-percent dead or in an unhealthy condition at end of warranty period.

5. Any work required by this specification or the Owner's Representative during the progress of the work, to correct plant defects including the removal of roots or branches, or planting plants that have been bare rooted during installation to observe for or correct root defects shall not be considered as grounds to void any conditions of the warranty. In the event that the Contractor decides that such remediation work may compromise the future health of the plant, the plant or plants in question shall be rejected and replaced with plants that do not contain defects that require remediation or correction.

6. The Contractor is exempt from replacing plants, after Substantial Completion Acceptance and during the warranty period, that are removed by others, lost or damaged due to occupancy of project, lost or damaged by a third party, vandalism, or any natural disaster.

7. Replacements shall closely match adjacent specimens of the same species. Replacements shall be subject to all requirements stated in this specification. Make all necessary repairs due to plant replacements. Such repairs shall be done at no extra cost to the Owner.

8. The warranty of all replacement plants shall extend for an additional one-year period from the date of their acceptance after replacement. In the event that a replacement plant is not acceptable during or at the end of the said extended warranty period, the Owner's Representative may elect one more replacement items or credit for each item. These tertiary replacement items are not protected under a warranty period.

9. During and by the end of the warranty period, remove all tree wrap, ties, and guying unless agreed to by the Owner's Representative to remain in place. All trees that do not have sufficient caliper to remain upright, or those requiring additional anchorage in windy locations, shall be staked or remain staked, if required by the Owner's Representative.

B. End of Warranty Final Acceptance - Acceptance of plants at the end of the warranty period.

1. At the end of the warranty period, the Owner's Representative shall observe all warranted work, upon written request of the Contractor. The request shall be received at least ten calendar days before the anticipated date for final observation.

2. End of Warranty Final Acceptance will be given only when all the requirements of the work under this specification and in specification sections Planting Soil and Irrigation have been met.

C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.

1. Provide quality, size, genus, species, and variety of plants indicated complying with applicable requirements in ANSI Z60.1.
2. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6-inches above the root flare for trees up to caliper size, and 12-inches above the root flare for larger sizes.
3. Other Plants: Measure with stems, petioles, and foliage in their normal position.

1.14 Plant Material Observation:

A. The Owner's Representative may review all plants subject to approval of size, health, quality, character, etc. Review or approval of any plant during the process of selection, delivery, installation and establishment period shall not prevent that plant from later rejection in the event that the plant quality changes or previously existing defects become apparent that were not observed.

B. Plant Selection: The Owner's Representative reserves the right to select and observe all plants at the nursery prior to delivery and to reject plants that do not meet specifications as set forth in this specification. If a particular defect or substandard element can be corrected at the nursery, as determined by the Owner's Representative, the agreed upon remedy may be applied by the nursery or the Contractor provided that the correction allows the plant to meet the requirements set forth in this specification. Any work to correct plant defects shall be at the contractor's expense.

1. The Owner's Representative may make invasive observation of the plant's root system in the area of the root collar and the top of the root ball in general in order to determine that the plant meets the quality requirements for depth of the root collar and presence of roots above the root collar. Such observations will not harm the plant.

2. Corrections are to be undertaken at the nursery prior to shipping.

C. The Contractor shall bear all cost related to plant corrections.

D. All plants that are rejected shall be immediately removed from the site and acceptable replacement plants provided at no cost to the Owner.

E. Submit to the Owner's Representative, for approval, plant sources including the names and locations of nurseries proposed as sources of acceptable plants, and a list of the plants they will provide. The plant list shall include the botanical and common name and the size at the time of selection. Observe all nursery materials to determine that the materials meet the requirements of this section.

F. Trees shall be purchased from the growing nursery. Re-wholesale plant suppliers shall not be used as sources unless the Contractor can certify that the required trees are not directly available from a

growing nursery. When Re-wholesale suppliers are utilized, the Contractor shall submit the name and location of the growing nursery from where the trees were obtained by the re-wholesale seller. The re-wholesale nursery shall be responsible for any required plant quality certifications.

G. The Contractor shall require the grower or re-wholesale supplier to permit the Owner's Representative to observe the root system of all plants at the nursery or job site prior to planting including random removal of soil or substrate around the base of the plant. Observation may be as frequent and as extensive as needed to verify that the plants meet the requirements of the specifications and conform to requirements.

H. Each tree shall have a numbered seal applied by the Contractor. The seal shall be placed on a lateral branch on the north side of the tree. The seal shall be a tamper proof plastic seal bearing the Contractors name and a unique seven-digit number embossed on the seal.

1. Do not place seals on branches that are so large that there is not sufficient room for the branch growth over the period of the warranty.

I. The Owner's Representative may choose to attach their seal to each plant, or a representative sample. Viewing and/or sealing of plants by the Owner's Representative at the nursery does not preclude the Owner's Representative's right to reject material while on site. The Contractor is responsible for paying any up charge for the Owner's Representative to attach their seal to specific plants.

J. Where requested by the Owner's Representative, submit photographs of plants or representative samples of plants. Photographs shall be legible and clearly depict the plant specimen. Each submitted image shall contain a height reference, such as a measuring stick. The approval of plants by the Owner's Representative via photograph does not preclude the Owner's Representative's right to reject material while on site.

1.15 Observation of the work

A. The Owner's Representative may observe the work at any time. They may remove samples of materials for conformity to specifications. Rejected materials shall be immediately removed from the site and replaced at the Contractor's expense. The cost of testing materials not meeting specifications shall be paid by the Contractor.

B. The Owner's Representative shall be informed of the progress of the work so the work may be observed at the following key times in the construction process. The Owner's Representative shall be afforded sufficient time to schedule visit to the site. Failure of the Owner's Representative to make field observations shall not relieve the Contractor from meeting all the requirements of this specification.

1. SITE CONDITIONS PRIOR TO THE START OF PLANTING: review the soil and drainage conditions.

2. COMPLETION OF THE PLANT LAYOUT STAKING: Review of the plant layout. Notify Architect of sources of planting materials seven days in advance of delivery to site.

3. PLANT QUALITY: Review of plant quality at the time of delivery and prior to installation. Review tree quality prior to unloading where possible, but in all cases prior to planting.

4. COMPLETION OF THE PLANTING: Review the completed planting.

C. Preinstallation Conference: Conduct conference at Project site. Schedule a pre-construction meeting with the Owner's Representative at least seven (7) days before beginning work to review any questions the Contractor may have regarding the work, administrative procedures during construction and project work schedule.

1.16 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.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

C. Deliver bare-root stock plants freshly dug immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting.

D. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind bum, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

E. Handle planting stock by root ball.

F. Store bulbs and tubers in a dry place at 60ºF to 65ºF until planting.

G. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1. Heel-in bare-root stock. Soak roots that are in dry condition in water for two hours.
2. Reject dried-out plants.
3. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
4. Do not remove container-grown stock from containers before time of planting.
5. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.

1.17 PROJECT CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. It is the responsibility of the Contractor to be aware of all surface and sub-surface conditions, and to notify the Owner's Representative, in writing, of any circumstances that would negatively impact the health of plantings. Do not proceed with work until unsatisfactory conditions have been corrected.

1. Should subsurface drainage or soil conditions be encountered which would be detrimental to growth or survival of plant material, the Contractor shall notify the Owner's Representative in writing, stating the conditions and submit a proposal covering cost of corrections. If the Contractor fails to notify the Owner's Representative of such conditions, he/she shall remain responsible for plant material under the warranty clause of the specifications.

C. 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 Architect and Construction Manager no fewer than two days in advance of proposed interruption of each service or utility.
2. Do not proceed with interruption of services or utilities without Architect's or Owner's written permission.
3. Contractor shall carefully examine the civil, record, and survey drawings to become familiar with the existing underground conditions before digging.
4. Determine location of underground utilities and perform work in a manner that will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until parties concerned mutually agree upon removal.
5. Notification of *DIG SMART*, *811 or (207 749-7231)*, is required for all planting areas: The Contractor is responsible for knowing the location and avoiding utilities that are not covered by DIG SMART.

D. Planting Restrictions: It is the responsibility of the Contractor to be familiar with the local growing conditions, and if any specified plants will be in conflict with these conditions. Report any potential conflicts, in writing, to the Owner's Representative.

1. Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
   a. Spring Planting: April 15th to June 15th.
   b. Fall Planting: August 15th to September 15th.
   c. Sod may be placed between May 15th and September 15th.

2. Planting shall be performed during those aforementioned periods when weather and soil conditions are suitable in accordance with locally accepted horticultural practices.

   a. Do not install plants into saturated or frozen soils. Do not install plants during inclement weather, such as rain or snow or during extremely hot, cold or windy conditions.

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

F. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.

1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.18 MAINTENANCE SERVICE

A. Initial Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: 12-months from date of Substantial Completion.

B. Initial Maintenance Service for Ground Cover and Other Plants (besides Trees and Shrubs): Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below:

1. Maintenance Period: 12 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than in diameter; or with stem girdling roots will be rejected.
2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

B. Selection of Nursery Stock

1. At least twenty (20) days prior to the expected planting date, the Contractor shall request, in writing, that the Landscape Architect provide a representative to select and tag stock to be planted under this section. The request shall be made ten (10) days prior to the date on which stock selections are to be made. The Contractor shall arrange for and bear the cost of transportation, meals in transit, and overnight accommodations, if necessary, for the Landscape Architect's representative during the period of time required to select and tag the required number of sized stock. The letter of request shall also have attached a letter of certification from the supplier attesting to the fact that the stock to be selected from is, in fact, the patented tree required under this Section. The Contractor shall supply the necessary tags or seals which shall be durable and capable of accepting weather-resistant ink or an embossed process. The tags or seals shall be attached directly and securely to each selected plant.

2. The Contractor shall furnish and plant all plants shown on the drawings, as specified, and in quantities as shown on plans. No substitutions will be permitted. All plants shall be nursery grown.

3. The Contractor shall take note that only tree stock grown specifically for hardiness in Zone 5 of the Hardiness Zones established by the Arnold Arboretum, Jamaica Plain, Massachusetts, will be accepted. The Contractor's suppliers must certify in writing that the stock has actually been grown under Zone 5 conditions and is hardy to the City of Boston or that the stock was asexually propagated from and grafted onto stock from a strain proven hardy to Zone 5 conditions. Trees not so certified will not be accepted.

C. Plant Quality above the soil line:

Plants shall be healthy with the color, shape, size and distribution of trunk, stems, branches, buds and leaves normal to the plant type specified. Tree quality above the soil line shall comply with the project Crown Acceptance details and the following:

1. Crown: The form and density of the crown shall be typical for a young specimen of the species or cultivar pruned to a central and dominant leader.

    a. Crown specifications do not apply to plants that have been specifically trained in the nursery as topiary, espalier, multi-stem, clump, or unique selections such as contorted or weeping cultivars.

2. Leaves: The size, color, and appearance of leaves shall be typical for the time of year and stage of growth of the species or cultivar. Trees shall not show signs of prolonged moisture stress or over watering as indicated by wilted, shriveled, or dead leaves.

3. Branches: Shoot growth (length and diameter) throughout the crown should be appropriate for the age and size of the species or cultivar. Trees shall not have dead, diseased, broken, distorted, or otherwise injured branches.

    a. Main branches shall be distributed along the central leader not clustered together. They shall form a balanced crown appropriate for the cultivar/species.

    b. Branch diameter shall be no larger than two-thirds (one-half is preferred) the diameter of

the central leader measured 1 inch above the branch union.

c. The attachment of the largest branches (scaffold branches) shall be free of included bark.

4. Trunk: The tree trunk shall be relatively straight, vertical, and free of wounds that penetrate to the wood (properly made pruning cuts, closed or not, are acceptable and are not considered wounds), sunburned areas, conks (fungal fruiting bodies), wood cracks, sap leakage, signs of boring insects, galls, cankers, girdling ties, or lesions (mechanical injury).

5. Temporary branches, unless otherwise specified, can be present along the lower trunk below the lowest main (scaffold) branch, particularly for trees less than 1 inch in caliper. These branches should be no greater than 3/8-inch diameter.

D. Trees shall have one central leader. If the leader was headed, a new leader (with a live terminal bud) at least one-half the diameter of the pruning cut shall be present.

1. All trees are assumed to have one central leader trees unless a different form is specified in the plant list or drawings.

2. All graft unions, where applicable, shall be completely closed without visible sign of graft rejection. All grafts shall be visible above the soil line.

3. Trunk caliper and taper shall be sufficient so that the lower five feet of the trunk remains vertical without a stake. Auxiliary stake may be used to maintain a straight leader in the upper half of the tree.

E. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

F. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

G. Labeling: Label each plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.

H. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

I. Annuals and Biennials: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery and that are in bud but not yet in bloom.

2.2 ROOT BALL PACKAGE OPTIONS: The following root ball packages are permitted. Specific root ball packages shall be required where indicated on the plant list or in this specification. Any type of

root ball packages that is not specifically defined in this specification shall not be permitted.

All plants must be moved with the root systems as solid units with balls or earth firmly wrapped with burlap. The diameter and depth of the balls of earth must be sufficient to encompass the fibrous root feeding systems necessary for the healthy development of the plant. No plant shall be accepted when the ball of earth surrounding its roots has been badly cracked or broken preparatory to or during the process of planting or after the burlap, staves, ropes or platform required in connection with its transplanting have been removed. The plants and balls shall remain intact during all operations. All plants shall be freshly dug. No plants from cold storage or previously heeled-in will be accepted. All plants that cannot be planted at once must be heeled in by setting in the ground and covering the balls with soil and then watering.

A. BALLED AND BURLAPPED PLANTS

Note to specifier: Remove this paragraph if Balled and Burlapped plants are not to be permitted.

1. All Balled and Burlapped Plants shall be field grown, and the root ball packaged in a burlap and twine and/or burlap and wire basket package.
2. Plants shall be harvested with the following modifications to standard nursery practices.

a. Prior to digging any tree that fails to meet the requirement for maximum soil and roots above the root collar, carefully removed the soil from the top of the root ball of each plant, using hand tools, water or an air spade, to locate the root collar and attain the soil depth over the structural roots requirements. Remove all stem girdling roots above the root collar. Care must be exercised not to damage the surface of the root collar and the top of the structural roots.

b. Trees shall be dug for a minimum of 4 weeks and a maximum of 52 weeks prior to shipping. Trees dug 4 to 52 weeks prior to shipping are defined as hardened-off. Digging is defined as cutting all roots and lifting the tree out of the ground and either moving it to a new location in the nursery or placing it back into the same hole. Tress that are stored out of the ground shall be placed in a holding area protected from extremes of wind and sun with the root ball protected by covering with mulch or straw and irrigated sufficiently to keep moisture in the root ball above wilt point and below saturation

c. If wire baskets are used to support the root ball, a "low profile" basket shall be used. A low profile basket is defined as having the top of the highest loops on the basket no less than 4 inches and no greater than 8 inches below the shoulder of the root ball package.

1.) At nurseries where sandy soils prevent the use of "low profile baskets", baskets that support the entire root ball, including the top, are allowable..

d. Twine and burlap used for wrapping the root ball package shall be natural, biodegradable material. If the burlap decomposes after digging the tree then the root ball shall be re-wrapped prior to shipping if roots have not yet grown to keep root ball intact during shipping.

B. CONTAINER (INCLD ABOVE-GROUND FABRIC CONTAINERS AND BOXES) PLANTS

1. Container plants may be permitted only when indicated on the drawing, in this specification, or approved by the Owner's Representative.

2. Provide plants shall be established and well rooted in removable containers.

3. Container class size shall conform to ANSI Z60.1 for container plants for each size and type of plant.

C. Annual flowering and seasonal color plants

1. Container or flat-grown plants should be sized as noted in the planting plan. Plants shall be well-rooted and healthy.

D.

2.3 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80-percent calcium carbonate equivalent and as follows:

1. Class T, with a minimum of 99-percent passing through No 8 sieve and a minimum of 75-percent passing through No. 60 sieve.
2. Class O, with a minimum of 95-percent passing through No 8 sieve and a minimum of 55-percent passing through No. 60 sieve.
3. Provide lime in form of ground dolomitic limestone.

B. Sulfur: Granular, biodegradable, and containing minimum of 99-percent passing through No. 6 passing through No. 40 sieve a minimum of 90-percent sulfur, with a sieve and a maximum of 10-percent.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20-percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated. Perlite: Horticultural perlite, soil amendment grade.

E. Agricultural Gypsum: Minimum 90-percent calcium sulfate, finely ground with 90-percent passing through No. 50 sieve.

F. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

2.4 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35- to 55-percent by weight; 100-percent passing through sieve; soluble salt content of 5 to 10 decisiemens/meter; not exceeding 0.5-percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50- to 60-percent of dry weight.

2.5 FERTILIZERS

A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50-percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.
2. Planting Tablets: Tightly compressed chip type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.

a. Size: 5-gram tablets.

b. Nutrient Composition: 20-percent nitrogen, 10-percent phosphorous and 5-percent potassium, by weight plus micronutrients.

c. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial grade FeDTPA for ornamental grasses and monocots.

2.6 PLANTING SOIL

A. Planting Soil shall be topsoil as specified in Section 32 92 00 Turf and Grass, amended as recommended by the soil testing lab results for the particular plants used.

2.7 MULCHES

A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:

1. Type: Bark
2. Size Range: 3" maximum, 13mm minimum.
3. Color: Dark Black

2.8 WEED-CONTROL BARRIERS

A. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, 15 mils thickness minimum, composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally-encountered chemicals, alkalis, and acids.

2.9 PESTICIDES

A. General: Use of pesticides/herbicides may and used only by Owner's permission. Pesticide registered and approved by 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.

1. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
2. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.10 TREE STABILIZATION MATERIALS

A. Stakes and Guys:

1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, free of knots, holes, cross grain, and other defects, 8-mm by length indicated, pointed at one end.
2. Wood Deadmen: Timbers measuring 8-inch diameter and 48-inch long, treated with specified wood pressure-preservative treatment.
3. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes or turnbuckle.
4. Guys and Tie Wires: ASTM A 641/A 641M, Class 1, galvanized-steel, 12 gauge braided wire, two-strand, twisted.
5. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.
6. Guy Cables: Five-strand, diameter, galvanized-steel cable, with zinc-coated turnbuckles, a minimum of 3-feet long, with two No. 10 galvanized eyebolts.
7. Flags: Standard surveyor's plastic flagging tape, white.

B. Root-Ball Stabilization Materials:

1. Upright Stakes and Horizontal Hold-Down: Rough-sawn, sound, new hardwood or softwood, free of knots, holes, cross grain, and other defects, by length indicated; stakes pointed at one end.
2. Wood Screws: ASME Bl8.6.l.

2.11 LANDSCAPE EDGINGS

A. Aluminum Edging: Standard commercial-aluminum edging, rolled edge, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Product: Subject to compliance with requirements, provide product indicated on Drawings from Sure-Loc Edging Corporation, or approved equal.

3. Edging Size: 3/16" x 4" (4.8 mm x 102 mm).
4. Stakes: Tapered steel, a minimum of 15-inches long.
5. Accessories: Standard tapered ends, comers, and splicers.
6. Finish: Mill finish.

B. Shovel-cut Edging: A sharp 45-degree edge cut into the soil or sod, 4" to 6" deep, to create a clean bed edge.

2.12 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. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.

C. Burlap: Non-synthetic, biodegradable.

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 liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid 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 Architect and replace with new planting soil.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

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.

C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.

D. Lay out plants at locations directed by Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

E. Apply antidesiccant to trees and 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. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again two weeks after planting.

F. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

G. Protect soil from compaction during the delivery of plants to the planting locations, digging of planting holes and installing plants.

1. Where possible deliver and plant trees that require the use of heavy mechanized equipment prior to final soil preparation and tilling. Where possible, restrict the driving lanes to one area instead of driving over and compacting a large area of soil.

2. Till to a depth of 6 inches, all soil that has been driven over during the installation of plants.

H. Soil Moisture

1. Volumetric soil moisture level, in both the planting soil and the root balls of all plants, prior to, during and after planting shall be above permanent wilting point and below field capacity for each type of soil texture within the following ranges.

Soil type	Permanent wilting point	Field capacity
Sand, Loamy sand, Sandy loam	5-8%	12-18%
Loam, Sandy clay, Sandy clay loam	14-25%	27-36%
Clay loam, Silt loam	11-22%	31-36%
Silty clay, Silty clay loam	22-27%	38-41%

a. Volumetric soil moisture shall be measured with a digital moisture meter. The meter shall be the Digital Soil Moisture Meter, DSMM500 by General Specialty Tools and Instruments, or approved equivalent.

2. The Contractor shall confirm the soil moisture levels with a moisture meter. If the moisture is too high, suspend planting operations until the soil moisture drains to below field capacity.

3.3 PLANTING AREA ESTABLISHMENT

A. Loosen subgrade of planting areas to a minimum depth of 4-inches. Remove stones larger than l-inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Spread planting soil to a depth of 4-inches but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

a. Spread approximately one-half the thickness of planting soil over loosened subgrade. Mix thoroughly into top 2-inches of subgrade. Spread remainder of planting soil.

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 Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

D. Observe each plant after delivery and prior to installation for damage of other characteristics that may cause rejection of the plant. Notify the Owner's Representative of any condition observed.

E. No more plants shall be distributed about the planting bed area than can be planted and watered on the same day.

F. The root system of each plant, regardless of root ball package type, shall be observed by the Contractor, at the time of planting to confirm that the roots meet the requirements for plant root quality in Part 2 Products: Plants General: Plant Quality. The Contractor shall undertake at the time of planting, all modifications to the root system required by the Owner's Representative to meet these quality standards.

1. Modifications, at the time of planting, to meet the specifications for the depth of the root collar and removal of stem girdling roots and circling roots may make the plant unstable or stress the plant to the point that the Owner's Representative may choose to reject the plant rather than permitting the modification.

2. Any modifications required by the Owner's Representative to make the root system conform to the plant quality standards outlined in Part 2 Products: Plants General: Quality, or other requirements related to the permitted root ball package, shall not be considered as grounds to modify or void the plant warranty.

3. The resulting root ball may need additional staking and water after planting. The Owner's Representative may reject the plant if the root modification process makes the tree unstable or if the tree is not healthy at the end of the warranty period. Such plants shall still be covered under the warranty

4. The Contractor remains responsible to confirm that the grower has made all required root modifications noted during any nursery observations.

3.4 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

Excavation of the Planting Space: Using hand tools or tracked mini-excavator, excavate the planting hole into the Planting Soil to the depth of the root ball measured after any root ball modification to correct root problems, and wide enough for working room around the root ball or to the size indicated on the drawing or as noted below.

1. For trees and shrubs planted in soil areas that are NOT tilled or otherwise modified to a depth of at least 12 inches over a distance of more than 10 feet radius from each tree, or 5 feet radius from each shrub, the soil around the root ball shall be loosened as defined below or as indicated on the drawings.

    a. The area of loosening shall be a minimum of 3 times the diameter of the root ball at the surface sloping to 2 times the diameter of the root ball at the depth of the root ball.

    b. Loosening is defined as digging into the soil and turning the soil to reduce the compaction. The soil does not have to be removed from the hole, just dug, lifted and turned. Lifting and turning may be accomplished with a tracked mini excavator, or hand shovels.

2. If an auger is used to dig the initial planting hole, the soil around the auger hole shall be loosened as defined above for trees and shrubs planted in soil areas that are NOT tilled or otherwise modified.

3. The measuring point for root ball depth shall be the average height of the outer edge of the root ball after any required root ball modification.

4. If motorized equipment is used to deliver plants to the planting area over exposed planting beds, or used to loosen the soil or dig the planting holes, all soil that has been driven over shall be tilled to a depth of 6 inches.
5. Excavate approximately three times as wide as ball diameter for balled and burlapped stock.
6. Excavate at least 12-inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
7. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
8. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
9. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
10. Maintain supervision of excavations during working hours.

11. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
12. If drain tile is shown on Drawings, or required under planting areas, excavate to top of porous backfill over drain tile.

B. Subsoil and topsoil removed from excavations may be used as planting soil, provided that it meets the requirements.

C. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

1. Hardpan Layer: Drill 6-inch free-draining holes to a depth of 10-inches or to free draining material. Holes should be 24-inches apart, and backfilled with clean, free-draining material.

D. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits

E. Fill excavations with water and allow to percolate away before positioning trees and shrubs

3.5 TREE, SHRUB, AND VINE 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, l-inch above adjacent finish grades.

1. Use planting soil for backfill.
2. Set top outer edge of the root ball at the average elevation of the proposed finish. Set the plant plumb and upright in the center of the planting hole. The tree graft, if applicable, shall be visible above the grade. Do not place soil on top of the root ball.
3. 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.
4. 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. Backfill the space around the root ball with the same planting soil or existing soil that was excavated for the planting space
5. 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 l-inch from root tips; do not place tablets in bottom of the hole.
6. Continue backfilling process. Water again after placing and tamping final layer of soil. Brace

root ball by tamping Planting Soil around the lower portion of the root ball. Place additional Planting Soil around base and sides of ball in six-inch (6") lifts. Lightly tamp each lift using foot pressure or hand tools to settle backfill, support the tree and eliminate voids. DO NOT over compact the backfill or use mechanical or pneumatic tamping equipment. Over compaction shall be defined as greater than 85% of maximum dry density, standard proctor or greater than 250 psi as measured by a cone penetrometer when the volumetric soil moisture is lower than field capacity.

a. When the planting hole has been backfilled to three quarters of its depth, water shall be poured around the root ball and allowed to soak into the soil to settle the soil. Do not flood the planting space. If the soil is above field capacity, allow the soil to drain to below field capacity before finishing the planting. Air pockets shall be eliminated and backfill continued until the planting soil is brought to grade level.

D. Set balled and potted stock plumb and in center of planting pit or trench with root flare l-inch 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 l-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. Set fabric bag-grown stock plumb and in center of planting pit or trench with root flare l-inch above adjacent finish grades.

1. Use planting soil for backfill.
2. Carefully remove root ball from fabric bag without damaging root ball or plant. 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 l-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.

F. Set and support bare-root stock in center of planting pit or trench with root flare 1-inch above adjacent finish grade.

1. Use planting soil for backfill.

2. Spread roots without tangling or turning toward surface, and carefully work backfill around roots by hand Puddle with water until backfill layers are completely saturated. Plumb before backfilling, and maintain plumb while working backfill around roots and placing layers above roots.
3. 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 soil-covered roots about 1-inch from root tips; do not place tablets in bottom of the hole or touching the roots.
4. Continue backfilling process. Water again after placing and tamping final layer of soil.

G. 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.

3.6 TREE, SHRUB, AND VINE PRUNING

A. Remove only dead, dying, or broken branches. Do not prune for shape.

B. Prune, thin, and shape trees, shrubs, and vines as directed by Architect.

C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.

D. Do not apply pruning paint to wounds.

3.7 TREE STABILIZATION

A. Install trunk stabilization as follows unless otherwise indicated:

1. Upright Staking and Tying: Stake trees of 2-inch or greater caliper. Stake trees of less than 2-inch caliper only as required to prevent wind tip out. Use a minimum of two stakes of length required to penetrate at least 18-inches below bottom of backfilled excavation and to extend one-third of trunk height above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.
2. Use two stakes for trees up to 6-feet high and caliper; three stakes for trees less than 10-feet high and up to 4-inch caliper. Space stakes equally around trees.
3. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.
4. Support trees with two strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

B. Staking and Guying: Stake and guy trees more than 14-inch height and more than 3-inch caliper unless otherwise indicated. Securely attach no fewer than three guys to stakes 30-inch long, driven to grade.

1. Site-Fabricated Staking-and-Guying Method:

a. Do not stake or guy trees unless specifically required by the Contract Documents, or in the event that the Contractor feels that staking is the only alternative way to keep particular trees plumb.

1) The Owner's Representative shall have the authority to require that trees are staked or to reject staking as an alternative way to stabilize the tree.

2) Trees that required heavily modified root balls to meet the root quality standards may become unstable. The Owner's Representative may choose to reject these trees rather than utilize staking to temporarily support the tree.

b. Trees that are guyed shall have their guys and stakes removed after one full growing season or at other times as required by the Owner's Representative.

c. Tree guying shall utilize the tree staking and guying materials specified. Guying to be tied in such a manner as to create a minimum 12-inch loop to prevent girdling. Refer to manufacturer's recommendations and the planting detail for installation.

1) Plants shall stand plumb after staking or guying.

2) Stakes shall be driven to sufficient depth to hold the tree rigid.

d. For trees planted in planting mix over waterproofed membrane, use dead men buried 24 inches to the top of the dead man, in the soil. Tie the guy to the dead man with a double wrap of line around the dead man followed by a double half hitch. When guys are removed, leave the dead men

e. For trees more than 6-inch caliper, anchor guys to wood deadmen buried at least 36-inches below grade. Provide turnbuckle for each guy wire and tighten securely.

f. Support trees with bands of flexible ties at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid restraint of tree.

g. Support trees with strands of cable or multiple strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid restraint of tree.

h. Attach flags to each guy wire, 30-inch above finish grade.

i. Paint turnbuckles with luminescent white paint.

C. Root-Ball Stabilization: Install at- or below-grade stabilization system to secure each new planting by the root ball unless otherwise indicated.

1. Wood Hold-Down Method: Place vertical stakes against side of root ball and drive them into subsoil; place horizontal wood hold-down stake across top of root ball and screw at each end to one of the vertical stakes.

a. Install stakes of length required to penetrate at least 18-inches below bottom of backfilled excavation. Saw stakes off at horizontal stake.

b. Install screws through horizontal hold-down and penetrating at least l-inch into

stakes. Predrill holes if necessary to prevent splitting wood.

c. Install second set of stakes on other side of root trunk for larger trees as indicated.

3.8 GROUND COVER AND PERENIAL PLANTING

A. Set out and space ground cover and plants other than trees, shrubs, and vines apart in even rows with triangular spacing.

B. Use planting soil for backfill.

C. Dig holes large enough to allow spreading of roots.

D. For rooted cutting plants supplied in flats, plant each in a manner that will minimally disturb the root system but to a depth not less than two nodes.

E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.9 PLANTING AREA MULCHING

A. Install weed-control barriers before mulching according to manufacturer's written instructions. Completely cover area to be mulched, overlapping edges a minimum of 6-inches and secure seams with galvanized pins.

B. Mulch backfilled surfaces of planting areas and other areas indicated.

1. Trees and Tree-like Shrubs in Turf Areas: Apply organic mulch ring of thickness shown on Drawings, within radius around trunks or stems. Do not place mulch within 3-inches of trunks or stems.
2. Organic Mulch in Planting Areas: Apply thickness of organic mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 2-inches of trunks or stems.

3.10 EDGING INSTALLATION

A. Shovel-Cut Edging: Separate mulched areas from turf areas with a 45-degree, 4-inch to 6-inch deep, shovel-cut edge.

B. Aluminum Edging: Install aluminum edging where indicated according instructions. Anchor with steel stakes spaced approximately 18-inches below top elevation of edging and spaced according manufacturer's written installation instructions.

3.11 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, 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 trees and 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. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

D. During the warranty period, provide all maintenance for all plantings to keep the plants in a healthy state and the planting areas clean and neat.

E. General requirements:

1. All work shall be undertaken by trained planting crews under the supervision of a foreman with a minimum of 5 years experience supervising commercial plant maintenance crews.

2. All chemical and fertilizer applications shall be made by licensed applicators for the type of chemicals to be used. All work and chemical use shall comply with all applicable local, provincial and federal requirements.

3. Assure that hoses and watering equipment and other maintenance equipment does not block paths or be placed in a manner that may create tripping hazards. Use standard safety warning barriers and other procedures to maintain the site in a safe manner for visitors at all times.

4. All workers shall wear required safety equipment and apparel appropriate for the tasks being undertaken.

5. The Contractor shall not store maintenance equipment at the site at times when they are not in use unless authorized in writing by the Owner's Representative.

6. Maintenance vehicles shall not park on the site including walks and lawn areas at any time without the Owner's Representative's written permission.

7. Maintain a detailed log of all maintenance activities including types of tasks, date of task, types and quantities of materials and products used, watering times and amounts, and number of each crew. Periodically review the logs with the Owner's Representative, and submit a copy of the logs at the end of each year of the maintenance agreement.

8. Meet with the Owner's Representative a minimum of three times a year to review the progress and discuss any changes that are needed in the maintenance program. At the end of the warranty period attend a hand over meeting to formally transfer the responsibilities of maintenance to the Owner's Representative. Provide all information on past maintenance activities and provide a list of critical tasks that will be needed over the next 12 months. Provide all maintenance logs and soil test data. Make the Contractor's supervisor available for a minimum of one year after the end

of the warranty period to answer questions about past maintenance.

F. Provide the following maintenance tasks:

1. Watering; Provide all water required to keep soil within and around the root balls at optimum moisture content for plant growth.

a. Maintain all watering systems and equipment and keep them operational.

b. Monitor soil moisture to provide sufficient water. Check soil moisture and root ball moisture with a soil moisture meter on a regular basis and record moisture readings. Do not over water.

G. Soil nutrient levels: Take a minimum of 4 soil samples from around the site in the spring and fall and have them tested by an accredited agricultural soil testing lab for chemical composition of plant required nutrients, pH, salt and % organic matter. Test results shall include laboratory recommendations for nutrient applications. Apply fertilizers at rates recommended by the soil test.

1. Make any other soil test and/or plant tissue test that may be indicated by plant conditions that may not be related to soil nutrient levels such as soil contaminated by other chemicals or lack of chemical uptake by the plant.

H. Plant pruning: Remove cross over branching, shorten or remove developing co dominant leaders, dead wood and winter-damaged branches. Unless directed by the Owner's Representative, do not shear plants or make heading cuts.

I. Restore plants: Reset any plants that have settled or are leaning as soon as the condition is noticed.

J. Guying and staking: Maintain plant guys in a taught position. Remove tree guys and staking after the first full growing season unless directed by Owner's Representative.

K. Weed control: Keep all beds free of weeds. Hand-remove all weeds and any plants that do not appear on the planting plan. Chemical weed control is permitted only with the approval of the Owner's Representative. Schedule weeding as needed but not less *12 times per year*.

L. Trash removal: Remove all trash and debris from all planting beds and maintain the beds in a neat and tidy appearance. The number of trash and debris removal visits shall be no less than 12 times per year and may coincide with other maintenance visits.

M. Plant pest control: Maintain disease, insects and other pests at manageable levels. Manageable levels shall be defined as damage to plants that may be noticeable to a professional but not to the average person. Use least invasive methods to control plant disease and insect outbreaks.

1. The Owner's Representative must approve in advance the use of all chemical pesticide applications.

N. Plant replacement: Replace all plants that are defective as defined in the warranty provisions, as soon as the plant decline is obvious and in suitable weather and season for planting as outlined in above sections. Plants that become defective during the maintenance period shall be covered and replaced under the warranty provisions.

O. Mulch: Refresh mulch once a year to maintain complete coverage but do not over mulch. At no time shall the overall mulch thickness be greater than 3 inches. Do not apply mulch within 6 inches of the trunks or stems of any plants. Replacement mulch shall meet the requirements of the original approved material. Mulch shall be no more than one inch on top of the root ball surface.

P. Bed edging: Check and maintain edges between mulch and lawn areas in smooth neat lines as originally shown on the drawings.

Q. Leaf, fruit and other plant debris removal: Remove fall leaf, spent flowers, fruit and plant part accumulations from beds and paved surfaces. Maintain all surface water drains free of debris. Debris removal shall be undertaken at each visit to weed or pick up trash in beds.

R. Damage from site use: Repair of damage by site visitors and events, beyond normal wear, are not part of this maintenance. The Owner's Representative may request that the Contractor repair damage beds or plantings for an additional cost. All additional work shall be approved in advance by the Owner's Representative.

3.12 CLEANUP AND PROTECTION

A. During planting, keep adjacent paving and work area in a clean 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.

C. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

D. During installation, keep the site free of trash, pavements reasonably clean and work area in an orderly condition at the end of each day. Remove trash and debris in containers from the site no less than once a week.

E. Immediately clean up any spilled or tracked soil, fuel, oil, trash or debris deposited by the Contractor from all surfaces within the project or on public right of ways and neighboring property.

F. Once installation is complete, wash all soil from pavements and other structures. Ensure that mulch is confined to planting beds and that all tags and flagging tape are removed from the site. The Owner's Representative's seals are to remain on the trees and removed at the end of the warranty period.

G. Make all repairs to grades, ruts, and damage by the plant installer to the work or other work at the site.

H. Remove and dispose of all excess planting soil, subsoil, mulch, plants, packaging, and other material brought to the site by the Contractor.

3.13 REPAIR AND REPLACEMENT

A. The value of trees destroyed or damaged will be charged against the account of the contractor responsible for the damage in an amount determined by the Owner's certified arborist using the ISA International Society of Arboriculture, Council of Tree & Landscape Appraiser's Guide for Plant Appraisal, Current Edition. If a replacement tree is provided, the amount charged against the contractor will be reduced by the value of the replacement tree.

3.14 DISPOSAL

Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property. Burning of surplus and waste materials is not permitted

3.15.1 GUARANTEES AND FINAL ACCEPTANCES

GUARANTEES SHALL BE AS FOLLOWS:

A. Lawn Areas: Scattered bare spots, none of which are larger than 36 sq.in., will be allowed up to a maximum of five percent of any lawn area. After the grass has started growing, all areas and parts of areas which fail to show a uniform thick and well developed stand of grass ,prior to acceptance, damage resulting from erosion, gullies, washouts, or other causes shall be repaired by filling with topsoil, tamping, re-fertilizing and re-seeding.

B. Plants: Guarantee trees and shrubs for a period of one year after date of provisional acceptance, against defects and death.

    a. 1. At the issuance of provisional acceptance, the Owner shall take over maintenance of the planting. The guarantee of all plant material shall remain the responsibility of the Contractor. The Contractor shall ascertain that the Owner properly waters and maintains all planting during the one year guarantee period. The Contractor shall make inspection of all plant materials during this period at intervals of not over 30 days during growing season. Contractor shall report in writing to Owner's Representative any deficiencies as identified or changes in maintenance as needed. Report within ten days after inspection.

    b. At the end of the guarantee period, any plant that is dead, not true to name, or not in satisfactory growth as determined by the Owner's Representative, shall be replaced. In case of reasonable doubt or question regarding the condition and satisfactory establishment of a rejected plant, the Owner's Representative may allow such a plant to remain through another complete growing season, at which time the rejected plant, if found to be dead or in an unhealthy or badly impaired condition, shall be replaced at once. The Contractor will not be required to replace an inspected and accepted plant more than once.

        i. Replacements shall be plants of the same kind and size as specified in the Plant List. They shall be furnished and planted as specified herein. The cost of replacement shall be borne by the Contractor, except where it can be definitely shown that loss resulted from the Owner's failure to maintain planting as instructed. Also, the Contractor shall not be held liable for damages incurred to plants caused by deicing compounds, fertilizer, pesticides and other materials that

the Contractor has not applied or supervised application thereof. The Contractor shall not be held responsible for damages resulting from acts of God, vandalism, or physical negligence beyond the Contractor's control.

3.16 FINAL INSPECTION AND FINAL ACCEPTANCE:

A. At the end of the guarantee period, inspection shall be made by the Owner's Representative at the request of the Contractor within five working days.

1. The landscape work may be inspected for acceptance in parts agreeable to the Owner's Representative, provided the work offered for inspection is complete, including maintenance, and that the area comprises one complete unit or area of substantial size.

2. All staking and guying shall be removed at the end of one year with the exception of replace plants. Contractor shall remove all staking and guying from replaced plants one year after the date of replacement.

3. After all necessary clean-up, protective and corrective work has been completed, the Owner's Representative will certify in writing the final acceptance of the planting

4. f the work is satisfactory, the maintenance period will end on the date of the final observation.

5. If the work is deemed unsatisfactory, the maintenance period will continue at no additional expense to the Owner until the work has been completed, observed, and approved by the Owner's Representative.

6. FAILURE TO PASS OBSERVATION: If the work fails to pass final observation, any subsequent observations must be rescheduled as per above. The cost to the Owner for additional observations will be charged to the Contractor at the prevailing hourly rate of the Owners Representative.

END OF SECTION 32 93 00

SECTION 32 94 00 – IRRIGATION SYSTEM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. The Drawings, General Provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.2 SUMMARY:

A. Work includes labor, materials and equipment necessary to provide the Owner with a fully operational, automatic irrigation system with instructions for operating and maintaining the system. The irrigation system shall originate from an existing pond on-site. System is designed for 50 gallons per minute. Minimum 80-psi dynamic pressure at full system flow is required.

B. Related Work Specified in other Sections:
1. Section 31 20 00 "Earth Moving"
2. Section 32 93 00 "Plants"

1.3 QUALITY ASSURANCE:

A. Installer: A firm which has at least five (5) years experience in work of this type and size required by this Section and which is acceptable to the Owner's Representative.

B. References: The contractor must supply three references for work of this type and size with their bid including names and phone numbers of contact person(s).

C. Applicable requirements of accepted Standards and Codes shall apply to the Work of this section and shall be so labeled or listed.
1. American Society for Testing and Materials (ASTM)
2. National Plumbing Code (NPC)
3. National Electric Code (NEC)
4. National Sanitary Foundation
5. American Society of Agricultural Engineers
6. Underwriters Laboratories, Inc. (UL)
7. Occupational Safety and Health Regulations (OSHA)

D. Observation: The Owner's Representative will be on site at various times to insure the system is being installed according to the Specifications and Drawings.

E. Testing: After completion of the system, test the operation of entire system and adjust sprinklers as directed by the Owner's Representative. Demonstrate to the Owner's Representative that all irrigated areas are being adequately covered. Furnish and install materials required to correct inadequacies of coverage due to deviations from Drawings or where the system has been willfully installed when it is obviously inadequate or inappropriate without bringing it to the attention of the Owner.

1.4 SUBMITTALS:

A. The Contractor shall provide copies of product specification sheets on all proposed equipment to be installed to the Owner's Representative for approval prior to the start of work. Work on the irrigation system may not commence until product sheets are submitted and approved. Submittals shall be marked up to show proper nozzles, sizes, flows etc. Equipment to be included:

1. Submersible Pump – water end
2. Pump motor
3. Variable frequency drive
4. Float Switches
5. Rotary Sprinklers
6. Isolation Valves
7. Electric Control Valves
8. Controller
9. Valve Boxes
10. HDPE Pipe and Fittings
11. Sprinkler wire, Two-wire and connectors
12. Decoders
13. Surge arrestors
14. Swing Joints
15. Quick Coupling Valves
16. Sensors/switches
17. Grounding rods, copper wire, and clamps
18. Miscellaneous Materials

B. The Contractor shall provide and keep up-to-date a complete redlined Record Set of Drawings of the system as the project proceeds. Each valve box location to be referenced by distance from a minimum of two permanent locations.

C. Guarantee: In addition to the manufacturers guarantees the Contractor shall warrant the entire irrigation system, both parts and labor for one (1) year from the date of acceptance by Owner. As part of the warranty, the Contractor shall perform the first year-end winterization and spring start-up for the irrigation system.

1.5 PRODUCTS:

A. General: All materials to be incorporated in this system shall be new and without flaws or defects and of quality and performance as specified.

B. HDPE Irrigation Pipe: All pipe shall be IPS HDPE DR 11 manufactured from a PE 4710 resin listed with the Plastic Pipe Institute in TR4. The resin material shall meet the specifications of ASTM D3350-09 with a minimum cell classification of PE 445474C. Pipe shall be manufactured to the dimensions and requirements of ASTM F714 or ASTM D3035. Pipe shall be DR 11 unless otherwise specified on the plans. The pipe shall

contain no recycled compounds except that generated in the manufacturers own plant from resin of the same specification from the same raw material. Piping shall be fusion welded HDPE piping as manufactured by Dura Line, Flying W or approved equal. The pipe must provide a written 25 limited warranty. All pipe shall be HDPE, PE4710, DR 11.

C. HDPE Fittings: All HDPE fittings shall be molded butt-fusion DR 11. Isolation valves will be attached to mainline with HDPE electro-fusion saddle or butt-fused branch saddle. No thrust blocks shall be used except by permission of the Owner.

D. Copper Pipe and Fittings: Copper pipe shall be Type K, hard tempered ASTM B88. Copper fitting shall be wrought copper, solder joint type in accordance with ASTM B828-00. Joints shall be soldered with silver solder ASTM B32, Grade 95TA up to 250 degree using non-corrosive flux.

E. Brass Pipe and Fittings: Brass pipe shall be 125lb., cast bronze, ground joint pattern, threaded, ASTM B43-98. Brass fittings shall be cast bronze, screwed, 125lb. class.

F. Wire Conduit: Conduit for wiring beneath non-soil areas shall be PVC, SCH-40 conduit with solvent weld joints, as manufactured by Certainteed, Cresline, JM or Equal. All communication wire and cable shall be installed within a schedule 40 2-inch PVC conduit with solvent welded joints 18-inches below grade. Conduit for above ground wiring shall be galvanized, rigid metallic conduit.

G. Large rotary sprinklers shall be gear-driven, rotary type with drain check valve and stainless steel riser designed for in-ground installation. The nozzle assembly shall elevate three inches when in operation and retraction shall be achieved by a stainless steel spring. Check valve shall be capable of holding up to 10 feet of elevation. Sprinkler shall be capable of covering a 49-61 foot radius and flow range of 7.5 to 15.7 gpm at 60 pounds per square inch of pressure. All sprinkler parts shall be removable through the top of the unit by removing a heavy-duty threaded cap. The sprinkler shall have a one-inch (1") IPS water connection at the bottom of the sprinkler. Sprinklers shall be manufactured by Hunter Industries.

H. Isolation Valves: Isolation valves shall have electro-fusion and butt fusion connections, 2 and 3-inch in size and shall be polyethylene ball valves with DR9 bodies (rated 250psi) DR11 ends (rated 200psi) per the requirements of ASTM D 3261. The valves shall be approved for water contact and NSF 61 listed. The valves shall be manufactured using black PE 4710 resin. The valve shall be full port with 2-inch operating nut. The valve shall be the Poly-Water Valve for potable water as manufactured by Polyvalve-Andronaco Industries (Harco). Mainline to lateral shall be made with Harco IPS electro-fusion or butt-fused branch saddles and Harco electro-fusion 90s (if required).

I. Electric Control Valves: Electric control valves shall be diaphragm type, fiberglass or reinforced nylon body plastic valves with manual flow control, manual bleed screw, 200 psi pressure rating with additional pressure regulation (if required). Valves shall be manufactured by Hunter ICV Series.

J. Quick Coupling Valves: The valve shall be of brass construction with a working pressure of 125 psi. The top of the valve body shall be equipped with ACME threads and smooth face to allow the key to open and close the valve smoothly. The quick coupling valve shall have a vinyl cover. Keys shall be ACME with 1-inch male thread and ¾-inch female thread at the top. Contractor to provide one (1) key for quick couplers and one (1) ¾ inch hose swivel. Quick coupling valves keys, and swivels shall be manufactured by Hunter Industries HQ-44RC-AW, HS2 and HS1.

K. Valve Boxes: All valve boxes shall be manufactured from unformed resin with a tensile strength of 3,100-5,500 psi conforming to ASTM D638. All covers shall be green in color. Valve boxes shall be as manufactured by Dura Plastic Products, Inc., Carson (Old Castle) or approved equal.

1. Valve boxes for isolation valves and wire splices shall be 10-inch round with metal detection.
2. Valve boxes for electric control valves shall be 12-inch deep standard with extensions as required.
2. Valve boxes for quick coupling valves shall be 6-inch round (non-econo) with metal detection.

L. Swing Joints:

1. Swing joints for Large Rotary sprinklers shall be on 1-inch prefabricated PVC unitized swing joint assembly with double o-ring seals, minimum length of 12 inches and 2-inch saddle for HDPE pipe.
2. Swing joints for quick coupling valves shall be 1-inch prefabricated PVC unitized swing joint assemblies with double o-ring seals, minimum length of 12 inches with brass insert and stabilizer (unless stabilizer is an integral part of the quick coupling valve). Swing joint shall be integrated with 2" saddle.

M. Two-Wire Specifications:

1. The two-wire path shall be polyethylene double-jacketed or UF-B UL PVC double-jacketed two-conductor solid core designed for direct burial.
2. The conductors shall be soft drawn, annealed, solid copper conforming to ASTM B3 (non tinned) or ASTM B33 (tinned).
3. Conductor insulation shall be 4/64-inch thick polyvinyl chloride (PVC), conforming to UL standard #493 for thermoplastic-insulated style UF (underground feeder), rated at 140°F.
4. The 2 insulated conductors are laid in parallel and encased in a single outer jacket of 3/64-inch thick, high density, sunlight resistant polyethylene conforming to ICEA S-61-402 and NEMA WC5, having a minimum wall thickness of .45 inch.
5. The 2 conductors shall be color-coded: normally one red conductor and one black conductor.

N. Direct Bury Wire Connectors:

1. All two-wire connectors shall be a DBR/Y or equivalent direct bury splice, made for full submersion proof and shall effectively seal moisture from two or more conductors and installed per manufacturer's specifications, and as specified herein.

O. Valve Decoders:

1. The valve decoders be fully sealed, submersion proof, and direct bury to effectively seal moisture from the electronics and shall be installed as specified herein.
2. The valve decoder shall have true two-way communication.
3. Each valve decoder shall come with 23 inches of 16-gauge PVC jacketed solid core wire to connect to the two-wire.
4. The valve decoder shall be BL-5201 or BL-5201 DC as manufactured by Baseline Inc., in Boise, Idaho.

P. Grounding for Two-Wire:

1. The installer shall install a ground rod or ground plate every 600 feet on the two-wire, and on the end of every spur that exceeds 50 feet. In high lightning areas, grounding should be increased to every 300 feet.
2. Grounding rods or plates shall be located the length of the grounding device away from the two-wire path. There shall be a 6-gauge bare copper wire connecting the grounding rod or plate to the surge arrestor.
3. The surge arrestor shall be located in a valve box and shall not be built into the decoder.

Q. Grounding Rods:

1. All grounding rods shall be bare copper 5/8 inch diameter or greater and 8 feet long or longer.
2. A 6 inch round valve box shall be installed over the top of the grounding rod for maintenance access.
3. Grounding rods shall be located at a minimum distance from the two-wire to assure that the two-wire is outside of the electrode sphere of influence. For an 8 foot grounding rod, the grounding rod shall be connected at least 8 feet away from the two-wire path at a right angle to the two-wire path.

R. Surge Arrestors:

1. The surge arrestors shall be fully sealed, submersion proof made for direct bury, and shall effectively seal moisture from electronics. The surge arrestors shall be installed as specified herein.
2. The surge arrestor shall come with 2 levels of protection that will clamp at 60 volts or less.
3. The surge arrestor shall clamp closed to dissipate all surges to earth ground and protect other devices on the two-wire.
4. The surge arrestor shall be a BL-LA01 as manufactured by Baseline Inc., in Boise, Idaho.

S. Automatic Controller: Controller shall be electronic in construction with capability of 5 second to 24 hour run times. Controller to have a minimum of 10 overlapping programs, auto/off switch and be capable of manual, semi-automatic and automatic operation. Controller shall be able to adjust seasonal water budget from 10% to 200% by program. Controller shall be BL-1000X as manufactured by Baseline Inc., in Boise, Idaho.

T. Automatic Rain Sensor: Rain Sensor shall be plastic in construction with adjustable interruption point, ½-inch IPS threads. The Rain sensor shall be manufactured by Hunter Industries, model Rain-Clik or approved equal.

U. Soil Moisture Sensor (optional): Moisture sensors to be BL-5351B as manufactured by Baseline Inc., Boise, Idaho.

V. Irrigation Pump: The main irrigation pump shall be of the submersible type, Model 40GS50 manufactured by Goulds. See Appendix C for catalog data.

W. Motor: Motor for irrigation pump shall be M50432, 230 V, three phase. See Appendix C for catalog data.

X. Pump Control: Pump control shall be Aquavar Solo 3AS50 pressure controller. See Appendix C for catalog data.

Y. Motor Starter: Motor starter for the pump system shall be mounted on a single back panel in a single NEMA enclosure. Motor starters shall meet I.E.C. standards and shall be rated for a minimum of 1,250,000 operations. Fuses shall supply short circuit protection to the motor and shall be rated for a minimum of 200,000 amp interrupting capacity.

Z. Lightning and Surge Arrestor: All electrical equipment shall be protected by a U.L. approved Category C and Category B surge arrestor to suppress voltage surges on incoming power. The device under IEEE C62.41 Category C will withstand an impulse of 10Kv/10Ka and Category B to withstand ringwave of 6Kv/500a and an impulse of 6Kv/3Ka. Response time shall be less than 5 nanoseconds.

AA. Electric Master Valve: Electric control valves shall be double-beaded diaphragm type seal design, fabric reinforced EPDM diaphragm and EPDM seat. Valves shall be brass with manual flow control, internal/external manual bleed screw, 220 psi pressure rating with additional pressure regulation (if required). Valves shall be manufactured by Hunter IBV Series.

PART 3 – EXECUTION:

A. General:

1. Examine all contract documents applying to this Section noting any discrepancies and bringing them to the attention of the Owner's Representative for timely resolution.
2. All work indicated on Drawings shall be provided whether or not specifically mentioned in the Specifications.

3. Verify dimensions and grades at job site before work is commenced. All obstructions, conflicts or discrepancies shall be brought to the attention of the Owner's Representative.
4. Coordinate field measurements with other trades.
5. Sprinkler lines indicated on drawings are diagrammatic only. Location of irrigation equipment is confined to dedicated irrigation isles and associated open space.
6. Coordinate installation of all sprinkler materials, including pipe, to avoid conflict with tree root systems.
7. At all times, protect existing irrigation, landscaping, paving, etc. from damage. Any inadvertent damage to the work for another trade shall be reported.

B. Pipe and Fittings Installation:

1. Excavate a straight and true trench to a depth as indicated on the drawings and details.
2. Pipe shall be laid on undisturbed trench bottom provided suitable base is available.
3. Back filling shall be accomplished as follows: the first 10-inch of backfill material shall contain no rock larger than 1-inch in diameter. Carefully place backfill material around pipe and wire and tamp in place. Remainder of backfill material shall be laid-up in 6-inch lifts and tamped to compaction with mechanical equipment. Conform compacted material to adjacent grades without humps, dips or other irregularities. Frozen material shall not be used for backfill. Do not use truck wheels for compaction.
4. Restore grades and repair damage when settling occurs.
5. Ensure all pipe ends are protected from debris entry at the end of each workday or if cannot be temporarily joined.
6. Clean pipe ends and make all fused pipe connections in strict accordance with Plastic Pipe Institute TR-33 standards and manufacturer's recommendations.
7. Mainline pipe shall have a minimum of 18 inches of cover and lateral piping shall have a minimum of 12 inches of cover.
8. In installing irrigation pipe the Contractor shall route the pipe as necessary to avoid damage to all tree roots.
9. Throughout the guarantee period it will be the responsibility of the Contractor to refill any trenches that have settled due to incomplete compaction.
10. Pulling of pipe will be allowed provided soil is suitable and specified depth of bury can be maintained.
11. No pipe shall be installed without tracer wire or metal detection tape.
12. Clean bell and spigot ends and make all gasketed joints in strict accordance with manufacturer's recommendations, making certain not to apply an excess amount of lubricant. Maximum deflection per joint shall not exceed manufacturer's recommendations.
13. Cut plastic pipe with hand saw or pipe cutting tool, removing all burrs at cut ends. All pipe cuts are to be square and true. Bevel cut end as required to conform to manufacturer's specifications.

C. Isolation Valve Installation: Install isolation valves per detail where indicated on the Drawings. Install all isolation valves on a level crushed stone base so they can be easily

utilized with the appropriate valve wrench. Install specified valve box over each isolation valve.

D. Control Valve Installation: Control valves shall be installed on a level crushed stone base. Grade of bases shall be consistent throughout the project so that finish grades fall within the limits of work. Valves shall be set plumb with adjusting handle and all bolts, screws and wiring accessible through the valve box opening. Valves shall be positioned with 24-inch maintenance clearance from other equipment. Install at sufficient depth to provide more that 6-inch, but no less that 4-inch cover from top of valve to finish grade. Adjust zone operation after installation using flow control device on valve. Adjust pressure regulation to match sprinkler requirement with optional pressure regulation device. Install specified valve box over each control valve.

E. Valve box installation: Furnish and install a valve access box for each electric valve, quick coupling valve, isolation valve and wire splice. All access valve boxes shall be installed on 4-inch crushed stone base. Finish elevation of all boxes shall be at grade and set flush.

F. Automatic Controller Installation: Contractor to install controller on interior wall of existing building as directed by Owner. Contractor to wire two-wire and rain sensor into controller then perform programming and setup operations. Wire controller to 120-volt electrical supply provided and installed to the controller by a licensed electrician.

G. Rain Sensor Installation: Install rain sensor on exterior of existing building as directed by Owner. Rain sensor shall be in direct contact with the weather. Install Rain sensor wiring within ½-inch conduit where exposed. All above ground wires shall be installed in galvanized conduit.

H. Wiring Installation:

1. Wiring shall be installed along with the piping. Sufficient slack for expansion and contraction shall be maintained and wiring shall at no point be installed tightly. Wiring in valve boxes shall be a sufficient length to allow the valve solenoid, splice and all connections to be brought above grade for servicing.
2. An expansion curl shall be provided and installed within 6 inches of each wire connection to a solenoid or decoder and at least every 100 feet of wire length runs of more than 100 feet.
3. Service wiring in connection with Drawings and local codes for 24-volt splice. All in-ground wire connections shall be waterproofed with 3M DBY splice kits. All splices shall be made in valve boxes (wire runs requiring splices between valve locations shall be made in a dedicated valve box).

I. Sprinkler Installation:

1. Large rotary sprinklers shall be installed flush to grade on 1-inch prefabricated PVC unitized swing joint assemblies with internal o-rings, minimum length 12 inches.
2. Sprinklers shall not exceed maximum spacing indicated on Drawings.

J. Quick Coupling Valve Installation: Provide and install quick coupling valves where indicated on the Drawings. Quick coupling valves to be mounted on 1-inch pre-

fabricated PVC unitized swing joint assemblies with internal o-rings, minimum length 12 inches with brass insert and stabilizer as per details.

K. Wire Path: The two-wire path may be looped, spliced, branched permitting extensions of the path in multiple directions. The distance from the controller to end of any one wire run shall not exceed the maximum distance specified for the gauge of wire. All splices should be made in a dedicated valve box so as not to damage connections when operating equipment.

L. Wire Installation: The two-wire shall be laid with the pressurized irrigation line between valve boxes and installed without damage including nicks, cuts, or abrasions to outer jackets. There shall be a 24-inch slack loop at every valve box for making connections and service.

M. Connector Installation: All connectors shall be installed per manufacturer's specifications. The install shall make all connections per manufacturer's specifications. The installer shall twist a wire connector in a clockwise direction, and then place a fully submersion-proof DBR/Y tube over the top making sure connector is full seated at the top of the tube, snap cover closed.

N. Valve Decoder Wiring and Installation: The valve decoder shall be 1" x 4" x 2" with 2 mounting tabs for attaching the decoder to the side of the valve box. The valve decoder shall be connected to the two-wire path and shall be mounted to the side of the valve box with the serial number face up. The valve decoders shall be attached to the wire using the connector specification in this document. All valve common wires shall be attached to white common wire of the valve decoder using the connector specification in this document. The maximum wire run between the valve decoder and the solenoid shall be 100 feet using standard 14-gauge wire.

O. Connections to Grounding Rods:

1. The minimum ground conductor running from the grounding device to the surge arrestor shall be a minimum of a 6-gauge diameter, bare copper wire.
2. The ground rod must be buried a minimum of 6 inches under the soil.
3. All connections to grounding rods shall conform to ASIC Earth Grounding Guideline 100-2002, and shall consist of either a Cadweld type or screw clamp type connection. Cadweld or equivalent connections are preferred.
4. The 6-gauge solid conductor shall not exceed a minimum of an 8-inch radius bend at any point along the wire.
5. All ground lugs shall be made of either copper with stainless steel bolts and copper washers or brass with stainless steel bolts and brass washers.

P. Surge Arrestor Wiring and Installation: The surge arrestor shall be installed in an appropriate irrigation box and shall be connected to the two-wire in accordance with the manufacturer's two-wire connector specifications. The surge arrestor ground wire shall be connected to bare copper solid core ground wire using a screw clamp or split bolt type connector (no wire nuts of any kind will be accepted) then inserted into a DBY/R connector or equivalent.

Q. Irrigation Pump Installation: Irrigation pump and motor will be installed in existing well. Pump support shall prevent pump movement and allow pump retrieval. Contractor will be responsible for coordination equipment installation and of all necessary structure penetrations.

R. Flush/Test/Start-Up/Adjust:

1. After all piping, valves, sprinkler bodies, pipe lines and risers are in place and connected, but prior to installation of sprinkler internals, open control valves and disinfect and flush out the system under full head of water.
2. Existing water system services the existing maintenance building. Contractor to verify existing plumbing system operates properly with the new pump.
3. Contractor shall be responsible for flushing the entire system after installation is complete and will be responsible for any clogged nozzles for thirty (30) days after substantial completion.
4. Test all lines for leaks under operating pressure. Repair all leaks and re-test.
5. Adjust sprinklers, valve boxes and quick coupling valves to grade as required, so that they will not be damaged by mowing operations.
6. Each control zone shall be operated for a minimum of 5 minutes and all heads checked for consistency of delivering water.

S. Acceptance and Operation by Owner:

1. Upon completion of the work and acceptance by the owner, the Contractor shall be responsible for the training of Staff in the operation of the system.

T. In addition to the record drawings and submittals, the Contractor shall provide a complete Operation and Maintenance Manual containing copies of the original plan, record drawings, control valve system wiring diagram, list of all parts, list of manufacturers, approved submittals, operation, service, maintenance and contacts of reputable companies to perform the duties outlined above.

END OF SECTION 32 94 00

SECTION 33 41 00

STORM DRAINAGE

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. Description of work: Provide labor, materials, equipment, and services necessary for proper and complete installation of the storm drainage system as indicated on the Drawings and as herein specified including the following items:

1. Storm drainage piping.
2. Field inlets
3. Bedding and cover materials.
4. Related appurtenances.

B. The Contractor shall pay all fees associated with connection to the existing utilities and inspections by the Town.

1.3 REFERENCES

A. The "Standard Specifications" referred to herein is the book entitled "Standard Specifications" published by the State of Maine Department of Transportation dated December 2002, as supplemented.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data indicating pipe, pipe accessories, structures and appurtenances.

C. Shop Drawings: Submit Product Specification Literature and/or Shop Drawings for:

1. Precast concrete structures (field inlets).
2. Cast iron frames, grates and covers for structures.
3. Storm drainage piping.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

A. Comply with Section 01 73 00 - Execution Requirements: Requirements for submittals.

B. Project Record Documents:

1. Accurately record actual locations of pipe runs, connections, field inlets, and invert elevations.

2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 QUALITY ASSURANCE

A. Comply with the requirements of Section 01 40 00 Quality Requirements.

B. Documents affecting Work of this Section include, but are not necessarily limited to; the Conditions of the Contract, General Conditions, Supplementary Conditions, Addenda, and all Sections of Division 1 are hereby made a part of this Section.

C. Coordinate Work with that of other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of the Work.

D. All Work shall comply with the requirements of the Maine Department of Environmental Protection standards, the York County Soil & Conservation District Standards, and Town of Sanford, Maine requirements, to minimize adverse environmental impacts. Strict adherence to the Specifications and Plans is required in order to prevent adverse downstream impacts.

E. Work shall be accomplished in accordance with regulations of local, county and state agencies and national or utility company standards as they apply.

F. The Contractor shall bear all cost associated with correcting any Work that does not meet the requirements of this Section or any damages to property outside the limits of Work.

1.7 PRE-INSTALLATION MEETINGS

A. Comply with Section 01 31 00 – Project Management and Coordination: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.8 COORDINATION

A. Comply with Section 01 31 00 - Project Management and Coordination: Coordination and project conditions.

B. Coordinate the Work with other trades.

1.9 AS- BUILT DRAWINGS

A. As-built scale Drawings, accurately showing actual installed locations and inverts of all underground and surface drainage lines and structures, shall be produced by the Contractor and turned over to the Architect/Engineer at the completion of the project.

PART 2 - PRODUCTS

2.1 STORM DRAINAGE PIPING

A. Polyethylene Pipe (HDPE): High density polyethylene pipe conforming to AASHTO M294-97, Type S and/or AASHTO M252, Type S and/or AASHTO MP7-97. Pipe shall be smooth bore.

B. Pipe shall be joined with the bell-and-spigot joint meeting AASHTO M252, AASHTO M294-97 OR MP7-97. The joint shall be silt tight and nonrated watertight. Gaskets shall be made of polyisoprene meeting the requirements of ASTM F477 with the addition that the gaskets shall not have any visible cracking when tested according to ASTM D1149 after 72 hour exposure in 50 PPHM ozone at 104° Fahrenheit. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.

C. Pipe and fitting material shall be high-density polyethylene meeting ASTM D3350 minimum cell classification 324420C for 4" through 10" diameters or 335420C for 12" through 60" diameters.

2.2 ACCESSORIES

A. Mortar: One part Portland Cement, Type IIA, two parts mortar sand, and clean water as required: MDOT Section 705.02.

2.3 FIELD INLETS

A. Precast Concrete Structures: ASTM C478, MDOT Section 712.06. Structures and top pieces shall provide H-20 load bearing capacity. Butyl rubber gaskets shall be installed at all joints between manhole sections.

B. Brick: ASTM C32-69, Grade MS, MDOT Section 704.01.

C. Concrete Block: ASTM C-139; MDOT Section 704.03.

D. Structure walls: 5 in. thick for precast up to 10 ft. depth; 8 in. thick for precast below that depth.

E. Grout: Specified in Section 03 30 00.

F. Cast Iron Frames, Grates, and Covers shall meet requirements of MDOT Section 712.07.

1. Grates in paved areas shall be "ADA Style".
2. Grates in lawn areas to be Type "B" catch basin top.

3. All components shall be H-20 rated.

2.4 FIELD INLET BEDDING AND BACKFILL MATERIAL

A. Bedding shall be ¾" crushed stone.

B. Backfill shall be MDOT Type B.

2.5 PIPE BEDDING AND COVER MATERIAL

A. Bedding material shall be ¾" crushed stone installed to the top of the pipe.

B. Cover material shall be satisfactory excavated material.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Comply with Section 01 73 00 – Execution Requirements: Verification of existing conditions before starting work.

B. Verify trench cut base is ready to receive work and excavations, dimensions, and elevations are as indicated on the Drawings.

3.2 PREPARATION

A. Notify "Dig-Safe" (1-888-334-7233) at least 3 days prior to beginning any excavation work, in accordance with Maine State Law.

B. Contact local utility companies, before beginning work.

C. Check for conflict with underground utilities or structures. Notify the Architect/Engineer immediately or all discrepancies before proceeding with the work.

D. Fully coordinate with utility companies to insure timely work by others to avoid construction delays.

E. Hand trim excavations to required elevations. Correct over excavation with Common Borrow as specified in Section 31 20 00.

F. Remove large stones or other hard matter which could damage piping or impede consistent backfilling or compaction.

3.3 BEDDING

A. Excavate pipe trench in accordance with Section 31 20 00 for Work of this Section. Hand trim

excavation for accurate placement of pipe to elevations indicated.

B. Place bedding material at trench bottom, level materials in continuous layer not exceeding 6 inches compacted depth.

C. Maintain optimum moisture content of bedding material to attain required compaction density.

3.4 INSTALLATION - PIPE

A. Excavate in locations and to depths indicated on the drawings to install drain lines.

B. Install pipe, fittings, and accessories in accordance with ASTM D2321. Seal joints watertight.

C. Place pipe on minimum 6 inch deep bed of bedding material as specified.

D. Lay pipe to inverts noted on drawings in straight lines and constant slopes.

E. Install bedding material at sides and over top of pipe. Install top cover to minimum compacted thickness of 12 inches, compact to 95 percent.

F. The remainder of the trench shall be backfilled according to Section 31 20 00 – Fill Schedule.

G. Refer to Section 31 20 00 for backfilling and compacting requirements. Do not displace or damage pipe when compacting.

H. Connect to roof drain and foundation drain outlet from building.

I. Connect underdrain systems shown on the drawings.

J. After all site work is completed, including spreading of topsoil and seeding, clean silt, stones and debris from all structures and lines.

3.5 INSTALLATION - FIELD INLETS

A. Establish elevations and pipe inverts for inlets and outlets as indicated on Drawings.

B. Construct all field inlets to lines, grades and dimensions shown on Drawings.

C. Cut inlet or outlet pipes flush with inside wall unless otherwise indicated.

D. Set metal or polypropylene fittings, including rings and frames, in full mortar beds.

3.6 CLEANING

A. At completion of work, all sumps and pipes shall be vacuum cleaned.

3.7 FIELD QUALITY CONTROL

A. Comply with Section 01 40 00 - Quality Requirements.

B. Comply with Section 01 73 00 - Execution Requirements.

C. Request inspection prior to placing aggregate cover over pipe.

D. When tests indicate work does not meet specified requirements, remove work, replace and retest.

3.8 PROTECTION OF FINISHED WORK

A. Comply with Section 01 73 00 - Execution Requirements: Protecting finished Work.

B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

1. Take care not to damage or displace installed pipe and joints during construction of pipe supports, backfilling, testing, and other operations.

2. Repair or replace pipe that is damaged or displaced from construction operations.

END OF SECTION 33 41 00