PROJECT MANUAL AND SPECIFICATIONS

WHITTEMORE-ROBBINS ESTATE
REHABILITATION *of* THREE BUILDINGS
ARLINGTON, MASSACHUSETTS

for

TOWN OF ARLINGTON
DEPARTMENT OF HEALTH AND HUMAN SERVICES
CHRISTINE BONGIORNO, DIRECTOR

Prepared By:

Spencer, Sullivan & Vogt
ARCHITECTURE • PRESERVATION

1 Thompson Square, Suite 504 • Charlestown, MA 02129

Andrew Jerome Cannata, AIA
Architect
5 Upland Avenue | Boston, Massachusetts 02124-2132
Telephone (617) 459-6334 | AJCannata@verizon.net

Bid Documents
April 15, 2022

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PROJECT MANUAL AND SPECIFICATIONS

**Indicates Filed Sub Bid Section

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Town of Arlington, Massachusetts
INVITATION TO BID #22-29
Whittemore-Robbins Estate - Rehabilitation of Three Buildings

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Sealed Bids for the Rehabilitation of the Whittemore-Robbins Estate - Rehabilitation of Three Buildings located at 670R Massachusetts Avenue, Arlington, MA for the Town of Arlington, MA will be received at the Office of the Town Manager, Arlington Town Hall Annex 2nd Floor, 730 Massachusetts Avenue, Arlington, MA. Filed sub-bids are due no later than **10:00 A.M. on Thursday June 23, 2022. General bids** are due no later than **10:00 A.M. on Wednesday July 6, 2022** and will be publicly read aloud thereafter in the Town Hall Annex 2nd Floor.

Specifications and Proposal Forms will be available at the Office of the Town Manager at the above-mentioned address on **Tuesday, June 8, 2022** and on the Town Website www.arlingtonma.gov/purchasing.

A **bid deposit** in the form of a bid bond, certified check, or treasurer's or cashier's check, payable to the Town of Arlington, shall accompany every bid. The amount of such bid deposit shall be **five percent (5%)** of the value of the bid. No bid will be accepted unless accompanied by the required bid deposit.

The Town of Arlington requests bids for the exterior repair and restoration of this early 19th century two-story carriage house outbuilding located behind the Whittemore-Robbins House and currently used for storage purposes. The project is being funded with a grant from the Arlington Community Preservation Fund. The building is listed in the State and National Register of Historic Places and is contained within Arlington's civic block (Arlington Center Historic District). All work must be performed in accordance with the documents provided and conform to the Secretary of the Interior's Standards for the Treatment of Historic Properties. Contractors must have **DCAMM Certification in the category of Historical Building Restoration.**

The estimated construction cost is $740,000.

Sealed Filed Sub-bids:

All work must be completed by February 3, 2023..

A Pre-bid Site Visit will be held on Tuesday June 14, 2022 @ 9:00 A.M. at the Whittemore-Robbins Carriage House, 670R Massachusetts Avenue, Arlington, MA. All Prospective Bidders are encouraged to attend.

Questions from bidders will be accepted by the Town until close 4 PM on Thursday June 16, 2022. Bidder's questions and corresponding answers from the Architect or Structural Engineer will be posted on the Town's website as an Addendum.

All Bids shall be in sealed envelopes plainly marked: **BID #22-29 Whittemore-Robbins Estate - Rehabilitation of Three Buildings.**

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Attention is called to the fact that minimum wage rates and health and welfare and pension fund contributions are established for this contract and are a part of the Specifications.

Work under this Contract shall be governed by MGL Ch. 149, Sec. 44A-J.

A Performance Bond in the amount of 100% of the total dollar award is required.

A Payment Bond in the amount of 100% of the total dollar award is required.

The Conditions of Employment as set forth in Sections 26 to 27D and 27F of Chapter 149 of the General Laws, as amended, shall prevail in the execution of the work under this Contract.

Bids to receive consideration must be in the possession of the Purchasing Agent at the Office of the Town Manager, or his authorized representative, no later than the abovementioned day and hour.

Bidders shall not include Sales Taxes. The Work for this project for the Town of Arlington is sales tax exempt.

Bids shall be evaluated on the basis of price, previous experience with similar types of projects, ability to perform work in a timely manner, and references.

OSHA Construction Training Required: As of July 1, 2006, under M.G.L. – Chapter 30, Section 39s, any person, submitting a bid for, or signing a contract to work on the construction, reconstruction, alteration, remodeling or repair of any public work by the Commonwealth of Massachusetts/Town of Arlington and estimated by the awarding authority to cost more than $10,000, shall certify on the bid or contract, under penalty of perjury, that all employees to be employed at the work will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration.

For further information relative to this bid please contact Jim Feeney, Assistant Town Manager, at jfeeney@town.arlington.ma.us.

The Town Manager reserves the right to cancel any Invitation for Bids, to reject in whole or in part any and all bids, when it is deemed in the best interest of the Town of Arlington to do so.

The Town of Arlington does not discriminate on the basis of sex, race, age, physical disability, religion or national origin. The Town is an Affirmative Action/Equal Opportunity Employer. Minority/Women's Business Enterprises are encouraged. This project is subject to Title 1, Article 16 of the Town of Arlington By-Laws.

TOWN OF ARLINGTON

Adam W. Chapdelaine
Town Manager

FORM FOR GENERAL BID

Whittemore-Robbins Estate – Rehabilitation of Three Buildings
for the
Town of Arlington, Massachusetts

General Contractor Name:_____

Owner: Town of Arlington, Massachusetts
730 Massachusetts Avenue
Arlington, MA 02476
James Feeney, Assistant Town Manager
781-316-3010

Architect: Spencer, Sullivan & Vogt *and* Andrew Jerome Cannata, AIA – Architect
One Thompson Square | Suite 204
Charlestown, MA 02129
Andrew Cannata, Project Principal
617-861-4291, Ext. 33

To the Awarding Authority:

A. The undersigned Bidder hereby offers and agrees to furnish all labor and materials required in performance of the Work to complete Whittemore-Robbins Estate - Rehabilitation of Three Buildings for the Town of Arlington, Massachusetts, in accordance with the accompanying plans and specifications dated April 15, 2022 prepared by the Architect for the contract price specified below, subject to additions and deductions per the terms of the specifications.

B. This bid includes addenda numbered _____

C. The proposed contract price is:

_____

_____ dollars

($_____)

Note: *For each Alternate below indicate "nc" for "no change" in each line for which there is no dollar value inserted.*

Alternate No. 1 - Cottage Interior; Ceramic Wall Tile and Porcelain Floor Tile (Add Alternate):

Numeric: $_____

Written: _____

Alternate No. 2 – Carriage House Interior; Add Terrazzo Floor Feature (Add Alternate):

Numeric: $_____

Written: _____

Alternate No. 3 – Cottage Exterior; Add Wood Shutters (Add Alternate):

Numeric: $_____

Written: _____

Alternate No. 4 – Cottage Interior; Add Crown Molding. (Add Alternate):

Numeric: $_____

Written: _____

For each of the following Unit Prices add:

Clapboard Siding and Board Sheathing	$_____/S.F.
Cedar Shingle Siding and Board Sheathing	$_____/S.F.
Roof Sheathing	$_____/S.F.
Paver Brick Walk Over Stone Dust and Gravel	$_____/S.F

D. Bid Security: Accompanying this Proposal is a Did Surety in the form of: (Bid Bond)(Certified check)(Treasurer's check)(Cashier's check), payable to the Town of Arlington in the amount of

_____ Dollars
(Written amount, which governs)

($ _____)
(Numeric amount)

E. Examined Conditions: The undersigned Bidder hereby declares that he or she has visited the site and the conditions present and has carefully examined the Contract Documents, together with all Addenda issued, received and acknowledged below, and has familiarized himself or herself with the legal requirements (federal, state, and local laws, ordinances, rules and regulations) and other conditions which may affect the cost, progress or performance of Work, and has made independent investigations, deemed necessary by the Bidder

F. The undersigned agrees that, if he is selected as general contractor, he will within 5 days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the awarding authority, execute a contract in accordance with the terms of this bid and furnish a performance bond and also a labor and materials or payment bond, each of a surety company qualified to do business under the laws of the commonwealth and satisfactory to the awarding authority and each in the sum of the contract price, the premiums for which are to paid by the general contractor and are to be included in the contract price.

G. Furnish Labor: The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees

to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that he will comply fully with all laws and regulations applicable to awards made subject to section 44A.

H. Withdraw bids: The Bidder agrees that this Bid shall be good and may not be withdrawn for a period of 30 calendar days after the scheduled closing time for receipt of bids.

I. Non-collusion: The undersigned Bidder certifies under the penalty of perjury, that he/she, and his/hers employees and agents of the Bidder, are the only persons interested in this proposal, that this proposal is made without any connection with any other person making any bid for the same work; that no person acting for, or employed by, the Awarding Authority is directly or indirectly interested in this proposal, or in any contract which be made under it, or in expected profits to arise therefrom; and without directly or indirectly influencing or attempting to influence any other person or corporation to bid or to refrain from bidding or to influence the amount of the bid of any other person or corporation; and that this proposal is made in good faith without collusion or connection with any other person bidding for the same work; and that this proposal is made with distinct reference and relation to the plans and specifications prepared for this contract and herein mentioned. The undersigned further declares that in regard to the conditions affecting the work to be done and the labor and materials needed, this proposal is based solely on their own investigation and research and not in reliance upon any representation of any employee, officer or agent of the Awarding Authority. The undersigned further certifies under the penalties of perjury that this bid is in all respect bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the word “person” shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth under the provisions of Section twenty-nine F of chapter twenty-nine, or any other applicable debarment provision of any other chapter of the General Laws or any rule or regulation promulgated thereunder.

J. Affidavit of eligibility to perform work in the Commonwealth of Massachusetts: The undersigned certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth under the provisions of Section 29F of Chapter 29, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated hereunder.

K. Authority Rights: The Bidder understands the Awarding Authority right to reject any and all bids, if in the public interest to do so.

L. The undersigned further certifies under penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the word “person” shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the commonwealth under the provisions of section twenty-nine, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated thereunder.

Date _____

_____
(Name of General Bidder)

By _____
(Title and Name of Person Signing Bid and Title)

_____
(Business Address)

_____
(City and State)

FORM FOR FILED SUB-BID

Whittemore-Robbins Estate – Rehabilitation of Three Buildings
for the
Town of Arlington, Massachusetts

Sub-bidder Name:_____

To all General Bidders Except those Excluded:

A. The undersigned proposed to furnish all labor and materials required for completing, in accordance with the hereinafter described plans, specifications and addenda, all the work specified in Section(s) No._____of the specifications and in any plans specified in such section, prepared by Spencer, Sullivan & Vogt *and* Andrew Jerome Cannata, AIA – Architect for the Whittemore-Robbins Estate – Rehabilitation of Three Buildings for the Town of Arlington, Massachusetts, for the contract sum of

_____dollars

($_____).

Note: *For each Alternate below indicate "nc" for "no change" in each line for which there is no dollar value inserted.*

For Alternate No. 1; Add $_____Subtract_____

For Alternate No. 2; Add $_____Subtract_____

For Alternate No. 3; Add $_____Subtract_____

For Alternate No. 4; Add $_____Subtract_____

A. This sub-bid includes addenda numbered _____

B. This sub-bid

☐may be used by any general bidder except:

_____

_____

_____

☐may only be used by the following general bidders:

_____

_____

_____

[To exclude general bidders, insert "X" in one box only and fill in blank following that box. Do not answer C if no general bidders are excluded]

C. The undersigned agrees that, if he is selected as a sub-bidder, he will, within 5 days, Saturdays, Sundays and legal holidays excluded, after presentation of a subcontract by the general bidder selected as the general contractor, execute with such general bidder a subcontract in accordance with the terms of this sub-bid, and contingent upon the execution of the general contract, and, if requested so to do in the general bid by the general bidder, who shall pay the premiums therefore, or if pre-qualification is required pursuant to section 44D ¾, furnish a performance and payment bond of a surety company qualified to do business under the laws of the commonwealth and satisfactory to the awarding authority, in the full sum of the subcontract price.

D. The names of all persons, firms and corporations furnishing to the undersigned labor or labor and materials for the class or classes or part thereof of work for which the provisions of the section of the specifications for this sub-trade require a listing in this paragraph, including the undersigned if customarily furnished by persons on his own payroll and in the absence of a contrary provision in the specifications, the name of each such class of work or part thereto and the bid price for such class of work or part thereof are:

Class of Work	Sub-sub bidder Name	Amount
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

[Do not give bid price for any class or part thereof furnished by undersigned.]

E. The undersigned agrees that the above list of bids to the undersigned represents bona fide bids based on the hereinbefore described plans, specifications and addenda and that, if the undersigned is awarded the contract, they will be used for the work indicated at the amounts stated if satisfactory to the awarding authority.

F. The undersigned further agrees to be bound to the general contractor by the terms of the hereinbefore described plans, specifications, including all general conditions stated therein, and addenda, and to assume toward him all the obligations and responsibilities that he, by those documents assumes toward the owner.

G. The undersigned offers the following information as evidence of his qualifications to perform the work as bid upon according to all the requirements of the plans and specifications:

1. Have been in business under present business name_____years.
2. Ever failed to complete any work awarded?_____
3. List one or more recent buildings with names of the general contractor and architect on which you served as a sub-contractor for work of similar character as required for the above-named building.

_____
_____
_____
_____

4. Bank reference_____

H. The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that he will comply fully with all laws and regulations applicable to awards of subcontracts subject to section 44F.

The undersigned further certifies under penalties of perjury that this sub-bid is in all respect bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the commonwealth under the provisions of section twenty-nine F of chapter twenty- nine, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated thereunder.

Date _____

_____
(Name of Sub-bidder)

By_____
(Title and Name of Person Signing Bid)

_____
(Business Address)

_____
(City and State)

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CONSOLIDATED GENERAL CONDITIONS
OF THE CONTRACT FOR CONSTRUCTION

ARTICLE1

GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of the Agreement between Owner and Contractor (hereinafter the Agreement), the Consolidated General Conditions of the Contract for Construction, the Supplemental Statutory Conditions, Drawings, Specifications, including all numbered sections, Addenda issued prior to execution of the Contract, Instructions to Bidders and Proposal, other documents listed in the Agreement and within the Building Requirements, Contract Forms and Conditions of the Contract (as set out in the Project Manual for the Arlington Highland Fire Station Renovation & Central Station Envelope Repair), and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include other documents such as bidding requirements (advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or portions of addenda relating to bidding requirements).

In the event of any conflict among the Contract Documents, the Documents shall be construed according to the following priorities:

Highest Priority:	Modifications
Second Priority:	Agreement
Third Priority:	Addenda--later date to take precedence
Fourth Priority:	Supplemental Statutory Conditions
Fifth Priority:	Specifications and Drawings
Sixth Priority:	Consolidated General Conditions
Seventh Priority:	Instructions to Bidders and Proposal

Any references throughout the contract documents (or any other project documents) to "General Conditions" or "Supplementary General Conditions" are deleted and "Consolidated General Conditions and Supplemental Statutory Conditions" is substituted therefor. All bidders and sub-bidders take note that the Town has consolidated and modified former versions of the standard form AIA Document A210 General Conditions of the Contract for Construction with the Town's desired Supplementary General Conditions into one document. The Supplemental Statutory Conditions remain intact and separate, and form a part of the Contract Documents.

1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. Except as provided in Paragraph 3.18, nothing contained in the Contract Documents shall be construed to create any contractual relationship (1) between the Architect and the Contractor, (2) between the Owner or the Architect and a Subcontractor or Sub-subcontractor, (3) between the Owner and the Architect, or (4) between any persons or entities other than the Owner and the Contractor. The Contract Documents shall comply with the requirements of Mass. Gen. Laws Chapter 44, Section 31C.

1.1.3 THE WORK

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

1.1.4 THE PROJECT

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

1.1.5 THE DRAWINGS

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

1.1.6 THE SPECIFICATIONS

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

1.1.7 THE PROJECT MANUAL

The Project Manual is the volume usually assembled for the work which may include thebidding requirements, sample forms, Consolidated General Conditions of the Contract and Specifications.

1.2 EXECUTION, CORRELATION AND INTENT

1.2.1 The Contract Documents shall be signed by the Owner and Contractor as provided in the Agreement. A copy of the signed set shall be deposited with the Architect. If either the Owner or Contractor or both do not sign all the Contract Documents, the Architect shall identify such unsigned Documents upon request.

1.2.2 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents. By executing the Contract, the Contractor also certifies, under penalties of perjury, that to the best of his information, knowledge and belief he has complied with all laws of the Commonwealth of Massachusetts relating to taxes.

1.2.3 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results. All Work mentioned or indicated in the Contract Documents shall be performed by the Contractor as part of this Contract unless it is specifically indicated in the Contract Documents that such Work is to be done by others.

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

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

1.2.6 Where codes, stand ards, requirements and publications of public and private bodies are referred to in the Specifications, references shall be understood to be to the latest revisions prior to the date of receiving bids, except where otherwise indicated.

1.2.7 Where no explicit quality or standards for materials or workmanship are established for Work, such Work or materials is to be of good, workmanlike quality for the intended use and consistent with the quality of the surrounding Work and of the construction of the Project generally.

1.2.8 All manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the manufacturer's written or printed directions and instructions unless otherwise indicated in the Contract Documents.

1.2.9 The Mechanical, Electrical and Fire Protection Drawings are diagrammatic only, and are not intended to show the alignment, physical locations or configurations of such Work.

Such Work shall be installed without additional cost to the Owner to clear all obstructions, permit proper clearances for the Work of other trades, and present an orderly appearance where exposed. Prior to beginning such Work, the Contractor shall prepare coordination drawings showing the exact alignment, physical location and configuration of the Mechanical, Electrical and Fire Protection installations and demonstrating to the Contractor's satisfaction that the installations will comply with the preceding sentence.

1.2.10 Ex act locations of fixtures and outlets shall be obtained from the Architect as provided in Subparagraph 3.2.5 before the Work is roughed in; Work installed without such information from the Architect shall be relocated at the Contractor's expense.

1.2.11 Test boring or soil test information included with the Contract Documents or otherwise made available to the Contractor was obtained by the Owner for use by the Architect in the design of the Project or Work. The Owner does not hold out such information to the Contractor as an accurate or approximate indication of subsurface conditions, and no claim for extra cost or extension of time resulting from a reliance by the Contractor on such information shall be allowed except as provided in Subparagraph 4.3.6.

1.3 OWNERSHIP AND USE OF ARCHITECT'S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS

1.3.1 The Drawings, Specifications and other documents prepared by the Architect are instruments of the Architect's service through which the Work to be executed by the Contractor is described. The Contractor may retain one contract record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Architect, and unless otherwise indicated, and except as provided in the Owner/Architect Agreement for the Project, the Architect shall be deemed the author of them and will retain all common law, statutory and other reserved rights, in addition to the copyright. All copies of them, except the Contractor's record set, shall be returned or suitably accounted for to the Architect, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Architect, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner and Architect. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this license shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's copyright or other reserved rights.

Notwithstanding anything herein to the contrary, as between the Owner and Architect, their rights and obligations with respect to the Architect's instruments of service are governed by the provisions of the Owner/Architect Agreement for the Project.

1.4 CAPITALIZATION

1.4.1 Terms capitalized in these General Conditions include those which are (1) specifically defined, (2) the titles of numbered articles and identified references to Paragraphs, Subparagraphs and Clauses in a document or (3) the titles of documents published by the American Institute of Architects.

1.5 INTERPRETATION

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

ARTICLE2

OWNER

2.1 DEFINITIONS

2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. From time to time herein the Owner is referred to as the Town.

2.1.2 The Project Manager is the person or entity identified as such in writing by the Owner, at the Owner's option. The Project Manager shall act as the Owner's representative with respect to all matters pertaining to the Project. The duties, responsibilities, and obligations of the Project Manager under this Contract may be modified from time to time by the Town, so long as such modifications do not interfere materially with the Contractor's performance of the Work hereunder, and so long as the Contractor is given notice of any such modifications that affect the Contractor's performance of the Work.

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

2.2.1 The Owner upon reasonable written request shall furnish to the Contractor in writing information which is necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein at the time of execution of the Agreement.

2.2.2 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site.

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

2.2.4 I nformation or services required of the Owner hereunder shall be furnished by the Owner with reasonable promptness after receipt from the Contractor of a written request for such information or services.

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

2.2.6 The foregoing are in addition to other duties and responsibilities of the Owner enumerated herein and especially those in respect to Article 6 (Construction by Owner or by Separate Contractors), Article 9 (Payments and Completion) and Article 11 (Insurance and Bonds).

2.3 OWNER'S RIGHT TO STOP THE WORK

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

2.3.2 The Owner may order the Contractor in writing to suspend, delay, or interrupt all or any part of the Work for such period of time as it may determine to be appropriate for the convenience of the Owner; provided however, that if there is a suspension, delay or interruption ordered by the Owner for fifteen days or more or due to a failure of the Owner to act within the time specified in this Contract, the Owner shall make an adjustment in the Contract Sum for any increase in the cost of performance of this Contract, but shall not include any profit to the Contractor on such increase; and provided further, that the Owner shall not make any adjustment in the Contract Sum under this provision for any suspension, delay, interruption or failure to act to the extent that such is due to any cause for which this Contract provides for an equitable adjustment of the Contract Sum under any other contract provisions.

2.3.3 The Contractor must submit the amount of a claim under Subparagraph 2.3.2 to the Owner in writing as soon as practicable after the end of the suspension, delay, interruption or failure to act and, in any event, not later than 21 days after the end thereof. Except for costs due to a suspension order, the Owner shall not approve any costs in the claim incurred more than twenty days before the Contractor notified the Owner in writing of the act or failure to act involved in the claim.

2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

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

ARTICLE3

CONTRACTOR

3.1 DEFINITION

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

3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

3.2.1 Before starting the Work, and at frequent intervals during the progress thereof, the Contractor shall carefully study and compare the Contract Documents with each other and with any information furnished by the Owner pursuant to Subparagraph 2.2.2 and shall at once report to the Architect any error, inconsistency or omission the Contractor may discover. Any necessary change shall be ordered as provided in Article 7, subject to the requirements of Paragraph 1.2 and other provisions of the Contract Documents. If the Contractor proceeds with the Work without such notice to the Architect, having discovered such errors, inconsistencies or omissions, or if by reasonable study of the Contract Documents the Contractor could have discovered such, the Contractor shall bear all costs arising therefrom.

3.2.2 The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the Architect at once. Any necessary change shall be ordered as provided in Article 7, subject to the requirements of Paragraph 1.2 and other provisions of the Contract Documents. If the Contractor proceeds with the Work without such notice to the Architect, having discovered such errors, inconsistencies or omissions, the Contractor shall bear all costs arising therefrom.

3.2.3 The Contractor shall perform the Work in accordance with the Contract Documents and any submittals made in accordance with Paragraph 3.12.

3.2.4 The Contractor shall give the Architect timely notice of any additional Drawings, Specifications, or instructions required to define the Work in greater detail, or to permit the proper progress of the Work.

3.2.5 The Contractor shall not proceed with any Work not clearly and consistently defined in detail in the Contract Documents, but shall request additional drawings or instructions from the Architect as provided in Subparagraph 3.2.4. If the Contractor proceeds with such Work without obtaining further Drawings, Specifications or instructions, the Contractor shall correct Work incorrectly done at the Contractor's own expense.

3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract. Where the Contract Documents refer to particular construction means, methods, techniques, sequences or procedures or indicate or imply that such are to be used in the Work, such mention is intended only to indicate that the operations of the Contractor shall be such as to produce at least the quality of work implied by the operations described, but the actual determination of whether or not the described operations may be safely and suitably employed on the Work shall be the responsibility of the Contractor, who shall notify the Architect in writing of the actual means, methods, techniques, sequences or procedures which will be employed on the Work, if these differ from those mentioned in the Contract Documents. All loss, damage, liability, or cost of correcting defective work arising from the employment of any construction means, methods, techniques, sequences or procedures shall be borne by the Contractor, notwithstanding that such construction means, methods, techniques, sequences or procedures are referred to, indicated or implied by the Contract Documents, unless the Contractor has given timely notice to the Owner and Architect in writing that such means, methods, techniques, sequences or procedures are not safe or suitable, and the Owner has then instructed the Contractor in writing to proceed at the Owner's risk.

3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons performing portions of the Work under a contract with the Contractor.

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

3.3.4 The Contractor shall be responsible for inspection of portions of Work already performed under this Contract to determine that such portions are in proper condition to receive subsequent Work.

3.4 LABOR AND MATERIALS

3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. The word "provide" shall mean furnish and install completely, including connections, unless otherwise specified.

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

3.5 WARRANTY

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

3.5.2 The Contractor shall be responsible for determining that all materials furnished for the Work meet all requirements of the Contract Documents. The Architect may require the Contractor to produce reasonable evidence that a material meets such requirements, such as certified reports of past tests by qualified testing laboratories, reports of studies by qualified experts, or other evidence which, in the opinion of the Architect, would lead to a reasonable certainty that any material used, or proposed to be used in the Work, meets the requirements of the Contract Documents. All such data shall be furnished at the Contractor's expense. This provision shall not require the Contractor to pay for periodic testing of different batches of the same material, unless such testing is specifically required by the Contract Documents to be performed at the Contractor's expense.

3.5.3 If the Contractor proposes to use a material which, while suitable for the intended use, deviates in any way from the detailed requirements of the Contract Documents, the Contractor shall inform the Architect in writing of the nature of such deviations at the time the material is submitted for approval, and shall request written approval of the deviation from the requirements of the Contract Documents, in accordance with the procedures set forth in Mass. Gen. Laws Chapter 30, Section 39I.

3.5.4 In requesting approval of deviations or substitutions, the Contractor shall provide, upon request, evidence leading to a reasonable certainty that the proposed substitution or

deviation meets or exceeds the requirements set forth in Mass. Gen. Laws Chapter 30, Section 39M(b). If, in the opinion of the Architect, the evidence presented by the Contractor does not provide a sufficient basis for such reasonable certainty, the Architect may reject such substitution or deviation.

3.5.5 The Contract Documents are intended to produce a building of consistent character and quality of design. All components of the building including visible items of mechanical and electrical equipment have been selected to have a coordinated design in relation to the overall appearance of the building. The Architect shall judge the design and appearance of proposed substitutes on the basis of their suitability in relation to the overall design of the Project, as well as for their intrinsic merits. The Architect will not approve as equal to materials specified proposed substitutes which, in the Architect's opinion, would be out of character, obtrusive, or otherwise inconsistent with the character or quality of design of the Project. In order to permit coordinated design of color and finishes the Contractor shall, if required by the Architect, furnish the substituted material in any color, finish, texture, or pattern which would have been available from the manufacturer originally specified, at no additional cost to the Owner.

3.5.6 Any additional cost, or any loss or damage arising from the substitution of any material or any method for those originally specified shall be borne by the Contractor, notwithstanding approval or acceptance of such substitution by the Owner or the Architect, unless such substitution was made at the written request or direction of the Owner or the Architect.

3.5.7 The warranty provided in this paragraph 3.5 shall be in addition to and not in limitation of any other warranty required by the Contract Documents or otherwise prescribed by law.

3.5.8 The Contractor shall procure and deliver to the Architect, no later than the date claimed by the Contractor as the date of Substantial Completion, all special warranties required by the Contract Documents. Delivery by the Contractor shall constitute the Contractor's guarantee to the Owner that the warranties shall be performed in accordance with their terms and conditions.

3.6 TAXES

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

3.7 PERMITS, FEES AND NOTICES

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

negotiations concluded. Notwithstanding the foregoing, the Town hereby waives the fee for the Town's building permit for the Project.

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

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

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

3.8 ALLOWANCES

3.8.1-3.8.2 OMITTED.

3.9 SUPERINTENDENCE

3.9.1 The Contractor shall employ a competent superintendent, acceptable to the Owner, and necessary assistants who shall be in attendance at the Project site full time during the progress of the Work until the date of Substantial Completion, and for such additional time thereafter as the Architect may determine to be necessary for the expeditious completion of the Work. The superintendent shall be licensed to act as superintendent in accordance with all applicable laws for projects of this type. The Contractor shall remove the superintendent if requested to do so in writing by the Owner, and shall promptly replace him with a competent person reasonably acceptable to the Owner. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

3.9.2 The Contractor shall retain a competent Registered Professional Engineer or Registered Land Surveyor, acceptable to the Architect, who shall establish the exterior lines and required elevations of all buildings and structures to be erected on the site and shall establish sufficient lines and grades for the construction of associated Work such as, but not limited to, roads, utilities and site grading. The Engineer or Land Surveyor shall certify as to the actual location of the constructed facilities in relation to property lines, building lines, easements, and other restrictive boundaries.

3.9.3 The Contractor shall establish the building grades, lines, levels, column, wall and partition lines required by the various Subcontractors in laying out their Work.

3.9.4 The Contractor shall coordinate and supervise the Work performed by Subcontractors to the end that the Work is carried out without conflict between trades and so that

no trade, at any time, causes delay to the general progress of the Work. If such delays occur, the Owner may deduct anticipated liquidated damages from the Progress Payments to the Contractor. The Contractor and all Subcontractors shall at all times afford each trade, any separate contractor, or the Owner, every reasonable opportunity for the installation of Work and the storage of materials.

3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

3.10.1 The Contractor shall prepare and submit to the Architect a progress schedule, and shall comply with such schedule, as described in Subparagraphs 8.2.4 through 8.2.8.

3.11 DOCUMENTS AND SAMPLES AT THE SITE

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

3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

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

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

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

3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required the way the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Review by the Architect is subject to the limitations of this Paragraph 3.12 and Paragraph 4.2.

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

3.12.6 The Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been reviewed by the Architect. Such Work shall be in accordance with reviewed and approved submittals.

3.12.7 By approving and submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor thereby represents that the Contractor has determined and verified all dimensions, quantities, field dimensions, relations to existing work, coordination with work to be installed later, coordination with information on previously accepted Shop Drawings, Product Data, Samples, or similar submittals and verification of compliance with all the requirements of the Contract Documents. The accuracy of all such information is the responsibility of the Contractor. In reviewing Shop Drawings, Product Data, Samples, and similar submittals the Architect shall be entitled to rely upon the Contractor's representation that such information is correct and accurate.

3.12.8 The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's review of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and the Architect has given written approval to the specific deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's review thereof.

3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. Unless such notice has been given, the Architect's review of a resubmitted Shop Drawing, Product Date, Sample, or similar submittal shall not constitute acceptance of any changes not requested on the prior submittal.

3.12.10 Informational submittals upon which the Architect is not expected to take responsible action may be so identified in the Contract Documents.

3.12.11 When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the Owner shall be entitled to rely upon such certifications, and neither the Owner nor the Architect shall be expected to make any independent examination with respect thereto.

3.12.12 The Architect will not check dimensions or quantities on any Shop Drawings and will not assume any responsibility for any errors in dimensions or quantities on Shop Drawings.

3.13 USE OF SITE

3.13.1 The right of possession of the premises and the improvements made thereon by the Contractor shall remain at all times in the Owner. The Contractor's right to entry and use thereof arises solely from the permission granted by the Owner under the Contract Documents. The Contractor shall confine the Contractor's apparatus, the storage of materials and the

operations of the Contractor's workers to limits indicated by law, ordinances, the Contract Documents and permits and/or directions of the Architect, and shall not unreasonably encumber the premises with the Contractor's materials. The Owner shall not be liable to the Contractor, the Subcontractors, their employees or anyone else with respect to the conditions of the premises, except only for a condition caused directly and solely by the negligence of the Owner.

3.14 CUTTING AND PATCHING

3.14.1 The Contractor and its Subcontractors shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly, all to be performed in accordance with the requirements of the Contract Documents.

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

3.15 CLEANING UP

3.15.1 The Contractor daily shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials. Immediately prior to the Architect's inspection for Substantial Completion, the Contractor shall completely clean the premises. Concrete and ceramic surfaces shall be cleaned and washed. Resilient coverings shall be cleaned, waxed and buffed. Woodwork shall be dusted and cleaned. Sash, fixtures and equipment shall be thoroughly cleaned. Stains, spots, dust, marks and smears shall be removed from all surfaces. Hardware and all metal surfaces shall be cleaned and polished. Glass and plastic surfaces shall be thoroughly cleaned by professional window cleaners. All damaged, broken or scratched glass or plastic shall be replaced by the Contractor at the Contractor's expense.

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

3.15.3 The provisions of paragraphs 3.15.1 and 3.15.2 shall apply equally to all subcontractors at the project insofar as each subcontractor's work is concerned.

3.16 ACCESS TO WORK

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

3.17 ROYALTIES AND PATENTS

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

3.18 INDEMNIFICATION

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

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

3.18.3 The obligations of the Contractor under this Paragraph 3.18 shall not extend to the liability of the Architect, the Architect's consultants, and agents and employees of any of them arising out of (1) the preparation of maps, Drawings, opinions, reports, surveys, Change Orders, designs or Specifications, or (2) directions or instructions given by the Architect, the Architect's consultants, and agents or employees of any of them.

3.19 COVENANT NOT TO SUE

3.19.1 In consideration of the Contractor's undertaking to indemnify and hold harmless the Architect, the Architect's consultants and agents or employees of any of them, in accordance with Paragraph 3.18, agree that the Architect will not bring any civil suit, action or other proceeding in law, equity or arbitration against the Contractor, or the officers, employees, agents and servants of the Contractor, for or on account of any action which the Architect may have arising out of or in any manner connected with the Work, except to enforce the provisions of

Paragraph 3.18 and this Paragraph 3.19; and the Contractor, or any successor, assign or subrogee of the Contractor, agrees not to bring any civil suit, action or other proceeding in law, equity or arbitration against the Architect, or the officers, employees, agents and servants of the Architect, for the enforcement of any action which the Contractor may have arising out of or in any manner connected with the Work.

3.20 RECORD KEEPING REQUIREMENTS

3.20.1 The Contractor shall comply with all applicable requirements of Mass. Gen. Laws Chapter 30, Section 39R.

ARTICLE4

ADMINISTRATION OF THE CONTRACT

4.1 ARCHITECT

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

4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld. To the extent inconsistent herewith, the rights and responsibilities of the Architect shall be governed by the Owner/Architect Agreement for the Project.

4.1.3 In case of termination of employment of the Architect, the Owner shall appoint an architect whose status under the Contract Documents shall be that of the former architect.

4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents. The Architect will advise and consult with the Owner. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified by written instrument in accordance with other provisions of the Contract.

4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction to become generally familiar with the progress and quality of the completed Work and to determine in general if the Work is being performed in a manner indicating that the Work, when completed, will be in accordance with the Contract Documents. The Architect will visit the site at least once per week during periods of active construction. The Architect will not be required to make exhaustive or continuous on-site inspections to check quality or quantity of the Work. On the basis of on-site observations as an architect, the Architect will keep the Owner informed

of progress of the Work, and will endeavor to guard the Owner against defects and deficiencies in the Work.

4.2.3 The Architect will not have control over or charge of and will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility as provided in Paragraph 3.3. The Architect will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Architect will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons performing portions of the Work.

4.2.4 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate through the Project Manager. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers generally shall be through the Contractor, although the Owner and Project Manager may have direct communications with subcontractors and suppliers intended to facilitate or expedite construction. Communications by and with separate contractors shall be through the Owner.

As to any written communications between two of the three of the Owner, Architect, and Contractor, a concurrent copy shall be sent to the third.

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

4.2.6 In accordance with generally accepted standards of professional practice the Architect will review, approve, and take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, for the purpose of checking for conformance with the Contract Documents. The Architect's action will be taken with reasonable promptness, while allowing sufficient time in the Architect's professional judgment to permit adequate review, and in any event shall take no longer than the time permitted by law. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of obligations set forth in Paragraphs 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods,

techniques, sequences or procedures. The Architect's action with respect to any specific item shall not indicate approval of an assembly of which the item is a component.

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

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

4.2.9 If the Owner and Architect agree in writing, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall beas set forth in an exhibit to be incorporated in the Contract Documents. If no such exhibit has been so incorporated, the duties, responsibilities, and limitations of authority of such project representatives shall be as set forth in the edition of AIA Document B352 current as of the date of the Agreement.

4.2.10 The Architect will interpret and decide matters concerning performance under and requirements of the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made with reasonable promptness and within any time limits agreed upon. The Architect may, as the Architect judges desirable, issue additional drawings or instructions indicating in greater detail the construction or design of the various parts of the Work; such drawings or instructions may be effected by field order or other notice to the Contractor, and provided such drawings or instructions are reasonably consistent with the previously existing Contract Documents, the Work shall be executed in accordance with such additional drawings or instructions without additional cost or extension of the Contract Time. If the Contractor claims additional cost or time on account of such additional drawings or instructions, the Contractor shall give the notice provided in Subparagraph 4.3.7.

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

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

4.3 CLAIMS AND DISPUTES

4.3.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The term "Claim" includes Change

Order requests by the Contractor as well as other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be made by written notice. The responsibility to substantiate Claims shall rest with the party making the Claim.

4.3.2 Decision of Architect. Claims arising prior to final payment or the earlier termination of the Contract shall be referred initially to the Architect for action as provided in Paragraph 4.4. Action by the Architect, as provided in Paragraph 4.4, shall be required as a condition precedent to arbitration of a Claim between the Contractor and Owner as to all such matters arising prior to the date final payment is due. Action by the Architect in response to a Claim shall not be a condition precedent to arbitration in the event (1) the position of Architect is vacant; (2) the Architect has failed to take action as required under Subparagraph 4.4.1 within 15 days after the Claim is made; (3) the Architect has failed to take action required under Subparagraph 4.4.4 within 30 days after the Claim is made, unless the Architect has notified the parties in writing of the reasons why action could not be taken within 30 days, and of the date by which action will be taken; or (4) the Claim relates to a mechanic's lien.

4.3.3 Time Limits on Claim. Claims by either party must be made within 35 days after occurrence of the event giving rise to such Claim or within 35 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be made by written notice. Any change or addition to a previously made Claim shall be made by timely written notice in accordance with this Subparagraph 4.3.3.

4.3.4 Continuing Contract Performance. Pending final resolution of a Claim including arbitration, unless otherwise agreed in writing the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

4.3.5 Waiver of Claims: Final Payment. The making of final payment shall constitute a waiver of Claims by the Owner except those arising from:

.1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;

.2 failure of the Work to comply with the requirements of the Contract Documents; or

.3 terms of special warranties required by the Contract Documents.

Any Claim which has not been waived in accordance with this Subparagraph shall be deemed to have accrued upon discovery by the Owner of the condition or breach upon which such Claim is based, for the purpose of any applicable statute of limitation.

4.3.6 Claims for Differing Subsurface or Latent Physical Conditions. If, during the progress of the Work, the Contractor or the Owner discovers that the actual subsurface or latent physical conditions encountered at the site differ substantially or materially from those shown on the plans or indicated in the Contract Documents, either the Contractor or the Owner may request

an equitable adjustment in the Contract Sum applying to Work affected by the differing site conditions. A request for such an adjustment shall be in writing and shall be delivered by the party making such claim to the other party as soon as possible after such conditions are discovered. Upon receipt of such a claim from a Contractor, or upon its own initiative, the Owner shall make an investigation of such physical conditions, and, if they differ substantially or materially from those shown on the plans or indicated in the Contract Documents or from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the plans and Contract Documents and are of such a nature as to cause an increase or decrease in the cost of performance of the Work or a change in the construction methods required for the performance of the Work which results in an increase or decrease in the cost of the Work, the Owner shall make an equitable adjustment in the Contract Sum and the Contract shall be modified in writing accordingly.

4.3.6.1 Should conditions encountered below the surface of the ground require that footings, foundations or other parts of the building or other structure be raised, lowered or changed, or if additional depth of excavation below the levels shown on the Drawings is required in order to provide proper bearing for the building or other structure or for any permanent utilities on the site or for permanent grading or other permanent site work, any change in the amount of excavation, dewatering, sheeting, protection, rock excavation, backfill, concrete or other structural work, or any other work permanently incorporated in the building shall be considered a change in the Work, and the Contract Sum shall be adjusted as provided in this Article, provided that the Work has been ordered in writing as provided in 7.1.1.

4.3.7 Claims for Additional Cost or Time. If the Contractor claims that any acts or omissions of the Owner or the Architect, including any instructions or orders, whether oral, written, by Drawings, or otherwise, involve extra cost or time, and the Contractor has not received a written acknowledgment by the Owner or Architect that extra payment will be made or time extended on account thereof, the Contractor shall promptly so notify the Architect in writing of such Claim and shall not proceed with the Work relating to such Claim until the Contractor has received a further written order to proceed except, as provided in Paragraph 10.3, in the case of an emergency affecting life or property. No Claim by the Contractor on account of such acts, omissions, instructions or orders shall be valid unless the Contractor has so notified the Architect before proceeding, and has received the further written order to proceed.

4.3.7.1 OMITTED

4.3.7.2 The Contractor shall have the burden of demonstrating the effect of the claimed act or omission on the Contract Sum or Contract Time, and shall furnish the Architect with such documentation relating thereto as the Architect may reasonably require. In the case of a continuing act or omission only one Claim is necessary.

4.3.7.3 Adverse weather conditions shall not be the basis for a Claim for additional time or cost.

4.3.8 Injury or Damage to Person or Property. If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, of any of

the other party's employees or agents, or of others for whose acts such party is legally liable, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after first observance. The notice shall provide sufficient detail to enable the other party to investigate the matter. If a Claim for additional cost or time related to this Claim is to be asserted, it shall be filed as provided in Subparagraph 4.3.7.

4.4 REVIEW OF CLAIMS BY ARCHITECT

4.4.1 The Architect shall take one or more of the following actions within ten days of receipt of a Claim: (1) defer any action with respect to all or any part of a Claim and request additional information from either party; (2) decline to render a decision for any reason which he deems appropriate (including but not limited to the fact that the Claim involves allegations of fault on the part of the Architect); (3) render a decision on all or a part of the Claim, or (4) submit a schedule to the parties indicating when the Architect expects to take action. The Architect shall notify the parties in writing of any action taken with respect to such Claim. If the Architect renders a decision or declines to render a decision, either party may proceed in accordance with Paragraph 4.5. If the Architect decides that the Work relating to such Claim should proceed regardless of his disposition of such Claim, the Architect shall issue to the Contractor a written order to proceed. The Contractor shall proceed as instructed, and all rights of both parties with respect to such Claim shall be deemed to have been reserved.

4.4.2 If a Claim is resolved by agreement of the parties, the Architect will prepare or obtain appropriate documentation indicating the parties' agreement to the resolution. In the absence thereof the Claim shall be treated as not resolved.

4.4.3 If a Claim has not been resolved, the party making the Claim shall, within ten days after the Architect's request, take one or more of the following actions: (1) submit additional supporting data requested by the Architect; (2) modify the initial Claim; (3) respond to the Architect's action under paragraph 4.4.1; or (4) notify the Architect that the initial Claim stands. Upon receipt of the response or supporting data, the Architect will either reject or approve the claim in whole or in part.

4.5 ARBITRATION

4.5.1 Controversies and Claims Subject to Arbitration. Any Claim arising out of or related to the Contract, or the breach thereof, except claims relating to aesthetic effect, shall be settled by arbitration, subject to the foregoing provisions of paragraph 4.4 and the provisions of Subparagraph 4.5.7. Arbitration will be conducted in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association and judgment upon the award rendered by the Arbitrator or Arbitrators may be entered in any Court having jurisdiction thereof. In any such arbitration in which the amount stated in the demand is $100,000 or less, a single arbitrator shall be appointed in accordance with the procedures set forth in the American Arbitration Association Construction Industry Arbitration Rules. In any such arbitration in which the amount stated in the demand is in excess of $100,000, a panel of three arbitrators shall be appointed in accordance with the procedures set forth in the American Arbitration Association Construction Industry Arbitration Rules.

4.5.2 Rules For Arbitration. The parties may agree to any arbitration forum. If unable to agree, by default the forum shall be the American Arbitration Association. If the neutral arbitrator(s) is/are appointed by the American Arbitration Association, the said Association shall administer the arbitration and its Construction Industry Arbitration Rules shall govern all aspects of the proceeding including the enforcement of any award. If the neutral arbitrator(s) is/are not appointed by the American Arbitration Association, then the arbitrator(s) shall act as the administrator of the arbitration but the Construction Industry Arbitration Rules of the Association shall nonetheless govern all aspects of the proceeding, including the enforcement of any award. The arbitration panel shall have all of the powers and duties conferred on the Association pursuant to said rules.

In addition, the following rules shall govern the selection of arbitrators and the proceedings:

4.5.2.1 Neither party may appoint as arbitrator an employee or an owner of that party, nor the parent, spouse or child of an employee or owner of that party.

4.5.2.2 After the neutral arbitrator has been appointed, neither party may engage in ex parte communication with the arbitrator appointed by that party.

4.5.3 Contract Performance During Arbitration. During arbitration proceedings, the Owner and Contractor shall comply with Subparagraph 4.3.4.

4.5.4 When a written decision of the Architect states that the decision is final, any demand for arbitration of the matter covered by such decision must be made within two months after substantial completion of the project, as determined by the Architect in accordance with paragraph 9.8.2 hereof. The failure to demand arbitration within said two month period will result in the Architect's decision becoming final and binding upon the Owner and the Contractor.

4.5.4.1 A demand for arbitration shall be made within the time limits specified in Subparagraph 4.5.4, and in no event shall be made after the date when the institution of legal or equitable proceedings based on such Claim would be barred by the applicable statute of limitations.

4.5.5 Claims and Timely Assertion of Claims. A party who files a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded. When a party fails to include a Claim through oversight, inadvertence or excusable neglect, or when a Claim has matured or been acquired subsequently, the arbitrator or arbitrators may permit amendment.

4.5.6 Judgment on Final Award. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

4.5.7 Notwithstanding any provision contained in this Paragraph 4.5 or elsewhere in the Contract Documents, the Owner reserves the following rights in connection with Claims and disputes between the Owner and the Contractor:

.1 the right to institute legal action against the Contractor in any court of competent jurisdiction in lieu of demanding arbitration pursuant to this Paragraph 4.5, in which case the dispute or disputes which are the subject of such action shall be decided by such court, and not by arbitration;

.2 the right to obtain f rom any court of competent jurisdiction a stay of any arbitration instituted by the Contractor, provided that the application for such stay is made before the appointment of the neutral arbitrator in such arbitration, in which case the dispute or disputes which are the subj ect of such arbitration shall be decided by such court, and not by arbitration;

.3 the right to require the Contractor to join as a party in any arbitration between the Owner and the Architect relating to the Project, in which case the Contractor agrees to be bound by the decision of the arbitrator or arbitrators in such arbitration.

In case the Owner elects to proceed in accordance with 4.5.7.1 or 4.5.7.2 above, the word "litigation" shall be deemed to replace the word "arbitration" wherever the latter word appears in the Contract Documents.

ARTICLE5

SUBCONTRACTORS

5.1 DEFINITIONS

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

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

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

5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the

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

5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection, unless otherwise required by law to do so.

5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. The Contract Sum shall be increased or decreased by the difference in cost occasioned by such change and an appropriate Change Order shall be issued. However, no increase in the Contract Sum shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

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

5.2.5 The form of each filed Subcontract shall be submitted to the Owner for its acceptance, which shall not be unreasonably withheld or delayed. The form of subcontract shall be that set forth in Mass. Gen. Laws Chapter 149, Section 44F. Each Subcontract shall expressly provide for the contingent assignment referred to in Paragraph 5.4.

5.3 SUBCONTRACTUAL RELATIONS

5.3.1 By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Documents, assumes toward the Owner and Architect, including without limitation the obligations set forth in Paragraph 3.18. Each Subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that Subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the Subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the Subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed Subcontract agreement which may be at

variance with the Contract Documents. Subcontractors shall similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

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

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Paragraph 14.2 and only for those Subcontract agreements which the Owner accepts by notifying the Subcontractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

ARTICLE6

CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTS

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

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

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

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

6.2 MUTUAL RESPONSIBILITY

6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

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

6.2.3 Costs caused by delays or by improperly timed activities or defective construction shall be borne by the party responsible therefor.

6.2.4 The Contractor shall promptly remedy damage wrongfully caused by the Contractor to completed or partially completed construction or to property of the Owner or separate contractors as provided in Subparagraph 10.2.5. If such separate contractor sues or initiates an arbitration proceeding against the Owner on account of 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, and if any judgment or award against the Owner arises therefrom the Contractor shall pay or satisfy it and shall reimburse the Owner for all attorneys' fees and court or arbitration costs which the Owner has incurred.

6.2.5 Claims and other disputes and matters in question between the Contractor and a separate contractor shall be subject to the provisions of Paragraph 4.3 provided the separate contractor has reciprocal obligations.

6.2.6 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Paragraph 3.14.

6.3 OWNER'S RIGHT TO CLEAN UP

6.3.1 If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described in Paragraph 3.15, the Owner may clean up and allocate the cost among those responsible as the Architect determines to be just.

ARTICLE7

CHANGES IN THE WORK

7.1 CHANGES

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

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

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

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

7.2 CHANGE ORDERS

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

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

7.3 CONSTRUCTION CHANGE DIRECTIVES

7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

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

7.3.3 Upon request of the Owner or the Architect, the Contractor shall without cost to the Owner submit to the Architect, in such form as the Architect may require, an accurate written estimate of the cost of any proposed extra Work or change contemplated by a Construction Change Directive. The estimate shall indicate the quantity and unit cost of each item of materials, and the number of hours of work and hourly rate for each class of labor, as well as the description and amounts of all other costs chargeable under the terms of this Article. Unit labor costs for the installation of each item of materials shall be shown if required by the Architect. The Contractor shall promptly revise and resubmit such estimate if the Architect determines that it is not in compliance with the requirements of this Article, or that it contains errors of fact or mathematical errors. If required by the Architect, in order to establish the exact cost of new Work added or of previously required Work omitted, the Contractor shall obtain and furnish to the Architect bona fide proposals from recognized suppliers for furnishing any material included in such Work. Such estimates shall be furnished promptly so as to occasion no delay in the Work, and shall be furnished at the Contractor's expense. The Contractor shall state in the estimate any extension of time required for the completion of the Work if the change or extra work is ordered.

7.3.3.1 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods, as selected by the Owner:

(a) By unit prices stated in the Contract Documents or otherwise mutually agreed upon.

(b) By Cost and Percentages (as defined below) estimated by the Contractor as provided in Subparagraph 7.3.3 and accepted by the Owner; the Contractor's estimate shall become a fixed price which shall not be changed by any variation in the actual cost of executing the Work covered by the change.

(c) By actual Cost determined after the Work covered by the change is completed, plus Percentage.

(d) By use of the dispute resolution procedures set forth in Paragraph 4.3.

As used in this Paragraph 7.3, "Cost" shall mean the estimated or actual net increase or decrease in cost to the Contractor, Subcontractor, or Sub-subcontractor for performing the Work covered by the change, including actual payments for materials, equipment, rentals, expendable items, wages and associated benefits to workmen and to supervisors employed full time at the site, insurance, bonds and other provable direct costs, but not including any administrative, accounting or expediting costs, or other indirect or overhead costs, or any wages or benefits of supervisory personnel not assigned full time to the site, or any amount for profit or fee to the Contractor, Subcontractor or Sub-subcontractor.

"Percentage" shall mean an allowance to be added to or subtracted from the Cost in lieu of overhead and profit and of any other expense which is not included in the Cost of the Work

covered by the change, as defined above. Percentage for a Sub-subcontractor shall be 10% of any net increase or decrease of Cost of any Work performed by the Sub-subcontractor's own forces plus 5% of any aggregate net increase in Cost of any Work performed for the Sub-subcontractor by other contractors. Percentage for a Subcontractor shall be such percentage allowances for overhead and profit as are set forth in the Subcontract between such Subcontractor and the Contractor. Percentage for the Contractor shall be 9 1/2% of any net increase or decrease of Cost of any Work performed by the Contractor's own forces plus 4 1/2% of any net increase or decrease in the Cost for all other Work covered by the change.

When in the reasonable judgment of the Architect a series of Construction Change Directives or Change Orders effect a single change, Percentage shall be calculated on the cumulative net increase or decrease in Cost, if any.

7.3.3.2 If the Owner elects to determine the cost of the Work as provided in method (a) of sub-Subparagraph 7.3.3.1, the unit prices shall be subject to Subparagraph 7.1.4. Notwithstanding the inclusion of unit prices in the Contract Documents, it shall be the Owner's option to require the Cost of any given change to be determined by one of the other methods stated in 7.3.3.1. If the Owner elects to determine the Cost of the change by unit prices and the nature of the work is such that its extent cannot readily be measured after the completion of such work or any subsequent work, the Contractor shall keep daily records, available at all times to the Architect for inspection, of the actual quantities of such work put in place, and delivery receipts or other adequate evidence, acceptable to the Architect, indicating the quantities of materials delivered to the site for use in such unit price work, and distinguishing such other similar material delivered for use in work included in the base Contract Sum. If so required by the Architect, materials for use in unit price work shall be stored apart from all other materials on the Project.

7.3.3.3 If the Owner elects to determine the cost of the Work as provided in methods (c) or (d) of sub-Subparagraph 7.3.3.1 or if the method of determining the cost has not been established before the Work is begun, the Contractor shall keep detailed daily records of labor and materials costs applicable to the Work.

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

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

7.3.6 If the Owner and Contractor do not agree with the adjustment in Contract Sum or Contract Time or the method for determining the adjustment, the dispute shall be governed by the procedures set forth in Paragraph 4.3.

7.4 MINOR CHANGES IN THE WORK

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

ARTICLE8

TIME

8.1 DEFINITIONS

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

8.1.2 The date of commencement of the Work is the date established in the Agreement. The date shall not be postponed by the failure to act of the Contractor or of persons or entities for whom the Contractor is responsible.

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

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

8.2 PROGRESS AND COMPLETION

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

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

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

8.2.4 Within two weeks after award of the Contract, the Contractor shall submit to the Architect a Progress Schedule showing for each class of work the percentage completion to be obtained and the total dollar value of work to be completed as of the first of each month until Substantial Completion.

8.2.5 The Progress Schedule shall be based on an orderly progression of the Work, allowing adequate time for each operation (including adequate time for submission and review of submittals), and leading to a reasonable certainty of Substantial Completion by the date established in the Agreement. The Progress Schedule will be reviewed by the Architect for compliance with the requirements of this Article and will be accepted by the Architect or returned to the Contractor for revision and resubmittal. Unless specifically required by law, no payment under this Contract shall be due until the Progress Schedule has been approved by the Architect.

8.2.6 If in any application for payment as provided for in Paragraph 9.2, the total value of the completed Work in place, as certified by the Architect, is less than 90% of the total value of the Work in place estimated in the Progress Schedule, the Owner may, at the Owner's option, require the Contractor to accelerate the progress of the Work without cost to the Owner by increasing the work force or hours of work, or by other reasonable means approved by the Architect.

8.2.7 If each of three successive applications for payment indicate that the actual Work completed, as certified by the Architect, is less than 90% of the values estimated in the Progress Schedule to be completed by the respective dates, the Owner may at the Owner's option, treat the Contractor's delinquency as a default justifying the action permitted under Paragraph 14.2.

8.2.8 If the Architect has determined that the Contractor should be permitted to extend the time for completion as provided in Paragraph 8.3, the calendar dates in the Progress Schedule shall be adjusted accordingly to retain their same relationship to the adjusted date of Substantial Completion, and the dollar value of Work to be completed as of the first of each month shall be adjusted pro rata.

8.2.9 If the Contractor fails to submit any application for payment in any month, the Architect shall, for the purpose of this evaluation of progress, certify separately to the actual value of the Work in place completed as of the first of the month and to the best of the Architect's knowledge.

8.2.10 Nothing herein shall limit the Owner's right to liquidated or other damages for delays by the Contractor or to any other remedy which the Owner may possess under other provisions of the Contract Documents or by law.

8.2.11 The Progress Schedule required hereunder shall be a CPM Schedule in accordance with the Project Specifications and shall be updated in accordance therewith.

8.3 DELAYS AND EXTENSION OF TIME

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

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

8.3.3 The Contractor hereby agrees that the Contractor shall have no claim for damages of any kind against the Owner or the Architect on account of any delay in the commencement of the Work and/or any delay or suspension of any portion of the Work, whether such delay is caused by the Owner, the Architect, or otherwise, except as specifically provided in Subparagraphs 2.3.2 and 2.3.3. The Contractor acknowledges that, except as provided therein, the Contractor's sole remedy for any such delay and/or suspension will be an extension of time as provided in this Article.

8.3.4 No claim for delay shall be allowed on account of failure of the Architect to furnish Drawings, Specifications or instructions or to return Shop Drawings or Samples until the expiration of the applicable time period referred to in Mass. Gen. Laws Chapter 30, Section 39P, and not then unless such claim be reasonable.

8.3.5 No extension of time shall be granted because of seasonal or abnormal variations in temperature, humidity or precipitation, which conditions shall be wholly at the risk of the Contractor, whether occurring within the time originally scheduled for completion or within the period of any extension granted. There shall be no increase in the Contract Sum on account of any additional costs of operations or conditions resulting therefrom.

ARTICLE9

PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the maximum amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents, or in equity, should the Contractor assert a quantum meruit claim for the fair value of Contractor's Work, regardless of whether the Contractor is terminated hereunder.

9.2 APPLICATIONS FOR PAYMENT

9.2.1 Within fifteen days after receipt from the Contractor, at the place designated by the Owner if such a place is so designated, of a periodic estimate requesting payment of the amount due for the preceding month, the Owner will make a periodic payment to the Contractor for the Work performed during the preceding month and for the materials not incorporated in the Work but delivered and suitably stored at the site (or at some location agreed upon in writing) to which the Contractor has title or to which a Subcontractor has title and has authorized the Contractor to transfer title to the Owner, less (1) retention based on the Owner's estimate of the fair value of its claims against the Contractor and less (2) a retention for direct payments to Subcontractors based on demands for same in accordance with the provisions of Subparagraph 9.6.2, and less (3) a retention not exceeding five percent of the approved amount of the periodic payment.

9.2.2 After the receipt of a periodic estimate requesting final payment and within sixty-five days after (a) the Contractor fully completes the Work or substantially completes the Work so that the value of the Work remaining to be done is, in the estimate of the Owner, less than one percent of the original Contract Sum, or (b) the Contractor substantially completes the work and the Owner takes possession for occupancy, whichever occurs first, the Owner shall pay the Contractor the entire balance due on the Contract less (1) a retention based on its estimate of the fair value of its claims against the Contractor and the cost of completing the incomplete and unsatisfactory items of Work and less (2) a retention for direct payments to Subcontractors based on demands for same in accordance with the provisions of Subparagraph 9.6.2, or based on the record of payments by the Contractor to the Subcontractors under this Contract if such record of payment indicates that the Contractor has not paid Subcontractors as provided in Subparagraph 9.6.2. If the Owner fails to make payment as herein provided, there shall be added to each such payment daily interest at the rediscount rate then charged by the Federal Reserve Bank of Boston commencing on the first day after said payment is due and continuing until the payment is delivered or mailed to the Contractor; provided, that no interest shall be due, in any event, on the amount due on a periodic estimate for final payment until fifteen days after receipt of such a periodic estimate from the Contractor, at the place designated by the Owner if such a place is so designated. The Contractor agrees to pay to each Subcontractor a portion of any such interest paid in accordance with the amount due each Subcontractor.

9.2.3 The Owner may make changes in any periodic estimate submitted by the Contractor, and the payment due on said periodic estimate shall be computed in accordance with the changes so made, but such changes or any requirement for a corrected periodic estimate shall not affect the due date for the periodic payment or the date for the commencement of interest charges on the amount of the periodic payment computed in accordance with the changes made, as provided herein; provided, that the Owner may, within seven days after receipt, return to the Contractor for correction, any periodic estimate which is not in the required form or which contains computations not arithmetically correct and, in that event, the date of receipt of such periodic estimate shall be the date of receipt of the corrected periodic estimate in proper form and with arithmetically correct computations. The date of receipt of a periodic estimate received on a Saturday, Sunday, or holiday shall be the first working day thereafter.

9.2.4 All periodic estimates shall be submitted to the Owner, or to the Owner's representative, and the date of receipt by the Owner or its representative shall be marked on the estimate. All periodic estimates shall contain a separate item for each filed subtrade and each sub-subtrade listed in sub-bid form as required by the Specifications and a column listing the amount paid to each Subcontractor and Sub-subcontractor as of the date the periodic estimate is filed. The person making payment for the Owner shall add the daily interest provided for herein to each payment for each day beyond the due date based on the date of receipt marked on the estimate.

9.2.5 The format and number of copies of applications for payment shall be as directed by the Architect. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and reflecting retainage if provided for elsewhere in the Contract Documents.

9.2.5.1 Such applications may include requests for payment on account of changes in the Work which have been properly authorized by Construction Change Directives but not yet included in Change Orders when such Construction Change Directives have set forth an adjustment to the Contract Sum.

9.2.5.2 Such applications may not include requests for payment of amounts the Contractor does not intend to pay to a Subcontractor or material supplier because of a dispute or other reason.

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

9.3 The Contractor warrants that title to all Work covered by an application for payment will pass to the Owner either by incorporation in the construction or upon receipt of payment by the Contractor, whichever occurs first, free and clear of all liens, claims, security interests or encumbrances, hereinafter referred to in this Article 9 as "liens."

9.4 CERTIFICATES FOR PAYMENT

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

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

9.5 DECISIONS TO WITHHOLD CERTIFICATION

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

.1 defective Work not remedied;

.2 third party claims filed or reasonable evidence indicating probable filing of such claims;

.3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;

.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

.5 damage to the Owner or another contractor;

.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the retainage currently held by the Owner would not be adequate to cover actual or liquidated damages for the anticipated delay; or

.7 persistent failure to carry out the Work in accordance with the Contract Documents.

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

9.6 PROGRESS PAYMENTS

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

9.6.2 PaymentstoSubcontractors

9.6.2.1 Forthwith after the Contractor receives payment on account of a periodic estimate, the Contractor shall pay to each Subcontractor the amount paid for the labor performed and the materials furnished by that Subcontractor, less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the Subcontractor by the Contractor.

9.6.2.2 Not later than the sixty-fifth day after each Subcontractor substantially completes his work in accordance with the plans and Specifications, the entire balance due under the Subcontract less amounts retained by the Owner as the estimated cost of completing the incomplete and unsatisfactory items of work, shall be due the Subcontractor; and the Owner shall pay that amount to the Contractor. The Contractor shall forthwith pay to the Subcontractor the full amount received from the Owner less any amount specified in any court proceedings barring such payment and also less any amount claimed due from the Subcontractor by the Contractor.

9.6.2.3 Each payment made by the Owner to the Contractor pursuant to Subparagraphs 9.6.2.1 and 9.6.2.2 of this paragraph for the labor performed and the materials furnished by a Subcontractor shall be made to the Contractor for the account of that Subcontractor; and the Owner shall take reasonable steps to compel the Contractor to make each such payment to each such Subcontractor. If the Owner has received a demand for direct payment from a Subcontractor for any amount which has already been included in a payment to the Contractor or which is to be included in a payment to the Contractor for payment to the Subcontractor as provided in Subparagraphs 9.6.2.1 and 9.6.2.2, the Owner shall act upon the demand as provided in this section.

9.6.2.4 If, within seventy days after the Subcontractor has substantially completed the Subcontract work, the Subcontractor has not received from the Contractor the balance due under the Subcontract including any amount due for extra labor and materials furnished to the

Contractor, less any amount retained by the Owner as the estimated cost of completing the incomplete and unsatisfactory items of Work, the Subcontractor may demand direct payment of that balance from the Owner. The demand shall be by a sworn statement delivered to or sent by certified mail to the Owner, and a copy shall be delivered to or sent by certified mail to the Contractor at the same time. The demand shall contain a detailed breakdown of the balance due under the Subcontract and also a statement of the status of completion of the Subcontract work. Any demand made after substantial completion of the Subcontract work shall be valid even if delivered or mailed prior to the seventieth day after the Subcontractor has substantially completed the Subcontract work. Within ten days after the Subcontractor has delivered or so mailed the demand to the Owner and delivered or so mailed a copy to the Contractor, the Contractor may reply to the demand. The reply shall be by a sworn statement delivered to or sent by certified mail to the Owner and a copy shall be delivered to or sent by certified mail to the Subcontractor at the same time. The reply shall contain a detailed breakdown of the balance due under the Subcontract including any amount due for extra labor and materials furnished to the Contractor and of the amount due for each claim made by the Contractor against the Subcontractor.

9.6.2.5 Within fifteen days after receipt of the demand by the Owner, but in no event prior to the seventieth day after substantial completion of the Subcontract work, the Owner shall make direct payment to the Subcontractor of the balance due under the Subcontract including any amount due for extra labor and materials furnished to the Contractor, less any amount (i) retained by the Owner as the estimated cost of completing the incomplete or unsatisfactory items of Work, (ii) specified in any court proceedings barring such payment, or (iii) disputed by the Contractor in the sworn reply; provided, that the Owner shall not deduct from a direct payment any amount as provided in part (iii) if the reply is not sworn to, or for which the sworn reply does not contain the detailed breakdown required by Subparagraph 9.6.2.4. The Owner shall make further direct payments to the Subcontractor forthwith after the removal of the basis for deductions from direct payments made as provided in parts (i) and (ii) of this Subparagraph.

9.6.2.6 The Owner shall forthwith deposit the amount deducted from a direct payment as provided in part (iii) of Subparagraph 9.6.2.5 in an interest-bearing joint account in the names of the Contractor and the Subcontractor in a bank in Massachusetts selected by the Owner or agreed upon by the Contractor and the Subcontractor and shall notify the Contractor and the Subcontractor of the date of the deposit and the bank receiving the deposit. The bank shall pay the amount in the account, including accrued interest, as provided in an agreement between the Contractor and the Subcontractor or as determined by decree of a court of competent jurisdiction.

9.6.2.7 All direct payments and all deductions from demands for direct payments deposited in an interest-bearing account or accounts in a bank pursuant to Subparagraph 9.6.2.6 shall be made out of amounts payable to the Contractor at the time of receipt of demand for direct payment from a Subcontractor and out of amounts which later become payable to the Contractor and in the order of receipt of such demands from Subcontractors. All direct payments shall discharge the obligation of the Owner to the Contractor to the extent of such payment.

9.6.2.8 The Owner shall deduct from payments to the Contractor amounts which, together with the deposits in interest-bearing accounts pursuant to Subparagraph 9.6.2.6, are sufficient to

satisfy all unpaid balances of demands for direct payment received from Subcontractors. All such amounts shall be earmarked for such direct payments, and the Subcontractors shall have a right in such deductions prior to any claims against such amounts by creditors of the Contractor.

9.6.2.9 If the Subcontractor does not receive payments as provided in Subparagraph 9.6.2.1 or if the Contractor does not submit a periodic estimate for the value of the labor or materials performed or furnished by the Subcontractor and the Subcontractor does not receive payment for same when due less the deductions provided for in Subparagraph 9.6.2.1, the Subcontractor may demand direct payment by following the procedure in Subparagraph 9.6.2.4 and the Contractor may file a sworn reply as provided in that same Subparagraph. A demand made after the first day of the month following that for which the Subcontractor performed or furnished the labor and materials for which the Subcontractor seeks payment shall be valid even if delivered or mailed prior to the time payment was due on a periodic estimate from the Contractor. Thereafter the Owner shall proceed as provided in Subparagraphs 9.6.2.5, 9.6.2.6, 9.6.2.7 and 9.6.2.8.

9.6.3 Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, Sub-subcontractor or material supplier, except as provided in Subparagraph 9.6.2, or otherwise as provided by law.

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

9.6.5 "Subcontractor" as used in Sub-subparagraphs 9.6.2.1 through 9.6.2.9 shall mean a person who files a sub-bid and receives a subcontract as a result of that filed sub-bid or who is approved by the awarding authority in writing as a person performing labor or both performing labor and furnishing materials pursuant to a contract with the Contractor. "Subcontractor" as used in other provisions of the Contract Documents shall, except as otherwise expressly provided, have the meaning set forth in Subparagraph 5.1.1.

9.7 FAILURE OF PAYMENT

9.7.1 If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's application for payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended as provided in Article 7.

9.8 SUBSTANTIAL COMPLETION

9.8.1 Substantial Completion is the stage in the progress of the Work when the Work is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use and only minor items which can be corrected or completed

without any material interference with the Owner's use of the Work remain to be corrected or completed.

9.8.2 When the Contractor considers that the Work, or a portion thereof designated in the Contract Documents for separate completion, is substantially complete and the premises comply with Subparagraph 3.15.1, the Contractor shall submit to the Architect (1) a list of items to be completed or corrected, (2) all special warranties required by the Contract Documents, endorsed by the Contractor and in a form reasonably acceptable to the Architect and (3) the permits and certificates referred to in Subparagraph 13.5.4. The failure to include any items on the list mentioned in the preceding sentence does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. When the Architect on the basis of an inspection determines that the Work or designated portion thereof is substantially complete and the other conditions have been met, the Architect will then prepare a Certificate of Substantial Completion which shall establish the Date of Substantial Completion, shall state the responsibilities of the Owner and the Contractor for security, maintenance, heat, utilities, damage to the Work, and insurance, and shall fix the time within which the Contractor shall complete the items listed therein. Warranties required by the Contract Documents shall commence on the date of Substantial Completion. The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of the responsibilities assigned to them in such Certificate.

9.8.3 Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Architect, the Owner shall make payment, reflecting adjustment in retainage, if any, for such Work or portion thereof as provided in the Contract Documents.

9.9 PARTIAL OCCUPANCY OR USE

9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage. Such partial occupancy or use may begin whether or not the portion is substantially complete, provided that the respective responsibilities of the Owner and Contractor with respect to payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work, insurance, correction of the Work, and warranties shall be established by agreement of the Owner and Contractor or, absent such agreement, shall be determined by the Architect subject to the right of either party to contest such determination as provided in Paragraph 4.5.

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

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

9.10 FINAL COMPLETION AND FINAL PAYMENT

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

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

9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims. The making of final payment shall constitute a waiver of claims by the Owner to the extent provided in Subparagraph 4.3.5.

9.10.4 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing

and identified by that payee as unsettled at the time of final application for payment. Such waivers shall be in addition to the waiver described in Subparagraph 4.3.5.

ARTICLE10

PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

10.2 SAFETY OF PERSONS AND PROPERTY

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

.1 employees performing the Work and other persons who may be affected thereby;

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

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

.4 any other property of the Owner, whether or not forming part of the Work, located at the site or adjacent thereto in areas to which the Contractor has access.

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

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

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

10.2.5 The Contractor shall promptly remedy damage and loss to property referred to in Clauses 10.2.1.2, 10.2.1.3 and 10.2.1.4. If the damage or loss is due in whole or in part to the Contractor's failure to take the precautions required by this Paragraph 10.2, the Contractor shall, subject to any reimbursement to which the Contractor is entitled under the property insurance required by the Contract Documents, bear the cost.

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

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

10.2.8 The Contractor shall provide and maintain in good operating condition suitable and adequate fire protection equipment and services, and shall comply with all reasonable recommendations regarding fire protection made by the representatives of the fire insurance company carrying insurance on the Work or by the local fire chief or fire marshal. The area within the site limits shall be kept orderly and clean, and all combustible rubbish shall be promptly removed from the site.

10.2.9 The Contractor shall at all time protect excavations, trenches, buildings and materials, from rain water, ground water, backup or leakage of sewers, drains and other piping, and from water of any other origin and shall remove promptly any accumulation of water. The Contractor shall provide and operate all pumps, piping and other equipment necessary to this end.

10.2.10 The Contractor shall remove snow and ice which might result in damage or delay.

10.2.11 During the progress of the Work and at all times prior to the date of Substantial Completion or occupancy of the Work by the Owner, whichever is earlier, the Contractor shall provide temporary heat, ventilation, and enclosure, as required by Mass. Gen. Laws Chapter 149, Section 44F(1). The permanent heating and ventilation systems may be used for these purposes when available unless otherwise provided in the Contract Documents.

10.3 EMERGENCIES

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

10.4 VANDALISM

10.4.1 The Contractor shall be responsible for protecting the work, the work site, materials, and equipment stored at the site (or incorporated in the work), other property at the

site, or other property of the Owner, against vandalism by known or unknown persons. In discharging this obligation the Contractor shall utilize security personnel, measures, procedures, and equipment or materials necessary to prevent vandalism.

10.4.2 In the event of any damage caused by vandalism to the property/materials/ equipment/items referenced in the preceding Article 10.4.1, and regardless of whether the Contractor has exercised due care in avoiding same, the Contractor shall be financially responsible therefor to whatever extent said damage is not indemnified by insurance coverage available to either the Contractor or Owner. The Contractor's obligation hereunder shall include payment of damages to whatever extent insurance coverage is unavailable due to self-insurance, a deductible, or a self-insured retention.

10.4.3 Any monies owed by the Contractor to the Owner on account of damages referenced in the preceding Article 10.4.2 may be offset by the Owner against any periodic payments made under the Contract.

ARTICLE11

INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located and to which the Owner has no reasonable objection such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

.1 claims under workers' or workmen's compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;

.2 claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;

.3 claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;

.4 claims for damages insured by usual personal injury liability coverage which are sustained (1) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (2) by another person;

.5 claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

.6 claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle; and

.7 claims involving contractual liability insurance applicable to the Contractor's obligations under Paragraph 3.18.

11.1.2 The insurance required by Subparagraph 11.1.1 shall include all major divisions of coverage, and shall be on a comprehensive general basis including Premises and Operations (including X-C-U), Owner's and Contractor's Protective, Products and Completed Operations, and Owned, Nonowned, and Hired Motor Vehicles. Such insurance shall be written for not less than any limits of liability required by law or those set forth in the Contract Documents, whichever is greater.

All insurance shall be written on an occurrence basis, unless the Owner approves in writing coverage on a claims-made basis. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment. The Owner shall be added as an Additional Insured on all policies, which shall constitute primary insurance for the Owner in relation to any similar or concurrent insurance independently maintained by the Owner.

11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These Certificates and the insurance policies required by this Paragraph 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. These certificates shall set forth evidence of all coverage required by 11.1.1 and 11.1.2. The form of certificate shall be AIA Document G705. The Contractor shall furnish to the Owner copies of any endorsements that are subsequently issued amending limits of coverage. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final application for payment as required by Subparagraph 9.10.2.

11.1.4 In addition to Statutory Workers' Compensation Coverage, the Contractor shall provide Employers Liability Coverage at the following limits of liability:

Each accident - $500,000; Disease -

policy limit $500,000; Disease -

each employee $500,000.

11.1.5 The liability insurance coverage purchased by the Contractor in order to comply with Section 11.1.1 (.1-.7) above shall contain the following limits of liability:

$3,000,000 - general aggregate;

$3,000,000 - products/completed operations aggregate;

$1,000,000 - personal injury and advertising;

$1,000,000 - each occurrence;

$1,000,000 - auto liability including hired and non-owned;

$2,000,000 - umbrella.

11.2 OWNER'S LIABILITY INSURANCE

11.2.1 The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance. Optionally, the Owner may purchase and maintain other insurance for self-protection against claims which may arise from operations under the Contract. The Contractor shall not be responsible for purchasing and maintaining this optional Owner's liability insurance unless specifically required by the Contract Documents.

11.3 PROPERTY INSURANCE BUILDERS RISK POLICY

11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance in the amount of the initial Contract Sum as well as subsequent modifications thereto for the entire Work at the site on a replacement cost basis. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Paragraph 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Paragraph 11.3 to be covered, whichever is earlier. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work.

11.3.1.1 Property insurance shall be on an all-risk policy form and shall insure against the perils of fire and extended coverage and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, false-work, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's services and expenses required as a result of such insured loss. Coverage for other perils shall not be required unless otherwise provided in the Contract Documents. The form of policy for this coverage shall provide for coverage in the event of a loss up to the contemplated value of the property following completion of all Work required under the Contract.

11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance which will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor, then the Owner shall bear all reasonable costs properly attributable thereto.

11.3.1.3 The property insurance maintained hereunder by the Owner has a deductible of $100,000 applicable to each/any claim thereunder. In the event of any property damage arising from any occurrence prior to the Architect's issuance of a final Certificate for Payment under Section 9.10.1, including but not limited to property damage arising from vandalism or casualty of any kind, the Contractor shall be responsible for the cost of said property damage: (a) to the extent not indemnified by the Owner's insurance policy because of said deductible; or (b) to the extent not indemnified by the Owner's insurance policy for any other reason.

11.3.1.4 Property insurance for portions of the Work stored off site and in transit shall be procured and the cost borne by the Contractor, unless otherwise provided in the Contract Documents.

11.3.2 Boiler and Machinery Insurance. The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

11.3.3 Loss of Use Insurance. The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused, to the extent covered and paid by insurance under this Subparagraph 11.3.3.

11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or for other special hazards be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be borne by the Contractor.

11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, adjoining or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Subparagraph 11.3.7 for damages caused by fire or other perils covered by this separate property

insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Paragraph 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Contractor.

11.3.7 Waivers of Subrogation. INTENTIONALLY OMITTED.

11.3.8 A loss insured under Owner's property insurance shall be adjusted by the Owner and made payable to the Owner on its behalf and on behalf of the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Subparagraph 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Subcontractors in similar manner.

11.3.9 If required in writing by a party in interest, the Owner shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties all subject to the requirements, if any, of the Owner's construction and/or permanent lender. The cost of required bonds shall be charged against proceeds received by Owner. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or in accordance with an arbitration award in which case the procedure shall be as provided in Paragraph 4.5.

11.3.10 The Owner shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection be made, arbitrators shall be chosen as provided in Paragraph 4.5. The Owner shall, in that case, make settlement with insurers in accordance with directions of such arbitrators. If distribution of insurance proceeds by arbitration is required, the arbitrators will direct such distribution.

11.4 PERFORMANCE BOND AND PAYMENT BOND

11.4.1 The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract. Said bonds shall satisfy the applicable statutory requirements of the place in which the Work is to be performed.

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

ARTICLE12

UNCOVERING AND CORRECTION OF WORK

12.1 UNCOVERING OF WORK

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

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

12.2 CORRECTION OF WORK

12.2.1 The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear costs of correcting such rejected work, including additional testing and inspections and compensation for the Architect's services and expenses made necessary thereby and any cost, loss, or damages to the Owner resulting from such failure or defect.

12.2.2 If, within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Subparagraph 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. This period of one year shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work. This obligation under this Subparagraph 12.2.2 shall survive acceptance of the Work under the Contract and termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

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

12.2.4 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Paragraph 2.4. If the Contractor does not proceed with correction of such nonconforming Work within a reasonable time fixed by written notice from the Architect, the Owner may remove it and store the salvable materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage within ten days after written notice, the Owner may upon ten additional days' written notice sell such materials and equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Architect's services and expenses made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contract Sum shall be reduced by the deficiency. If payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

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

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

12.3 ACCEPTANCE OF NONCONFORMING WORK

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

ARTICLE13

MISCELLANEOUS PROVISIONS

13.1 GOVERNING LAW

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

13.2 SUCCESSORS AND ASSIGNS

13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Contract Documents. Except as hereinafter provided, neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any moneys due or to become due to him hereunder, without the previous written consent of the Owner. The Owner may assign the Contract to any institutional lender providing construction or permanent financing for the Project or to any person acquiring the Owner's interest in the Project, and the Contractor agrees to execute all consents, certificates, and other documents required by such lender or other person in connection with such assignment.

13.2.2 If the Owner conveys its interest in the Project to a third party, any rights which the Owner may have against the Contractor arising from this Agreement shall automatically transfer to such third party.

13.3 WRITTEN NOTICE

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

13.4 RIGHTS AND REMEDIES

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

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

13.5 TESTS AND INSPECTIONS

13.5.1 Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timelynotice of when and where tests and inspections are to be made so the Architect may

observe such procedures. The Owner shall bear costs of tests, inspections or approvals which do not become requirements until after bids are received or negotiations concluded.

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

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

13.5.4 The Contractor shall obtain and deliver promptly to the Architect any occupancy permit and any certificates of final inspection of any part of the Contractor's work and operating permits for any mechanical apparatus, such as elevators, escalators, boilers, air compressors, etc., which may be required by law to permit full use and occupancy of the premises by the Owner. Receipt of such permits or certificates by the Architect shall be a condition precedent to Substantial Completion of the Work.

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

13.6 LIMITATION OF LIABILITY

13.6.1 The Owner shall be liable only to the extent of its interest in the Project; and no officer, director, partner, agent or employee of the Owner (or any partner of a partner or any agent or employee of a partner) shall ever be personally or individually liable with respect to this Contract or the Work. Each Subcontract shall include the foregoing limitation, which shall be effective if the Owner ever succeeds to the Contractor's rights and obligations under a Subcontract.

13.7 The Contractor shall comply with any decisions of the Arlington Redevelopment Board applicable to the Project, and with any other Laws, By-Laws, Rules, and Regulations or Ordinances within the Town of Arlington.

ARTICLE14

TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

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

.1 issuance of an order of a court or other public authority having jurisdiction; or

.2 an act of government, such as declaration of national emergency, making material unavailable.

14.1.2 If one of the above reasons exists, the Contractor may, upon seven additional days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead, profit and damages.

14.1.3 If the Work is stopped for a period of 60 days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has persistently failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Subparagraph 14.1.2.

14.2 TERMINATION BY THE OWNER

14.2.1 If the Contractor is adjudged a bankrupt, or if the Contractor makes a general assignment for the benefit of the Contractor's creditors, or if a receiver is appointed on account of the Contractor's insolvency, or if the Contractor persistently or repeatedly refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if the Contractor fails to make prompt payment to Subcontractors for materials or labor, or persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a significant violation of any provision of the Contract, including the failure to perform the Work in Accordance With the Contract, then the Contractor shall be in default, and the Owner may, without prejudice to any other right or remedy, and upon seven days' written notice to the Contractor, take possession of all materials, tools, appliances, equipment, construction equipment and machinery and vehicles, offices and other facilities on the Project site, and all

materials intended for the Work, wherever stored, and may terminate the employment of the Contractor, accept assignment of any or all Subcontracts pursuant to Paragraph 5.4, and finish the Work by whatever method the Owner may deem expedient. The Owner shall be entitled to collect from the Contractor all direct, indirect, liquidated, and consequential damages suffered by the Owner on account of the Contractor's default, including without limitation additional services and expenses of the Architect made necessary thereby. The Owner shall be entitled to hold all amounts due the Contractor at the date of termination until all of the Owner's damages have been established, and to apply such amounts to such damages.

14.2.2 When the Owner terminates the Contract for one of the reasons stated in Subparagraph 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished. Any payment to the Contractor in quantum meruit shall be capped at the amount due under this Contract, including any adjustments, regardless of whether said termination by the Owner is deemed rightful or wrongful.

14.2.3 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect, upon application, and this obligation for payment shall survive termination of the Contract.

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SUPPLEMENTAL STATUTORY CONDITIONS

ARTICLE 1 - WAGES AND EMPLOYMENT PRACTICES

1.1 Preference To Veterans and Citizens In Public Work; Rate of Wages. (Statutory reference: Mass. Gen. Laws Chapter 149, Section 26) This Paragraph applies to every contract or subcontract for the construction of public works by the Commonwealth or by a county, town or district, or by persons contracting or subcontracting for such works.

1.1.1 In the employment of mechanics and apprentices, teamsters, chauffeurs and laborers, preference shall first be given to citizens of the Commonwealth who have been residents of the Commonwealth for at least six months at the commencement of their employment, who are veterans as defined in Mass. Gen. Laws Chapter 4, Section 7, clause 43, and who are qualified to perform the work to which the employment relates; and secondly, to citizens of the Commonwealth generally who have been residents of the Commonwealth for at least six months at the commencement of their employment, and if they cannot be obtained in sufficient numbers, then to citizens of the United States, and every contract for such work shall contain a provision to this effect. Each county, town or district in the construction of public works, or persons contracting or subcontracting for such works, shall give preference to veterans and citizens who are residents of such county, town or district.

1.1.2 The rate per hour of the wages paid to said mechanics and apprentices, teamsters, chauffeurs and laborers in the construction of public works shall not be less than the rate or rates of wages to be determined by the Commissioner of Labor and Industries as hereinafter provided; provided, that the wages paid to laborers employed on said works shall not be less than those paid to laborers in the municipal service of the town or towns where said works are being constructed; provided, further, that where the same public work is to be constructed in two or more towns, the wages paid to laborers shall not be less than those paid to laborers in the municipal service of the town paying the highest rate; provided further, that if, in any of the towns where the works are to be constructed, a wage rate or wage rates have been established in certain trades and occupations by collective agreements or understandings in the private construction industry between organized labor and employers, the rate or rates to be paid on said works shall not be less than the rates so established; provided, further, that in towns where no such rate or rates have been so established, the wages paid to mechanics and apprentices, teamsters, chauffeurs and laborers on public works, shall not be less than the wages paid to the employees in the same trades and occupations by private employers engaged in the construction industry. This section shall also apply to regular employees of the Commonwealth or of a county, town or district, when such employees are employed in the construction, addition to or alteration of public buildings for which special appropriations of more than one thousand

dollars are provided. Payments by employers to health and welfare plans, pension plans and supplementary unemployment benefit plans under collective bargaining agreements or understandings between organized labor and employers shall be included for the purpose of establishing minimum wage rates as herein provided.

1.2 List of Jobs; Classifications; Determination of Rate of Wages; Schedule. (Statutory reference; Mass. Gen. Laws Chapter 149, Section 27) This Paragraph applies to every contract or subcontract for the construction of public works by the Commonwealth, or by a county, town or district.

The Commissioner of Labor and Industries shall prepare, for the use of such public officials or public bodies whose duty it shall be to cause public works to be constructed, a list of the several jobs usually performed on various types of public works upon which mechanics and apprentices, teamsters, chauffeurs and laborers are employed. The Commissioner shall classify said jobs, and he may revise such classifications from time to time, as he may deem advisable. Prior to awarding a contract for the construction of public works, said public official or public body shall submit to the Commissioner a list of the jobs upon which mechanics and apprentices, teamsters, chauffeurs and laborers are to be employed, and shall request the Commissioner to determine the rate of wages to be paid on each job. Said rates shall apply to all persons engaged in transporting gravel or fill to the site of said public works or removing gravel or fill from such site, regardless of whether such persons are employed by a contractor or subcontractor or are independent contractors or owner-operators. The Commissioner, subject to the provisions of Paragraph 1.1 of these Supplementary Statutory Conditions, shall proceed forthwith to determine the same, and shall furnish said official or public body with a schedule of such rate or rates of wages as soon as said determination shall have been made. In advertising or calling for bids for said works, the awarding official or public body shall incorporate said schedule in the advertisement or call for bids by an appropriate reference thereto, and shall furnish a copy of said schedule without cost, to any person requesting the same. Said schedule shall be made a part of the contract for said works and shall continue to the minimum rate or rates of wages for said employees during the life of the contract. Any person engaged in the construction of said works shall cause a legible copy of said schedule to be kept posted in a conspicuous place at the site of said works during the life of the contract. The aforesaid rates of wages in the schedule of wage rates shall include payment by employers to health and welfare plans, pension plans, and supplementary unemployment benefit plans and such payments shall be considered as payments to persons under this section performing work as herein provided. Any employer engaged in the construction of such works who does not make payments to a health and welfare plan, a pension plan and a supplementary unemployment benefit plan, where such payments are included in said rates of wages, shall pay the amount of said payments directly to each employee engaged in said construction. Note: The awarding authority does not guarantee the accuracy of any schedule of wage rates

furnished to the Contractor hereunder, and the Contractor shall be responsible for ascertaining the prevailing wages in the area where the work will be performed.

1.3 Employment Records To Be Kept By Contractor, Subcontractor; Statement of Compliance. (Statutory reference; Mass. Gen. Laws Chapter 149, Section 27B) This Paragraph applies to every contract or subcontract for the construction of public works by the Commonwealth, or by a county, town or district.

Every Contractor, Subcontractor or public body engaged in said public works to which Paragraph 1.2 of these Supplementary Statutory Conditions applies shall keep a true and accurate record of all mechanics and apprentices, teamsters, chauffeurs and laborers employed thereon, showing the name, address and occupational classification of each such employee on said works, and the hours worked by, and the wages paid to, each such employee, and shall furnish to the Commissioner of Labor and Industries, upon his request, a copy of said record, signed by the employer or his authorized agent under the penalties of perjury. Such records shall be open to inspection by any authorized representative of the Department of Labor and Industries at any reasonable time, and as often as may be necessary.

Each such Contractor, Subcontractor or public body shall preserve its payroll records for a period of three years from the date of completion of the contract.

Each such Contractor, Subcontractor or public body shall furnish to the Commissioner of Labor and Industries within fifteen days after completion of its portion of the work a statement, executed by the Contractor, Subcontractor, or public body or by any authorized officer or employee of the Contractor, Subcontractor or public body who supervises the payment of wages in the following form:

STATEMENT OF COMPLIANCE _____, 2004

I,_____, _____
(Name of signatory party) (Title) do hereby state:

That I pay or supervise the payment of the persons employed by (Contractor, Subcontractor or public body)_____on the_____and that all mechanics (building or project) and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty-nine of the General Laws.

_____
Signature

_____
Title

The above mentioned copies of payroll records and statements of compliance shall be available for inspection by any interested party filing a written request to the Commissioner for such inspection.

1.4 Wages Paid to Operators of Trucks and Other Equipment. (Statutory reference: Mass. Gen. Laws Chapter 149, Section 27F) This Paragraph applies to every contract for the construction of public works by the Commonwealth, or by a county, city, town or district.

Prescribed rates of wages, as determined by the Commissioner of Labor and Industries, shall be paid to the operators of all trucks, vehicles or equipment employed on the Project. Said rates of wages shall be requested of said Commissioner by the awarding authority and shall be furnished by the Commissioner in a schedule containing the classification of jobs, and the rate of wages to be paid for each job. Said rates of wages shall include payments to health and welfare plans, or, if no such plan is in effect between employer and employees, the amount of such payments shall be paid directly to said operators.

1.5 Reserve Police Officers (Statutory reference: Mass. Gen. Laws. Chapter 149, Section 27B) This Paragraph 1.5 applies to every contract for the construction, alteration, maintenance, repair or demolition of, or addition to, any public works for the Commonwealth or any political subdivision thereof.

The Contractor shall pay to any reserve police officer employed by him in any city or town the prevailing rate of wage paid to regular police officers in such city or town.

1.6 Eight-Hour Day, etc. This Paragraph 1.6 applies only to contracts which are subject to the provisions of Mass. Gen. Laws Chapter 149, Sections 30 and 34.

No laborer, worker, mechanic, foreman or inspector working within this Commonwealth in the employ of the Contractor, Subcontractor or other person doing or contracting to do the whole or part of the work contemplated by the contract, shall be required or permitted to work more than eight hours in any one day or more than forty-eight hours in any one week, or more than six days in any one week, except in cases of emergency.

1.7 Lodging, etc. (Statutory reference: Mass. Gen. Laws Chapter 149, Section 25) This Paragraph applies to every contract with the Commonwealth, a county, city or town, or with a department, board, commission, or officer acting therefor, for the doing of public work.

Every employee under this contract shall lodge, board and trade where and with whom he elects, and neither the Contractor nor his agents or employees shall, either directly or indirectly, require as a condition of the employment of any

person that the employee shall lodge, board or trade at a particular place or with a particular person.

1.8 Access to Contractor's Records (Executive Order No. 195) This paragraph applies to every contract for the purchase of services or material by any agency, bureau, board, commission, institution, or department of the Commonwealth.

The Governor or his designee, the secretary of administration and finance, and the state auditor or his designee shall have the right at reasonable times and upon reasonable notice to examine the books, records, and other compilations of data of the Contractor which pertain to the performance and requirements of this contract.

1.9 Worker's Compensation Insurance (Statutory reference: Mass. Gen. Laws Chapter 149, Section 34A) This Paragraph 1.9 applies to every contract for the construction, alteration, maintenance, repair or demolition of, or addition to, any public building or other public works for the Commonwealth or any political subdivision thereof.

The Contractor shall, before commencing performance of the contract, provide by insurance for the payment of compensation and the furnishing of other benefits under Mass. Gen. Laws Chapter 152 to all persons to be employed under the contract, and the Contractor shall continue such insurance in full force and effect during the term of the contract. Sufficient proof of compliance with this Paragraph 1.9 must be furnished at the time of execution of this contract. Failure to provide and continue in force such insurance as aforesaid shall be deemed a material breach of the contract and shall operate as an immediate termination thereof. No cancellation of such insurance, whether by the insurer or by the insured, shall be valid unless written notice thereof is given by the party proposing cancellation to the other party and to the awarding authority at least fifteen days prior to the intended effective date thereof, which date shall be expressed in full notice.

ARTICLE 2 - EQUAL EMPLOYMENT OPPORTUNITY AND AFFIRMATIVE ACTION

(Statutory reference: Mass. Gen. Laws Chapter 151B; Executive Orders No. 74, No. 116 and No. 246). The provisions of this Article 2 are intended to comply with the Commonwealth's Supplemental Equal Employment Opportunity Anti-Discrimination and Affirmative Action Program, referred to in Executive Order No. 116 and administered by the Massachusetts Commission Against Discrimination. If no specific percentage has been inserted in Subparagraph 2.2.3 below, the applicable minimum percentage provided for in such Supplemental Program shall be deemed to have been so inserted.

2.1 Definitions. For purposes of this Contract, "minority" refers to Asian-Americans, Blacks, Spanish-Surnamed Americans, North American Indians, and Cape Verdeans. "Commission" refers to the Massachusetts Commission Against Discrimination.

2.2 Non-DiscriminationandAffirmativeActionRequirements. During the performance of this Contract, the Contractor and all of his Subcontractors (hereinafter "Contractor"), for himself, his assignees and successors in interest, agree to comply with Subparagraphs 2.2.1 through 2.2.11.

2.2.1 In connection with the performance of Work under this Contract, the Contractor shall not discriminate against any employee or applicant for employment because of race, color, religious creed, national origin, age or sex. The aforesaid provision shall include, but not be limited to, the following: employment upgrading, demotion, or transfer; recruitment advertising; recruitment layoff; termination; rates of pay or other forms of compensation; conditions or privileges of employment; and selection for apprenticeship. The Contractor shall post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the Commission setting forth the provisions of the Fair Employment Practices Law of the Commonwealth.

2.2.2 In connection with the performance of Work under this Contract, the Contractor shall undertake in good faith affirmative action measures designed to eliminate any discriminatory barriers in the terms and conditions of employment on the grounds of race, color, religious creed, national origin, age or sex, and to eliminate and remedy any effects of such discrimination in the past. Such affirmative action shall entail positive and aggressive measures to ensure equal opportunity in the areas of hiring, upgrading, demotion or transfer, recruitment, layoff or termination, rate of compensation, and in-service or apprenticeship training programs. This affirmative action shall include all action required to guarantee equal employment opportunity for all persons, regardless of race, color, religious creed, national origin, age or sex. A purpose of this provision is to ensure to the fullest extent possible an adequate supply of skilled tradesmen for this and future Commonwealth public construction projects.

2.2.3 As part of his obligation of remedial action under the foregoing Subparagraph 2.2.2, the Contractor shall maintain on this project a not less than ten percent (10%) ratio of minority employee man hours to total man hours in each job category including but not limited to bricklayers, carpenters, cement masons, electricians, ironworkers, operating engineers, and those "classes of work" enumerated in Mass. Gen. Laws Chapter 149, Section 44F.

2.2.4 In the hiring of minority journeymen, apprentices, trainees and advanced trainees, the Contractor shall rely on referrals from a multi-employer affirmative action program approved by the Commission, traditional referral methods utilized by the construction industry, and referrals from agencies, not more than three in number at any one time, designated by the Liaison Committee (described in Subparagraph 2.2.5 below) or the Commission.

2.2.5 At the discretion of the Commission there may be established for the life of this Contract a body to be known as the Liaison Committee. The Liaison Committee shall be composed of one representative each from the agency or agencies administering this project, hereinafter called the administering agency, the Commission and such other representatives as may be designated by the Commission in conjunction with the administering agency.

2.2.6 The Contractor (or his agent, if any, designated by him as the on-site equal employment opportunity officer) shall recognize the Liaison Committee as an affirmative action body, and shall establish a continuing working relationship with the Liaison Committee, consulting with the Liaison Committee on all matters related to minority recruitment, referral, employment and training.

2.2.7 The Contractor shall prepare projected manning tables on a quarterly basis. These shall be broken down into projections, by week, of workers required in each trade. Copies shall be furnished one week in advance of the commencement of the period covered, and also when updated, to the Commission and Liaison Committee.

2.2.8 Records of employment referral orders, prepared by the Contractor, shall be made available to the Commission and to the Liaison Committee on request.

2.2.9 The Contractor shall prepare weekly reports in a form approved by the Commission of hours worked in each trade by each employee, identified as a minority or non-minority. Copies of these shall be provided at the end of each week to the Commission and to the Liaison Committee.

If the Contractor shall use any Subcontractor on any work performed under this Contract, he shall take affirmative action to negotiate with qualified minority Subcontractors. This affirmative action shall cover both pre-bid and post-bid periods. It shall include notification to the Office of Minority Business Assistance (within the Executive Office of Communities and Development) or its designee, while bids are in preparation, of all products, work or services for which the Contractor intends to negotiate bids.

In the employment of journeymen, apprentices, trainees and advanced trainees, the Contractor shall give preference, first, to citizens of the Commonwealth who have served in the armed forces of the United States in time of war and have been honorably discharged therefrom or released from active duty therein, and who are qualified to the perform the work to which the employment relates, and, secondly, to citizens of the Commonwealth generally, and, if such cannot be obtained in sufficient numbers, then to citizens of the United States.

A designee of the Commission and a designee of the Liaison Committee shall each have right of access to the construction site.

2.2.10 The Contractor shall maintain as a goal on this project a not less than five percent ratio of women work force to total project hours in both the general contract and each individual filed sub-bid contract.

A Labor Scheduling Table will be used as a tool for achieving a range of women work force participation for the entire project in both the general contract and each individual filed sub-bid contract. Said Labor Scheduling Table shall be in a form acceptable to the Town.

2.2.11 Before starting work, the Contractors (includes the General Contractor, for itself and its Subcontractors, as well as all filed sub-bid Contractors) will submit plans for achievement of the equal opportunity goals of the contract. All Contractors will be required to make a good faith effort to achieve these goals. The plan will indicate if the Contractors expect to achieve the requirements during the first quarter. If there are reasons why the Contractors do not expect to achieve the requirements during the first quarter year of the contract construction phase, then the Contractors shall provide a plan calculated to address, to the extent reasonably possible, these obstacles to a good faith effort to achieve such goals.

Not more than ten days following the end of each work quarter, the Contractors will report on the achievement of the goals, detailing the good faith efforts that have been made and will continue to be made and any other appropriate efforts not yet undertaken.

All reports will be signed by an officer or principal of the company who has the authority to contractually obligate the company.

2.3 The Contractor shall comply with the provisions of Executive Order No. 74, as amended by Executive Order No. 166, dated May 1, 1975, and of Mass. Gen. Laws Chapter 151B, both of which are herein incorporated by reference and made a part of this Contract.

2.4 The Contractor, in the performance of all Work, and prior to completion of the Work, will not discriminate on grounds of race, color, religious creed, national origin, age or sex in employment practices, in the selection or retention of Subcontractors, or in the procurement of materials and rentals of equipment.

2.5 In all solicitations either by competitive bidding or negotiation made by the Contractor either for work to be performed under a subcontract or for the procurement of materials or equipment, each potential Subcontractor or supplier shall be notified in writing by the Contractor of the Contractor's obligations under this Contract relative to non-discrimination and affirmative action.

2.6 The Contractor hereby certifies that he shall comply with the minority manpower ratio and specific action steps contained herein. The Contractor shall be required to obtain from each of its Subcontractors and submit to the administering agency

prior to the performance of any work under the Contract a certification by said Subcontractor, regardless of tier, that it will comply with the minority manpower ration and specific affirmative action steps contained herein. Such certification shall be provided on forms furnished by the administering agency or, in the absence thereof, on forms prescribed by the Commission.

2.7 The Contractor's certification form must be signed by all successful low bidder(s) prior to award by the administering agency.

2.8 Compliance Information, Reports and Sanctions.

2.8.1 The Contractor will provide all information and reports required by the administering agency or the Commission on instructions issued by either of them and will permit access to its facilities and books, records, accounts and other sources of information which may be determined by the Commission to affect the employment of personnel. This provision shall apply only to information pertinent to the Commonwealth's supplementary affirmative action contract requirements. Where information required is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor shall so certify to the administering agency or the Commission as appropriate and shall set forth what efforts he has made to obtain the information.

2.8.2 Whenever the administering agency, the Commission or the Liaison Committee believes the Contractor or any Subcontractor may not be operating in compliance with the terms of this Paragraph 2.8, the Commission directly, or through its designated agent, shall conduct an appropriate investigation, and may confer with the parties, to determine if such Contractor is operating in compliance with the terms of this Paragraph 2.8. If the Commission or its agent finds the Contractor or any Subcontractor not in compliance, it shall make a preliminary report on noncompliance, and notify such Contractor in writing of such steps as will in the judgment of the Commission or its agent bring such Contractor into compliance. In the event that such Contractor fails or refuses to fully perform such steps, the Commission shall make a final report of non-compliance, and recommend to the administering agency the imposition of one or more of the sanctions listed below. If, however, the Commission believes the Contractor or any Subcontractor has taken or is taking every possible measure to achieve compliance, it shall not make a final report of non-compliance. Within fourteen days of the receipt of the recommendations of the Commission, the administering agency shall move to impose one or more of the following sanctions, as it may deem appropriate to attain full and effective enforcement:

(i) The recovery by the administering agency from the Contractor of 1/100 of 1% of the contract award price or $1,000, whichever sum is greater, in the nature of liquidated damages or, if a Subcontractor is in non-compliance, the recovery by the administering agency from the Contractor, to be assessed by the Contractor as a back charge against

the Subcontractor, of 1/10 or 1% of the subcontract price, or $400, whichever sum is greater, in the nature of liquidated damages, for each week that such party fails or refuses to comply;

(ii) The suspension of any payment or part thereof due under the Contract until such time as the Contractor or any Subcontractor is able to demonstrate his compliance with the terms of the contract;

(iii) The termination, or cancellation, of the Contract, in whole or in part, unless the Contractor or any subcontractor is able to demonstrate within a specified time his compliance with the terms of the Contract;

(iv) The denial to the Contractor or any Subcontractor of the right to participate in any future contracts awarded by the administering agency for a period of up to three years.

If at any time after the imposition of one or more of the above sanctions a Contractor is able to demonstrate that he is in compliance with this Paragraph 2.8, he may request that the administering agency, in consultation with the Commission, suspend the sanctions conditionally, pending a final determination by the Commission as to whether the Contractor is in compliance. Upon final determination of the Commission, the administering agency, based on the recommendation of the Commission, shall either lift the sanctions or reimpose them.

Sanctions enumerated under Subparagraph 2.8.2 of this Paragraph 2.8 shall not be imposed by the administering agency except after an adjudicatory proceeding, as that term is used in Mass. Gen. Laws Chapter 30A, has been conducted. No investigation by the Commission or its agent shall be initiated without prior notice to the Contractor.

2.9 Severability. The provisions of this Article 2 are severable, and if any of these provisions shall be held unconstitutional by any court of competent jurisdiction, the decision of such court shall not affect or impair any of the remaining provisions.

2.10 The Contractor shall comply with the provisions of Executive Order No. 246, relating to discrimination against and equal employment opportunity for the handicapped, which is herein incorporated by reference and made a part of this Contract. In connection with the performance of work under this Contract, the Contractor, Subcontractors and suppliers of goods and services shall not discriminate against the handicapped. Furthermore, Contractors, Subcontractors and suppliers of goods and services must give written notice of their commitments under this Paragraph 2.10 to any labor union, association or brotherhood with which they have a collective bargaining contract or other agreement, and must give such notice to handicapped contractors and to handicapped contractor

associations. A copy of such notice must be furnished to the awarding authority at the time of the signing of the contract.

2.11 Suspension of Payments.

2.11.1 If the awarding authority determines after investigation that the Contractor or any Subcontractor is not in compliance with the terms of Article 2, it may suspend any payment or portion thereof due under the Contract until the Contractor demonstrates compliance with the terms of Article 2.

2.11.2 Payment shall not be suspended if the awarding authority finds that the Contractor made his best efforts to comply with Article 2, or that some other justifiable reason exists for waiving the provisions of Article 2 in whole or in part.

2.11.3 Payment may be suspended only after the Contractor and any other interested party shall have been given the opportunity to present evidence in support of its position at an informal hearing held by the awarding authority and the awarding authority has concluded upon review of all the evidence that such penalty is justified.

2.11.4 This temporary suspension of payments by the awarding authority is separate from the sanctions set forth in Paragraph 2.8 above, which are determined by the Commission and recommended to the awarding authority.

ARTICLE 3 - MASSACHUSETTS PUBLIC CONSTRUCTION STATUTES

3.1 To whatever extent Massachusetts statutory laws regarding public construction apply to this project, said laws specifically are incorporated herein as if re-stated herein.

ARTICLE 4 - TITLE I GENERAL GOVERNMENT, ARTICLE 16 CONSTRUCTION PROJECTS, § 1-3 OF THE TOWN OF ARLINGTON GENERAL BY-LAWS

4.1 Women Work Force Participation.

4.1.1 The contractor shall maintain as a goal on this project a not less than five percent ratio of women work force to total project hours in both the general contract and each individual filed sub-bid contract, if applicable. The preceding sentence shall be included in all construction contracts whether entered into by the Town pursuant to the provisions of M.G.L. c. 149 or M.G.L. c. 30, § 39M et. seq. provided however, that if entered into under Chapter 30 same shall not be deemed to apply where the projected bid price as determined by the Director of Public Works is not likely to exceed $200,000.

4.1.2 A Labor Scheduling Table which will be used as a tool for achieving a range of women work force participation for the entire project in both the general contract and each individual filed sub-bid contract.

4.2 Equal Opportunity Goal Compliance.

4.2.1 Before starting work, the contractors (includes the general contractor, for itself and its subcontractors, as well as all filed sub-bid contractors, if applicable) will submit plans for achievement of the equal opportunity goals of the contract. All contractors will be required to make a good faith effort to achieve these goals. The plan will indicate if the contractors expect to achieve the requirements during the first quarter. If there are reasons why the contractors do not expect to achieve the requirements during the first quarter year of the contract construction phase, then the contractors shall provide a plan calculated to address, to the extent reasonably possible, these obstacles to a good faith effort to achieve such goals.

4.2.2 Not more than ten days following the end of each work quarter, the contractors will report on the achievement of the goals, detailing the good faith efforts that have been made and will continue to be made and any other appropriate efforts not yet undertaken.

4.2.3 All reports will be signed by an officer or principal of the company who has the authority to contractually obligate the company.

4.3 Recruitment and Training

4.3.1 Any board, officer, committee, or other agency of the Town, which acts on behalf of the Town in making or supervising any contract, in any amount exceeding the sum of $100,000 for the purchase of goods or services or for the construction, renovation, or repair of buildings or other improvement of real estate, may make arrangements with contractors and other interested agencies for special programs of recruitment and training in connection with the work to be performed on such contract, with the objective of promoting equal employment opportunity for members of minority groups protected by the fair employment laws of the Commonwealth and the United States. Any board, officer, committee or other Town agency may expend Town funds in carrying them out provided that appropriations specifically designed for such purposes have been voted by the Town Meeting.

TOWN OF ARLINGTON

GENERAL CONTRACT

THE TOWN OF ARLINGTON, a municipal corporation of the Commonwealth of Massachusetts, acting through its Town Manager, and

_____

_____

_____

_____

(The Contractor) hereby mutually agrees as follows:

ARTICLE I – THE CONTRACT DOCUMENTS

The Contract Documents, as defined in the CONSOLIDATED GENERAL CONDITIONS and SUPPLEMENTAL STATUTORY CONDITIONS, including said CONSOLIDATED GENERAL CONDITIONS and SUPPLEMENTAL STATUTORY CONDITIONS are hereby incorporated by reference and made a part hereof, and shall include Addenda and Alternates, if any.

ARTICLE II – GENERAL DESCRIPTION OF WORK

The Contractor shall furnish all of the materials and perform all of the Work required by the

Contract Documents entitled "Whittemore-Robbins Estate – Rehabilitation of Three Buildings", dated April 15, 2022 prepared by SSV Architects | Andrew Jerome Cannata, AIA, acting as, and in these Contract Documents entitled, the Architect.

ARTICLE III – COMMENCEMENT AND COMPLETION OF WORK AND LIQUIDATED DAMAGES

It is agreed that time is of the essence of this Contract.

The Contractor shall commence work only upon the execution of this Contract by the Town of Arlington by its Town Manager, the certification of the availability of the appropriation by the Town Comptroller, approval as to form by the Town Counsel, and upon issuance of a Notice to Proceed, and shall bring the Work to Substantial Completion by Friday February 3, 2023, and to Final Completion within 15 calendar days thereafter. Liquidated damages in the amount of [$100] per calendar day will be applicable after the date of Substantial Completion for which the project is not substantially complete, and for each day after the date of Final Completion for which the project is not finally complete, and otherwise in accordance with the provisions of the CONSOLIDATED GENERAL CONDITIONS and SUPPLEMENTAL STATUTORY CONDITIONS. The liquidated damages amount per calendar day is a minimum damage figure to compensate the Owner for administrative costs and loss or delay of its use of the building and site, and does not limit in any way the liability of the Contractor for damages in excess of the specified liquidated damages amount for other damages, for example, damages for breach of Contract, and added architect and consultant foes. It is expressly understood that such liquidated

damages do not constitute a penalty. All work shall be phased (if applicable) in accordance with the Contract Documents.

NOTE: NOTWITHSTANDING ANYTHING TO THE CONTRARY, THE TIME OF COMMENCEMENT SHALL ONLY BE BY WRITTEN NOTICE TO PROCEED WITH THE WORK AS DATED AND ISSUED TO THE CONTRACTOR BY THE TOWN OF ARLINGTON. NOTICE TO PROCEED MAY BE GIVEN ANYTIME AFTER THE AWARD OF THE CONTRACT, BUT NOT LATER THAN 14 DAYS AFTER THE EXECUTION OF THE CONTRACT.

ARTICLE IV – COMPENSATION TO BE PAID BY TOWN

The Town shall pay and the Contract shall accept, as full compensation for everything furnished, done by or resulting to the Contractor in carrying out this Contract, subject to additions and deductions in the Contract Documents in the sum of:

_____

ARTICLE V – AVAILABILITY OF APPROPRIATION

The Contract is subject to an appropriation being available therefor.

This Contract is executed by the Town of Arlington and by the Contractor as of this _____ day of _____, _____.

TOWN OF ARLINGTON

BY: _____
(Town Manager)

Approved as to Availability of Appropriation:

_____
Town Comptroller

CONTRACTOR

_____
(Name)

_____
(Address)

Approved as to Form:

BY: _____
(Name)

_____
Town Counsel

_____
(Title)

(Affix Corporate Seal Here)

PERFORMANCE BOND

BOND NO. _____

KNOWN ALL MEN BY THESE PRESENT, that we,_____, as Principal, and_____, as Surety (the "Surety"), are held and firmly bound unto the Town of Arlington, as Obligee, (the "Obligee") in the sum of _____dollars ($_____) to be paid to the Obligee, for which payments, well and truly to be made, we bind ourselves, our respective heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents

WHEREAS**,** the said Principal has made a contract with the Obligee**,** bearing the date of_____ _____ , 2022 for the Rehabilitation of Three Buildings in the Whittemore-Robbins Estate in Arlington, Massachusetts for the Town of Arlington, Massachusetts.

NOW, the condition of this obligation is such that if the Principal and all Subcontractors under said contract shall well and truly keep and perform all the undertakings, covenants, agreements, terms and conditions of said contract on its part to be kept and performed during the original term of said contract and any extensions thereof that may be granted by the Obligee, with or without notice to the Surety, and during the life and any guarantee required under the contract, and shall also well and truly keep and perform all the undertakings, covenants, agreements, terms and conditions of any and all duly authorized modifications, alterations changes or additions to said contract that may hereafter be made, notice to the Surety of such modifications, alterations, changes or additions being hereby waived, then this obligation shall become null and void; otherwise, it shall remain in full force and virtue.

IN THE EVENT, that the contract is abandoned by the Principal, or in the event that the Obligee, under the provisions of Article 14 of the Consolidated General Conditions of said contract terminates the employment of the Principal or the authority of the Principal to continue the work, said Surety hereby further agrees that said Surety shall, if requested in writing by the Obligee, take such action as is necessary to complete said contract.

IN WITNESS WHEREOF, the Principal and Surety have hereunto set their hands and seals this:_____Day of _____2022.

PRINCIPAL	SURETY
_____	_____
By _____	By _____
_____	_____
(Title)	(Attorney-in-Fact)
SEAL:	SEAL:
Attest: _____	Attest: _____

The rate for this bond is ___% for the first $_____and_____% for the next $_____.
The total premium for this bond is $_____.

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PAYMENT BOND

Bond No. .....

KNOWN ALL MEN BY THESE PRESENT, that we _____with a place of business at_____as principal (the "Principal"), and

_____ a corporation qualified to do business in the Commonwealth of Massachusetts, with a place of business at _____as Surety (the "Surety"), are held and firmly bound undo Town of Arlington as Obligee (the "Obligee"), in the sum of

_____

Lawful money of the United States of America, to be paid to the Obligee, for which payment, well and truly to be made, we bind ourselves, our respective heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these present.

WHERAS, the Principal has assumed and made a contract with the Obligee bearing the date of _____, for the

NOW, THE CONDITIONS of this obligation are such that if the Principal and all subcontractors under said contract shall pay for all labor performed or furnished and for all material used or employed in said contract and in any and all duly authorized modification, alterations, extensions of time, changes or additions to said contract that may hereafter be made, notice to the Surety of such modifications, alterations, extensions of time, changes or additions being hereby waived, the foregoing to include any other purposes or items set out in, and to be subject to, the provisions of Massachusetts General Laws, Chapter 30, Section 39A, and Chapter 149, Section 29, as amended then this obligation shall become null and void; otherwise, it shall remain in full force and virtue.

IN WITNESS WHEREFORE, the Principal and Surety have hereto set their bands and seals this _____day of _____ ,2022.

PRINCIPAL	SURETY
_____	_____
By _____	By _____
_____	_____
(Title)	(Attorney-in-Fact)
SEAL:	SEAL:
Attest: _____	Attest: _____

The rate for this bond is ___% for the first $_____and_____% for the next $_____.
The total premium for this bond is $_____.

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WEEKLY PAYROLL RECORDS REPORT
& STATEMENT OF COMPLIANCE

In accordance with Massachusetts General Law c. 149, §27B, a true and accurate record must be kept of all persons employed on the public works project for which the enclosed rates have been provided. A Payroll Form has been printed on the reverse of this page and includes all the information required to be kept by law. Every contractor or subcontractor is required to keep these records and preserve them for a period of three years from the date of completion of the contract.

In addition, every contractor and subcontractor is required to submit a copy of their weekly payroll records to the awarding authority. For every week in which an apprentice is employed, a photocopy of the apprentice's identification card must be attached to the payroll report. Once collected, the awarding authority is also required to preserve those records for three years.

In addition, each such contractor, subcontractor, or public body shall furnish to the awarding authority directly, within fifteen days after completion of its portion of the work a statement, executed by the contractor, subcontractor or public body who supervises the payment of wages, in the following form:

STATEMENT OF COMPLIANCE

_____, 20_____

I,_____,_____
(Name of signatory party) (Title)

do hereby state:

That I pay or supervise the payment of the persons employed by

_____ on the _____
(Contractor, subcontractor or public body) (Building or project)

and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty nine of the General Laws.

Signature _____

Title _____

DIVISION OF OCCUPATIONAL SAFETY, 19 STANIFORD STREET, 2nd FL, BOSTON, MA 02114

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CONTRACTOR QUALIFICATION STATEMENT

The Whittemore-Robbins Estate is included in the National and State Registers of Historic Places as part of the National Register District of the Arlington Multiple Resource Area. Due to these historic designations, the project will be reviewed for workmanship appropriate to an historic building. Applicable standards are the Secretary of the Interior's publication, Standards for the Treatment of Historic Properties, which is part of the contract documents. Bidders should be familiar with these Standards.

Contractors must have DCAMM Certification in the categories of Historical Building Restoration and Historical Roofing. All bidders must demonstrate past successful experience in the last five years with at least three projects of similar scope and complexity on comparable historic buildings, with preference given to buildings listed in the State or National Registers of Historic Places. Provide information as requested.below.

Submitted by: _____
Name of person preparing this statement (please print)

_____
Company name

_____
Company address

PROJECT ONE

Project Name, Address, and Year of Completion _____

_____

Work Categories (CSI Categories) _____

Approximate Value of the Work _____

Property Owner (Name and Telephone) _____

Architect/Designer (Name and Telephone) _____

Brief Description of the Work _____

PROJECT TWO

Project Name, Address, and Year of Completion _____

_____

Work Categories (CSI Categories) _____

Approximate Value of the Work _____

Property Owner (Name and Telephone) _____

Architect/Designer (Name and Telephone) _____

Brief Description of the Work _____

PROJECT THREE

Project Name, Address, and Year of Completion _____

_____

Work Categories (CSI Categories) _____

Approximate Value of the Work _____

Property Owner (Name and Telephone) _____

Architect/Designer (Name and Telephone) _____

Brief Description of the Work _____

Only skilled workers who are familiar and experienced with the materials and methods specified and familiar with the design requirements shall be employed.

Only skilled workers shall be present at all times during work.

Licensed Supervisor shall be on site at all times during the work and shall personally direct the work.

No allowance will be made for lack of skill on the part of the workers.

END OF SECTION

CERTIFICATE OF COMPLIANCE WITH STATE TAX LAWS

Pursuant to M.G.L. C.62C, s.49A (b) and M.G.L. C.ISIA, s.19A, I hereby certify under the penalty of perjury that _____ has complied with all laws of the Commonwealth of Massachusetts relating to taxes, reporting of employees and contractors, and withholding and remitting child support.

_____

SIGNATURE OF INDIVIDUAL OR CORPORATE OFFICE*

_____

SOCIAL SECURITY NUMBER/FEDERAL IDENTIFICATION NUMBER**

_____

CORPORATE NAME (IF APPLICABLE)

_____

NAME AND TITLE OF CORPORATE OFFICE (IF APPLICABLE)

*Approval of a contract or other agreement will not be granted unless this certification clause is signed by the proposer. For all corporations, a certified copy of the authorizing vote of the Board of Directors must be provided.

** Your social security number will be furnished to the Massachusetts Department of Revenue to determine whether you have met tax filing or tax payment obligation. Providers who fail to correct their non-filing or
delinquency will not have a contract or other agreement issued, renewed, or extended. This request is made under the authority of Massachusetts General
Laws, Chapter 62C, s. 49A.

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CERTIFICATE OF CORPORATE AUTHORITY

The principle, officer, or person to sign below pledges under penalties of perjury, that he or she has been designated by the Owner(s) of the Board of Directors of the below named firm as an authorized representative.

Date: _____

Signature of individual submitting bid or proposal: _____

Printed Name of Person signing the bid or proposal: _____

Title of Person signing bid or proposal: _____

Name of Business: _____

Business Address: _____

_____

Business Phone: _____

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CERTIFICATE OF OSHA TRAINING

The undersigned hereby certifies that it is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the Work; that all employees to be employed at the worksite shall have successfully completed a course in construction safety and health approved by OSHA (the United States Occupational Safety and Health Administration) that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that it shall comply fully with all laws and regulations applicable to awards made subject to MGL, Chapter 149 Section 44A .

Signature: _____

Title: _____

Date: _____

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GENERAL BIDDER CERTIFICATE OF NON-COLLUSION

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club or other organization, entity, or group of individuals.

_____
(Signature of individual submitting bid or proposal)

_____
(Name of individual submitting bid or proposal)

_____
Name of Business

_____
Date

Pursuant to M.G.L. Chapter 62C, Section 49A, I certify under the penalties of perjury that I have complied with all laws of the commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting child support.

_____
Social Security Number or
Federal Identification Number

_____
Signature of Individual or Responsible
Corporate Officer and Title

NON-COLLUSION FORMS
MUST BE SIGNED AND
SUBMITTED WITH BID

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SUB-BIDDER CERTIFICATE OF NON-COLLUSION

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club or other organization, entity, or group of individuals.

_____
(Signature of individual submitting bid or proposal)

_____
(Name of individual submitting bid or proposal)

_____
Name of Business

_____
Date

Pursuant to M.G.L. Chapter 62C, Section 49A, I certify under the penalties of perjury that I have complied with all laws of the commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting child support.

_____
Social Security Number or
Federal Identification Number

_____
Signature of Individual or Responsible
Corporate Officer and Title

NON-COLLUSION FORMS
MUST BE SIGNED AND
SUBMITTED WITH BID

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The Secretary of the Interior's Standards for the Treatment of Historic Properties 1995

Four Treatment Approaches

There are Standards for four distinct, but interrelated, approaches to the treatment of historic properties--preservation, rehabilitation, restoration, and reconstruction. **Preservation** focuses on the maintenance and repair of existing historic materials and retention of a property's form as it has evolved over time. (Protection and Stabilization have now been consolidated under this treatment.) **Rehabilitation** acknowledges the need to alter or add to a historic property to meet continuing or changing uses while retaining the property's historic character. **Restoration** depicts a property at a particular period of time in its history, while removing evidence of other periods. **Reconstruction** re-creates vanished or non-surviving portions of a property for interpretive purposes.

Preservation is defined as the act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.

Standards for Preservation

1. A property will be used as it was historically, or be given a new use that maximizes the retention of distinctive materials, features, spaces, and spatial relationships. Where a treatment and use have not been identified, a property will be protected and, if necessary, stabilized until additional work may be undertaken.

2. The historic character of a property will be retained and preserved. The replacement of intact or repairable historic materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.

3. Each property will be recognized as a physical record of its time, place, and use. Work needed to stabilize, consolidate, and conserve existing historic materials and features will be physically and visually compatible, identifiable upon close inspection, and properly documented for future research.

4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.

5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.

6. The existing condition of historic features will be evaluated to determine the appropriate level of intervention needed. Where the severity of deterioration requires repair or limited replacement of a distinctive feature, the new material will match the old in composition, design, color, and texture.

7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.

8. Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

Rehabilitation is defined as the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values.

Standards for Rehabilitation

1. A property will be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces, and spatial relationships.

2. The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.

3. Each property will be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.

4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.

5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.

6. Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture, and, where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.

7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.

8. Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

9. New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work shall be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.

10. New additions and adjacent or related new construction will be undertaken in a such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

Restoration is defined as the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.

Standards for Restoration

1. A property will be used as it was historically or be given a new use which reflects the property's restoration period.

2. Materials and features from the restoration period will be retained and preserved. The removal of materials or alteration of features, spaces, and spatial relationships that characterize the period will not be undertaken.

3. Each property will be recognized as a physical record of its time, place, and use. Work needed to stabilize, consolidate and conserve materials and features from the restoration period will be physically and visually compatible, identifiable upon close inspection, and properly documented for future research.

4. Materials, features, spaces, and finishes that characterize other historical periods will be documented prior to their alteration or removal.

5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize the restoration period will be preserved.

6. Deteriorated features from the restoration period will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture, and, where possible, materials.

7. Replacement of missing features from the restoration period will be substantiated by documentary and physical evidence. A false sense of history will not be created by adding conjectural features, features from other properties, or by combining features that never existed together historically.

8. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.

9. Archeological resources affected by a project will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

10. Designs that were never executed historically will not be constructed.

Reconstruction is defined as the act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.

Standards for Reconstruction

1. Reconstruction will be used to depict vanished or non-surviving portions of a property when documentary and physical evidence is available to permit accurate reconstruction with minimal conjecture, and such reconstruction is essential to the public understanding of the property.

2. Reconstruction of a landscape, building, structure, or object in its historic location will be preceded by a thorough archeological investigation to identify and evaluate those features and artifacts which are essential to an accurate reconstruction. If such resources must be disturbed, mitigation measures will be under-taken.

3. Reconstruction will include measures to preserve any remaining historic materials, features, and spatial relationships.

4. Reconstruction will be based on the accurate duplication of historic features and elements substantiated by documentary or physical evidence rather than on conjectural designs or the availability of different features from other historic properties. A reconstructed property will re-create the appearance of the non-surviving historic property in materials, design, color, and texture.

5. A reconstruction will be clearly identified as a contemporary re-creation.

6. Designs that were never executed historically will not be constructed.

Preservation as a Treatment. *When the property's distinctive materials, features, and spaces are essentially intact and thus convey the historic significance without extensive repair or replacement; when depiction at a particular period of time is not appropriate; and when a continuing or new use does not require additions or extensive alterations, Preservation may be considered as a treatment. Prior to undertaking work, a documentation plan for Preservation should be developed.*

Rehabilitation as a Treatment *When repair and replacement of deteriorated features are necessary; when alterations or additions to the property are planned for a new or continued use; and when its depiction at a particular time is not appropriate, Rehabilitation may be considered as a treatment. Prior to undertaking work, a documentation plan for Rehabilitation should be developed.*

Restoration as a Treatment. *When the property's design, architectural, or historical significance during a particular period of time outweighs the potential loss of extant materials, features, spaces, and finishes that characterize other historical periods; when there is substantial physical and documentary evidence for the work; and when contemporary alterations and additions are not planned, Restoration may be considered as a treatment. Prior to undertaking work, a particular period of time, i.e., the restoration period, should be selected and justified, and a documentation plan for Restoration developed.*

Reconstruction as a Treatment. *When a contemporary depiction is required to understand and interpret a property's historic value (including the re-creation of missing components in a historic district or site); when no other property with the same associative value has survived; and when sufficient historical documentation exists to ensure an accurate reproduction, Reconstruction may be considered as a treatment. Prior to undertaking work, a documentation plan for Reconstruction should be developed.*

The Secretary of the Interior's Standards for the Treatment of Historic Properties may be applied to one historic resource type or a variety of historic resource types; for example, a project may include a complex of buildings such as a house, garage, and barn; the site, with a designed landscape, natural features, and archeological components; structures such as a system of roadways and paths or a bridge; and objects such as fountains and statuary.

Historic Resource Types & Examples

Building: houses, barns, stables, sheds, garages, court-houses, city halls, social halls, commercial buildings, libraries, factories, mills, train depots, hotels, theaters, stationary mobile homes, schools, stores, and churches.

Site: habitation sites, funerary sites, rock shelters, village sites, hunting and fishing sites, ceremonial sites, pëtroglyphs, rock carvings, ruins, gardens, grounds, battlefields, campsites, sites of treaty signings, trails, areas of land, shipwrecks, cemeteries, designed landscapes, and natural features, such as springs and rock formations, and land areas having cultural significance.

Structure: bridges, tunnels, gold dredges, firetowers, canals, turbines, dams, power plants, corn-cribs, silos, roadways, shot towers, windmills, grain elevators, kilns, mounds, cairns, palisade fortifications, earthworks, rail-road grades, systems of roadways and paths, boats and ships, railroad locomotives and cars, telescopes, carousels, bandstands, gazebos, and aircraft.

Object: sculpture, monuments, boundary markers, statuary, and fountains.

District: college campuses, central business districts, residential areas, commercial areas, large forts, industrial complexes, civic centers, rural villages, canal systems, collections of habitation and limited activity sites, irrigation systems, large farms, ranches, estates, or plantations, transportation networks, and large landscaped parks.

Adapted from:

The Secretary of the Interior's Standards for the Treatment of Historic Properties with Illustrated Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings. Kay D. Weeks and Anne E. Grimmer. The 1995 Standards for the Treatment of Historic Properties are regulations (36 CFR 68) used within the HPF grant-in-aid program to States, tribes, and local governments. They are also used by federal agencies, and have been adopted by many local historic district commissions nationwide. Updated Guidelines in a recommended/not recommended format address all four work options offered in the Standards, as applied to historic buildings. They are useful to anyone undertaking a historic preservation project on a historic building. 196 pages; illustrated. *GPO stock number: 024-005-01157-9. $29.50 per copy.*

Please see:

http://bookstore.gpo.gov/actions/GetPublication.do?stocknumber=024-005-01157-9

http://www.nps.gov/history/hps/tps/standards_guidelines.htm

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, general provisions of the Contract, including General and Supplementary Conditions, and Division 01 General Requirements, are a part of this Section and shall be binding on all Contractors and Subcontractors who perform this work.

1.2 SUMMARY

A. This Section includes the following:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Work restrictions.
5. Specification and drawing conventions.
6. Miscellaneous provisions.

1.3 PROJECT INFORMATION

A. Project Identification: “Whittemore-Robbins Estate – Rehabilitation of Three Buildings”. The estate consists of three buildings; the Mansion and Carriage House, both constructed in 1800 and the Cottage, built several years later. In July 1974 all three buildings were placed on the National Register of Historic Places as part of the Arlington Town Center District, NRHP reference No. 74000361. As a historic property the work of this Contract was designed in conformance with and all construction work shall likewise conform with The Secretary of the Interior’s Standards for the Treatment of Historic Properties 1995, a copy of which is included in the Project Manual.

1. Project Location: 670R Massachusetts Avenue | Arlington, MA

B. Owner: Town of Arlington, Massachusetts | 730 Massachusetts Avenue | Arlington, MA 02476

C. Architect: Spencer, Sullivan & Vogt Architects and Andrew Jerome Cannata, AIA – Architect | One Thompson Square | Charlestown, MA 02129.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of this Phase is defined by the Contract Documents and generally consists of the following:

1. Mansion – Exterior Only: Historically-sensitive building envelope repairs to a 3-½ story Federal Style building with former kitchen ell. The front and rear walls along with the ell are clapboard and the two sidewalls are brick. Work generally consists of repair and some replacement of wood siding, wood sash, wood balusters, wood porch decking, various wood details, and wood shutters. Brick masonry shall be repointed as indicated and required, and sand-set paver brick walkway repaired as indicated. The wrought iron railing at the granite steps leading to the front porch, and the pipe rail at the accessibility ramp shall be repaired as indicated. Only items added in this project or so noted as needing paint shall be painted. The existing HVAC equipment enclosures shall be

removed and replaced in kind.

2. Carriage House – Interior Only: The interior is currently only partially finished in scored board paneling. All existing wiring and electrical devices shall be demolished, and electrical wiring, panelboard, devices and fixtures shall be furnished and installed as indicated on a Design-Build basis. Scored board paneling shall be installed on the walls and ceilings in the Carriage Room, Alcove and Stair. Existing board paneling shall be salvaged and retrofitted in the Alcove with the remainder to be purchased. The existing wood stair shall be modified as indicated and a partition with a door shall be constructed at the head of the stair in the attic. The main attic space shall remain unfinished. The end bay of the ell, adjacent to the Alcove, is Garden Club Storage which shall be finished in plywood and painted. Although the Carriage House is unheated, the exterior walls of the Carriage Room and Alcove shall be insulated. A concrete vermin slab and wood stair shall be constructed in the Basement along with lighting. The existing fire alarm system shall remain in the completed work. The exterior of the Carriage House was rehabilitated in 2017 under the direction of Sullivan Buckingham Architects and Andrew Jerome Cannata, AIA – Architect.
3. Cottage – Exterior and Interior: Exterior work consists of the construction of a wood-framed porch, stair and accessibility ramp with steel handrails, demolition of wood entry vestibule and steps and construction of wood entry porch with roof and stair, wood privacy fencing at ramp, re-roofing with slate-look synthetic shingles, replacement of wood gutters and metal rainwater leaders, selective replacement of wood clapboard and shingle siding, sheathing, trim boards and moldings as indicated, selective repointing of stone foundation, adding sloped steel basement door, wood plank doors with strap hinges, replacement of several basement windows, and blocking-up of an abandoned basement window under the porch with CMU. Interior work is essentially a gut-rehabilitation of all finishes consisting of a removal of all lath and plaster, plumbing fixtures and related piping to basement ceiling level, all electrical fixtures, devices and wiring back to service entrance in basement, fire alarm system, built-in cabinetwork and countertops, stair to basement and straight portion of stair to second floor and portion of floor at stair head, modifying existing and constructing new wood stud partitions. Installing insulation in exterior walls, basement ceiling, and attic floor, sound insulation in office partitions, veneer plaster over gypsum lath at all partitions and ceilings on first and second floors, carpeting in offices, patching and refinishing wood floors, resilient flooring in accessible toilet rooms and foyer, HVAC system, plumbing fixtures and piping, electrical fixtures, devices and wiring, fire alarm system, modifications to second floor wood stair, and two accessible toilet rooms.

1.5 SCHEDULE

A. General: The Contractor shall prepare a detailed construction schedule, to be submitted to the Owner, Architect, and Owner's Representative for review and approval. The schedule must clearly demonstrate the proper sequencing of construction activities.

1.6 ACCESS TO SITE

A. General: Contractor shall have partial use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Mansion: The Mansion is a fully operational Town office building and will remain so during construction work at the exterior. The Contractor shall notify the Owner if an area requires a temporary chain link construction fence on an as-needed basis.

2. Carriage House and Cottage: These two buildings are vacant and the area of work shall be demarked with a temporary chain link construction fence. Enclosed area created by the construction fence shall encompass both buildings.

    a. North (front) elevation – 10 ft. from face of each building and traverse area between them where ramp is to be constructed.
    b. South (rear) elevation – To 4 ft. high fence at Verizon property line .
    c. East (house side) elevation – To within 4 ft. of stone wall at adjacent burial ground.
    d. West (playground) elevation – To East face of trash shed.

2. Confine the parking of workmen's and construction vehicles, and the storage of construction materials to a designated staging area determined by the Owner.
3. Owner Occupancy: Owner has no need to access Carriage House and Cottage.
4. Contractor may stage construction materials in the Carriage House but only on the concrete slabs on the 1st floor. The 2nd floor of the 2 story portion shall not be employed for construction materials storage.
5. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

    a. Schedule deliveries to minimize use of driveways and entrances.
    b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.7 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Work shall be generally performed during normal business working hours of 7:30 a.m. to 5:00 p.m., Monday through Friday, except as otherwise indicated.

1. Weekend Hours: Coordinate with Owner and Owner's Representative.

C. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to abutters with Owner.

1. Notify Owner's Representative ≥ 2 days in advance of proposed disruptive operations.
2. Obtain Owner's Representative's permission before proceeding with disruptive operations.

D. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to wear identification tags at all times.

1.8 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 48-division format and CSI/CSC's "MasterFormat" numbering system.

1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric

sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
3. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.

E. In general, the Specifications will describe the quality of the work and the Drawings, the extent of the work. The Drawings and Specifications are cooperative and supplementary; however, each item of the work is not necessarily mentioned in both the Drawings and the Specifications. All work necessary to complete the project, so described, is to be included in this Contract.

F. In case of disagreement between the Drawings and Specifications, or within either document itself, the Architect shall interpret the Documents to require the better quality or greater quantity of work for the Owner that can reasonably be construed therefrom. Any work performed by the Contractor without consulting the Architect, when the same requires a decision, shall be performed at the Contractor’s risk.

1.9 CODES, STANDARDS AND PERMITS

A. All work under this contract shall conform to all codes and standards in effect as of the date of receipt of Bids which are applicable to this Project. All work shall also conform to specific requirements and interpretations of local authorities having jurisdiction over the Project. These Codes, standards, and authorities are referred to collectively as “the governing codes and authorities” and similar terms throughout the Specifications. Determination of applicable codes and standards and requirements of the authorities having jurisdiction shall be the responsibility of the Contractor; as shall be the analysis of all such codes and standards in regard to their applicability to the Project for the purposes of determining necessary construction to conform to such code requirements, for securing all approvals and permits

necessary to proceed with construction, and to obtain all permits necessary for the Owner to occupy the facility for their intended use. In the case of conflicts between the requirements of different codes and standards, the most restrictive or stringent requirements shall be met.

B. The codes that were used in the design of this Project are as follows:

1. Commonwealth of Massachusetts State Building Code, 780 CMR Ninth Edition, including all referenced standards.

    a. 2015 International Building Code with Massachusetts amendments.
    b. 2015 International Existing Building Code (w/ 780 CMR Ch. 34 amendments).

C. Code Enforcement and Approvals: Secure the general building permit for the work, for which all fees will be paid by the Owner, and conform to all conditions and requirements of the permit and code enforcement authorities.

D. Identify all permits (other than general building permit) required from authorities having jurisdiction over the Project for the construction and occupancy of the work. Prepare the necessary applications and submit required plans and documents to obtain such permits in a timely manner.

1. Display all permit cards as required by the authorities and deliver legible photocopies of all permits to the Owner's Representative and Owner promptly upon their receipt.
2. Arrange for all inspections, testing and approvals required for all permits. Notify the Owner, Owner's Representative and Architect at least three business days in advance, so they may arrange to observe.
3. Comply with all conditions and provide all notices required by all permits.
4. Perform and/or arrange for and pay for all testing and inspections required by the governing codes and authorities, other than those provided by the Owner, and notify the Owner, Owner's Representative, and Architect of such inspections at least three business days in advance, so they may arrange to observe.
5. Where inspecting authorities require corrective work in conjunction with applicable codes and authorities, promptly comply with such requirements, except in cases where such requirements clearly exceed the requirements of the Contract Documents, in which case proceed in accordance with the procedures for modifications to the Work established in the Contract Documents.

E. The following Permit and Application fees have been waived by the Town of Arlington:

1. Arlington Building Permit and inspection fees.

1.10 OCCUPATIONAL SAFETY AND HEALTH ACT

A. The Contractor and each Subcontractor shall comply with the requirements of the Occupational Safety and Health Act of 1970 and the Construction Safety Act of 1969, including all standards and regulations which have been promulgated by the Governmental Authorities which administer such Acts. Said requirements, standards and regulations are incorporated herein by reference.

1. Each Contractor and Subcontractor shall comply with M.G.L. Chapter 306 of the Acts of 2004 which requires that all employees on the Project site complete a course in construction safety and health approved by the U.S. Occupational Safety and Health Administration (OSHA), known as the "OSHA 10-hour course."

B. The Contractor and each Subcontractor shall comply with said regulations, requirements and

standards and require and be directly responsible for compliance therewith on the part of his agents, employees, material, men, and Subcontractors; and shall directly receive and be responsible for all citations, assessments, fines or penalties which may be incurred by reason of his agents, employees, material men or Subcontractors failing to so comply.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section "Summary", Paragraph 1.01A, entitled "Related Documents."

1.2 HISTORIC DESIGNATIONS

A. This property is listed in both the State and National Registers of Historic Places. All work performed for this project must comply with the Secretary of the Interior's Standards for the Treatment of Historic Properties. Contractors are cautioned to exercise all possible care in handling historic portions of the building fabric.

1.3 PRE-CONSTRUCTION MEETING

A. A Pre-Construction Meeting with the Contractor and Owner shall be held on-site within one week of signing the contract.

1.4 PROJECT SIGN

A. A free-standing project sign provided by the Owner shall be installed within two weeks of the start of the project; location to be determined by the Project Manager. Project sign must remain in place until the project is closed out.

B. Sign size: $\geq$ 4 x 4 feet.

C. Sign material: ½ inch to ¾ inch thick exterior grade plywood.

1.5 CONTRACTOR USE OF PREMISES

A. General: Limit use of the premises to construction activities in areas indicated. Work hours on-site are limited to 7:30 am to 5:00 pm. Temporary toilet facilities shall be provided and maintained by the Contractor for the duration of the Contract.

B. Confine operations to areas immediately around the building. Portions of the site beyond areas on which work is indicated shall not be disturbed. Do not encumber the site with materials or equipment. Limit stockpiling of materials at the site. Coordinate locations of lay down area and waste container locations with Project Manager.

C. Use of the existing building: Maintain the existing buildings in a safe and weathertight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building during the construction period.

D. Submit a work plan detailing the schedule proposed to accomplish the work, including the order in which specific elevations and work items will be worked on; protection of entry ways and paths used by employees and the general public; and protection of museum property within the building from inclement weather, dust and construction debris, and theft and vandalism. Designate key personnel to coordinate work and schedule with museum staff.

1.6 UTILITIES

A. The Owner shall pay for water and electricity usage during construction. Contact *DigSafe* (888-344-7233) 72 hours prior to commencing any excavation.

1.7 COORDINATION OF INSURANCE COVERAGE

A. The Contractor and the Owner shall have insurers coordinate Construction and Owner's insurance plans to avoid gaps and overlaps in coverage during construction.

B. Contractor's required insurance shall include all major divisions of coverage, and shall be on a comprehensive general basis, including Premises and Operations (including X-C-U), and Owned, Non- owned, and Hired Motor Vehicles. Such insurance shall be written for not less than any limits of liability required by law or those set forth below. Coverage(s), whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment.

1. Workmen's Compensation: Statutory. Employers Liability, $500,000.
2. Public Liability – Per Person/Per Occurrence.
   Bodily and Personal Injury $1,000,000/$2,000,000. Property Damage $1,000,000/$2,000,000 Aggregate.
3. Automobile Liability – Per Person/Per Occurrence.
   Bodily Injury $500,000/$1,000,000. Property Damage $500,000 Per Occurrence.
4. Independent Contractors – Same limits as above.
5. Products and Completed Operations – Same limits as above, maintained for an additional one year after Final Completion.
6. Contractual Liability – Same limits as above.

1.8 REGULATIONS AND GENERAL REQUIREMENTS

A. All materials and operations shall be in accordance with 780 CMR the Massachusetts State Building Code, current edition, as amended; the requirements of the Massachusetts Department of Public Safety Codes and Regulations; the American Society of Testing Materials (ASTM); the Federal Standards; applicable public agencies or authorities, including all rules, regulations, laws, and ordinances of the Town of Arlington; other standards hereinafter indicated; and the current rules, standards, and specifications of the trade or materials or safety organization that normally has jurisdiction over the respective material, operation, or class of work. The most stringent requirements or conditions applicable shall apply to this project.

B. The Contractor shall, at his or her own expense, secure and pay for all permits, inspections, and fees, and give all legal notices that may be required in connection with his or her work, including the notification of local utility companies regarding location of subsurface water, gas, electric, and other utility lines.

1.9 MANUFACTURER'S SPECIFICATIONS

A. All manufactured products and materials shall be installed in accordance with manufacturers' installation instructions. It is the Contractor's responsibility to be fully familiar with the

manufacturers' installation specifications regardless of whether the specifications were shipped with the product or material.

1.10 STORAGE OF MATERIALS AND EQUIPMENT

A. Materials and equipment may be stored on the site as allowed by the Owner.

B. All material stored on site shall be protected from weather or damage as per manufacturers' recommendations and good construction practices. Materials shall be stored in an orderly fashion.

1.11 TEMPORARY FACILITIES

A. Provide all required staging, lifts, lulls, and other means of access to the work. Provide temporary construction fencing.

1.12 HANDLING OF MATERIALS

A. All materials shall be handled, stored, and protected as per the manufacturers' recommendations.

1.13 FIELD CONDITIONS

A. Verify all conditions in the field before proceeding with the Work. Notify the Project Manager immediately of any discrepancies between the plans, specifications, and site conditions.

1.14 NEW AND EXISTING WORK AND CONDITIONS

A. All details and characteristics of new and/or modified work (conditions and materials) shall match all details and characteristics of adjacent or similar existing work unless indicated otherwise.

B. Existing conditions and materials that are defective, or those that have materials or equipment or devices removed or that are modified in this work shall be repaired, patched, and refinished to a smooth, even plane to match the adjacent surfaces or class of work.

C. All materials shall be new unless otherwise specified and shall conform to standards specified herein. All manufactured articles, materials, and equipment shall be fabricated, assembled, shaped, finished, applied, installed, connected, erected, used, cleaned, and conditioned in accordance with manufacturers' printed directions or specifications, from which the most stringent conditions shall apply, unless herein specified to the contrary. Submit two copies of such directions to the Project Manager.

1.15 BROKEN GLASS

A. The Contractor shall be held responsible at all times prior to acceptance of the Work as completed, for all broken or scratched glass that has been damaged as a result of the work of this Contract. When so directed by the Project Manager, prior to completion of the whole project, the Contractor shall replace, at his or her own expense, all such glass broken, missing, or damaged.

1.16 DEMOLITION

A. Remove and properly dispose of all construction waste generated by the Work.

B. All materials and finishes to be retained shall be protected from damage during demolition and construction. Should any damage occur, the Contractor shall be responsible for repairing or replacing materials and finishes to their original condition.

1.17 RUBBISH REMOVAL AND FIRE PROTECTION AND PREVENTION

A. Keep the building and build site free of rubbish and debris at all times. Thoroughly clean the work areas and premises of rubbish and debris of any nature, and remove such material from the premises at the end of each work day.

B. Remove all rubbish, waste, tools, equipment, and appurtenances caused by and used in the execution of the Work; maintain the building and site clean and free of debris, leaving all work in a clean condition every day.

C. A waste container shall be kept on the site at all times during construction. Size of container shall be as required by the work. The container shall be emptied on a regular basis. The Contractor shall be responsible for all container and disposal fees.

1.18 HAZARDOUS WASTE AND MATERIALS

A. Notify the Owner and Project Manager promptly if hazardous material is discovered on site during construction. The Contractor shall not be responsible for the removal or correction of any hazardous waste conditions unless otherwise indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.1A, entitled “Related Documents.”

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.
2. Division 01 Section "Quality Requirements" for general testing and inspecting requirements.

1.3 DEFINITIONS

A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work 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 required by the Contract Documents are increased or decreased.

B. Abbreviations: The following abbreviations for units of measurement are used in unit prices:

1. S.F.: square foot
2. L.F.: linear foot
3. C.F.: cubic foot.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

1. Unit price amounts are net changes in the Contract Sum for additional work and include the Contractor’s and any Subcontractor’s amount for overhead and profit.
2. For deleted work, the net credit to the Contract Sum shall be 10% less.

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.

D. List of Unit Prices: A list of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 LIST OF UNIT PRICES

A. Provide the following unit prices as listed on the Bid Form:

1. Cedar Clapboard Siding over ¾ in. board sheathing:

   a. Description: Remove and replace rotted or deteriorated clapboard siding and wall sheathing according to Division 06 Sections “Sheathing” and “Exterior Finish Carpentry”.
   b. Unit of Measurement: S.F.
   c. Base Bid Quantity: 100 S.F.

2. Cedar Shingle Siding over ¾ in. board sheathing:

   a. Description: Remove and replace rotted or deteriorated cedar shingle siding and wall sheathing according to Division 06 Sections “Sheathing” and “Exterior Finish Carpentry”.
   b. Unit of Measurement: S.F.
   c. Base Bid Quantity: 30 S.F.

3. Roof Sheathing:

   a. Description: Remove and replace rotted or deteriorated board sheathing with ¾ in. board sheathing.
   b. Unit of Measurement: S.F.
   c. Base Bid Quantity: 100 S.F.

4. Paver Brick Walk

   a. Description: At depression in walk, remove and stockpile existing paver bricks, add gravel and stone dust as required to fill substrate depression when compacted reinstall paver bricks according to Division .
   b. Unit of Measurement: S.F.
   c. Base Bid Quantity: 100 S.F.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each Alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of Alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each Alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Cottage Interior; Ceramic Wall Tile and Porcelain Floor Tile.

1. Under Base Bid the Women's Toilet, Men's Toilet Rooms and Foyer are to receive resilient sheet flooring and the walls in the Toilet Rooms shall receive sprayed-glaze epoxy.
2. Under Alternate No. 1 the Women's Toilet, Men's Toilet Rooms and Foyer are to receive porcelain tile flooring and the walls in the Toilet Rooms shall receive ceramic tile. Also included is the addition of a ceramic tile backsplash at the Countertop in the Lower Lobby.
3. Affected trades and materials include gypsum veneer plastering, tiling, caulking and sealants, and painting.

B. Alternate No. 2: Carriage House Interior; Add Terrazzo Floor Feature.

1. Under Base Bid the concrete slab and several embedded cast-iron straps shall be demolished within the circular area of the concrete slab indicated in the Main Function Space. Within the circular area concrete shall be placed and replacement slab scored to produce the pattern indicated. When this and all other concrete repairs have been made to the slab in the Main Function Space and Alcove, the entire slab shall be ground to a honed finish.
2. Under Alternate No. 2 the replacement slab shall be ½ inch portland cement terrazzo over a concrete underbed. The terrazzo shall be done in 2 colors using divider strips in the pattern indicated. When this and all concrete repairs have been made to the slab in the Main Function Space and Alcove, the entire slab shall be ground to a honed finish.
3. Affected trades and materials include concrete and portland cement terrazzo.

C. Alternate No. 3: Cottage Exterior; Add Wood Shutters.

1. Under Base Bid the Cottage has no shutters.
2. Under Alternate No. 3 provide painted exterior wood shutters.
3. Affected trades and materials include exterior wood shutters.

D. Alternate No. 4: Cottage Interior; Add Crown Molding.

1. Under Base Bid the wall and ceilings Lower and Upper Lobbies shall receive veneer plaster, painted.
2. Under Alternate No. 4 the Lower and Upper Lobbies shall receive painted wood crown moldings after the installation of the veneer plaster.
3. Affected trades and materials include interior architectural woodwork and painting.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

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

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 AIA Document G710, "Architect's Supplemental Instructions” or similar form prepared by Architect.

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. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
2. Within 10 days after receipt of Proposal Request, submit a quotation to the Architect, 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 unforeseen conditions require modifications to the Contract, Contractor may propose changes by first submitting a “Request for Information” to the Architect. This request will be responded to by the Architect, wherein the Contractor may submit a Change Order Proposal.

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.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, the Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701 or similar form.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Sections include the following:

1. Division 01 Section "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
2. Division 01 Section "Closeout Procedures" for submitting warranties.
3. 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 Architect's responsive action.

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

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
2. Initial Submittal: Submit concurrently with preliminary network diagram. Include submittals required during the first 60 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.
4. Update the submittals schedule periodically as the work progresses. Submit concurrently with each Application for payment.
5. Utilize a computerized program for tracking submittals. Submit the following reports bi-weekly:

    a. Complete list of reviewed submittals.
    b. Listing of submittals to date.
    c. Listing of approved submittals.
    d. Listing of rejected submittals.
    e. Listing of submittals returned for correction.
    f. List of outstanding submittals.

6. At the request of the Architect provide reports capable of being sorted by the following criteria:

    a. Approved status.
    b. Subcontractor/Supplier.
    c. Submission date.
    d. Number of days late for return.
    e. Number of days under review.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.

1. Architect will furnish Contractor digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.

    a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
    b. Digital Drawing Software Program: The Contract Drawings are available in AutoCAD format.
    c. Contractor shall execute a data licensing agreement in an Agreement form acceptable to Owner and Architect.
    d. The following digital data files will by furnished for each appropriate discipline:

        1) Floor plans.
        2) Reflected ceiling plans.

B. 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. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. 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. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 2 weeks for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect 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 two weeks for review of each resubmittal.

a. The Owner reserves the right to deduct said reimbursement from the Contractor’s application for payment on a monthly basis.

4. Concurrent Consultant Review: Submittals shall be transmitted simultaneously to Architect and to Architect's consultants. Allow two weeks for review of each submittal. Consultant will return submittal to Architect before being returned to Contractor.

D. Submittals: Place a label or title block on each submittal item for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Include the following information for processing and recording action taken:

a. Project name.
b. Date.
c. Name of Architect.
d. Name of Contractor.
e. Name of subcontractor.
f. Name of supplier.
g. Name of manufacturer.
h. Identify submittals with the specification section and the order of submission. For example, the first submittal filed under the Painting section should be identified as submittal **09 91 00-01**. Revised submittals shall be resubmitted using the original number and an appended suffix (R1 for the first resubmittal, R2 for the second, etc.) For example, the first resubmittal of the example submittal above would be **09 91 00-01-R1**.
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.
l. Other necessary identification.

4. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return without review submittals received from sources other than Contractor.

a. Transmittal Form: Provide locations on form for the following information:

1) Project name.
2) Date.
3) Destination (To:).
4) Source (From:).
5) Name and address of Architect.
6) Name of Contractor.
7) Name of firm or entity that prepared submittal.
8) Names of subcontractor, manufacturer, and supplier.
9) Category and type of submittal.
10) Submittal purpose and description.
11) Specification Section number and title.
12) Specification paragraph number or drawing designation and generic name for each of multiple items.
13) Drawing number and detail references, as appropriate.
14) Indication of full or partial submittal.
15) Transmittal number.
16) Submittal and transmittal distribution record.
17) Remarks.
18) Signature of transmitter.

E. Options: Identify options requiring selection by Architect.

F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification 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 marked “No Exception Taken” or “Make Corrections as Noted.”

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: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with notation described in G-3 above from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Email electronic submittals as PDF electronic files to Architect.

a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Certificates and Certifications Submittals: Provide a 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.

a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
b. Provide a notarized statement on original paper copy certificates and certifications where indicated.

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. Colors will not be selected from PDF’s.
e. Manufacturer's catalog cuts.
f. Wiring diagrams showing factory-installed wiring.
g. Printed performance curves.
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.
n. Notation of coordination requirements.

4. For equipment, include the following in addition to the above, as applicable:

a. Wiring diagrams showing factory-installed wiring.
b. Printed performance curves.
c. Operational range diagrams.
d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:

a. PDF electronic file, with the exception of Color Selector sheets.

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**,** unless submittal based on Architect's digital data drawing files is otherwise permitted.

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.
o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.

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 42 inches.
3. Submit Shop Drawings in the following format:

a. PDF electronic file.
b. Three opaque copies of each submittal. Architect will retain two copies; remainder will be returned.

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.
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 sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect 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 Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.

      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.

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

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

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

I. 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.

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

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

L. Application for Payment and Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."

M. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."

N. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."

O. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

P. 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 architects and owners, and other information specified.

Q. 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.

R. 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.

S. 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.

T. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

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

V. 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.

W. 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.

X. 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.

7. Limitations of use.

Y. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements."

Z. 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.

AA. 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.

BB. 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.

CC. 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.

DD. 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.
6. Recommendations for cleaning and protection.

EE. 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.

FF. 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.

GG. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Architect.

1. Architect will not review submittals that include MSDSs and will return the entire submittal for resubmittal.

2.2 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 Architect.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit five 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 Architect.

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 ARCHITECT'S ACTION

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

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

1. “NO EXCEPTION TAKEN”: The portion of Work covered by the submittal may proceed provided it complies with the Contract Documents.
2. “MAKE CORRECTIONS AS NOTED”: The portion of Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal, and with the Contract Documents.
3. “REVISE AND RESUBMIT”: Revise or prepare a new submittal in accordance with

notations; resubmit. Do not proceed with that portion of the Work covered by the submittal.

4. "REJECTED": Submittal is not acceptable. Do not proceed with that portion of the Work covered by the submittal.
5. "NOT REVIEWED": Submittals not required by the Contract Documents may not be reviewed and may be discarded.

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

D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

END OF SECTION

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's or his Consultant’s action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's or his Consultant’s duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "No Exception Taken": When used to convey Architect's action on Contractor's submittals, applications, and requests, "no exception taken" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

I. "Provide": Furnish and install, complete and ready for the intended use.

J. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

D. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the organizations responsible for the standards and regulations.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Sections include the following:

1. Division 01 Section "Summary" for limitations on utility interruptions and other work restrictions.
2. Division 01 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.

C. Temporary Facilities and Controls to be provided by the Contractor, unless identified specifically as the work of a Filed Subcontractor.

1.3 USE CHARGES

A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

B. Electric Power Service: Pay electric power service use charges for electricity used by all entities for construction operations.

1.4 SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

A. General: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to the following:

1. Massachusetts State Building Code and referenced standards.
2. Health and safety regulations.
3. Utility company regulations.
4. Police and Fire Department rules and regulations.
5. Environmental Protection Agency regulations.

B. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

C. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each

temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portable Chain-Link Fencing: ≥ 2-inch, 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; ≥ 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide galvanized steel bases for supporting posts.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Contractor may at his option have a mobile unit field office on site, or set-up a temporary office in the Cottage or Carriage House, and relocate it as needed to facilitate the work being done in that part of the building.

1. A portion of the Cottage basement could be used as it would not interfere with the work of the Project.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. Electrical Power Cords: Provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary services.

1. Arrange with utility company, Owner, and Project Manager for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

C. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

D. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

1. Install electric power service overhead, unless otherwise indicated.

F. Waste Disposal Facilities: Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal."

G. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials > 7 days during normal weather or
> 3 days when the temperature is expected to rise above 80°F (27°C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Separate, salvage, recycle and dispose of materials in accordance with the Commonwealth of Massachusetts “Waste Ban” 310 CMR 19.017.

1. Comply with Division 01 Section "Execution" for progress cleaning requirements.
2. The Contractor shall provide sufficient quantity of dumpsters at strategic locations within the Contract limit lines for collection of waste from the work of all subcontractors on site.
3. Do not pass materials through open windows, or through window openings when any portion of the window remains in the opening.

H. Staging and Scaffolding: Where staging and scaffolding is required, the Contractor shall provide the entire installation, except for the Work of all Filed Subcontractors. The Filed Subcontractors are responsible to provide all staging and scaffolding for the scope of their Work.

1. Staging shall be of approved design, erected and removed by experienced stage builders and shall have all accident prevention devices required by State and local laws.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Division 01 Section "Summary."

B. Tree, Shrubbery and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

C. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide Owner with one set of keys.

D. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

E. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Provide enclosures as required on the exterior or interior side of the building, whether the roof has been installed or not, and whether windows or doors have been installed or not, in order to protect the Work and allow Work to continue in accordance with the requirements of the Specifications. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.

    a. The design of temporary enclosures at the Mansion where window sash have been removed to be repaired off-site and installed at a later date shall be as indicated on Drawing No. A-103.

G. Protection: Protect the Work at all times from damages. Provide all pumps, equipment and enclosures to ensure this protection.

1. Remove all snow and ice as may be required for proper protection and prosecution of the work.
2. Provide all shoring, bracing and sheeting as required for safety and for proper execution of work.
3. Protect all work from damage during cold weather. If low temperatures make it impossible to continue operations safely in spite of cold weather precautions, cease work and notify Architect. Repair and/or replacement of all work damaged from frost, freezing or any elements of the weather are the responsibility of the Contractor responsible for temporary protection of the Work.
4. Should high wind warnings be issued by the U.S. Weather Advisory Bureau, take every precaution to minimize danger to persons, to the Work, and to adjacent properties, including, but not limited to, removing all loose materials, tools and/or

equipment from exposed locations, and removing or securing scaffolding or other temporary work.

5. Protect the building and the site from damage, loss or liability due to theft or vandalism when the work is not in progress at night, weekends, or holidays.
6. Exercise precaution for the protection of persons and property at all times. Observe the provisions of applicable laws and construction codes. Take additional safety and health measures, or cause such measures to be taken as reasonably necessary. Maintain guards on machinery, equipment and other hazards as set forth in the safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, to the extent that such provisions are not in contravention of applicable laws.
7. Protect and preserve in operating conditions all utilities traversing the work area. Repair all damages to any utility due to work performed under this Contract, the satisfaction of the Architect at no additional cost to the Owner.

H. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241 and the Town of Templeton Fire Department requirements.

1. Prohibit smoking in construction areas.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor.
2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. This Section includes procedural requirements for cutting and patching and pertains to all trades.

1.3 DEFINITIONS

A. Cutting: Penetration of in-place construction necessary to permit installation or performance of other Work, including the removal of debris.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 SUBMITTALS

A. Cutting and Patching Proposal: Submit a proposal describing procedures ≥ 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:

1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
3. Products: List products to be used and firms or entities that will perform the Work.
4. Dates: Indicate when cutting and patching will be performed.
5. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
6. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive Architect’s right to later require removal and replacement of unsatisfactory work.

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio. Structural elements include, but are not limited to the following:

1. Masonry foundation construction.
2. Bearing and retaining walls, including architectural precast panels.
3. Structural steel frame.
4. Interior and/or exterior load bearing masonry wall construction.

B. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building’s aesthetic qualities. Remove and replace construction that has been cut and patched in a

visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

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

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. Cutting and Coring Responsibility:

    a. Cutting concrete slabs on grade for all work is the responsibility of the General Contractor.
    b. Cutting of structural wood framing is the responsibility of the General Contractor.
    c. Cutting of openings in roof framing is the responsibility of the General Contractor.
    d. Cutting and removal of roofing system is the responsibility of the Roofing Filed Subcontractor.

2. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
3. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
4. Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
5. Proceed with patching after construction operations requiring cutting are complete.

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

1. Patching Responsibility:

    a. Patching in conjunction with the cutting work of each Filed Subcontractor is the responsibility of the Filed Subcontractor. All other patching is the responsibility of the Contractor responsible for the cutting and coring.
    b. If the size of the cut is in excess of that required for the penetrating item, and exceeds the 6 inch dimension for work of the Filed Subcontractor, the patching is the responsibility of the Filed Subcontractor.

2. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

3. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

4. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to

a weathertight condition.

D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

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

1. Salvaging nonhazardous construction waste.
2. Recycling nonhazardous construction waste.
3. Disposing of nonhazardous construction waste.

1.3 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

A. The Contractor shall prepare and submit a Construction Waste Management Plan to the Owner and Architect for approval. The CWM Plan shall outline the provisions to be implemented by the Contractor and Subcontractors to recycle and salvage demolition and construction waste generated during the project.

B. Upon approval of the CWM Plan by the Owner and Architect, it shall be implemented by the Contractor and Subcontractors throughout the duration of the project, and documented in accordance with the Submittal Requirements below.

C. The Construction Waste Management Plan shall include, but not be limited to, the following components:

1. Listing of Targeted Materials: The contractor shall develop a list of the waste materials from the Project that will be targeted for reuse, salvage, or recycling. The following materials, at minimum, shall be accounted for (materials that will not be recycled shall be indicated as such):

a. Cardboard, paper, packaging
b. Clean dimensional wood
c. Beverage containers
d. Concrete Masonry Units (CMU)
e. Metals including steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
f. Paint
g. Glass

2. Landfill Information: The contractor shall provide the name and location of the landfill(s) where trash will be disposed of.
3. Recycling or Salvaging Facilities: The contractor shall provide the names and locations of the recycling or salvaging facilities where waste materials will be delivered.
4. Sorting Method: The contractor shall provide a description of the proposed means of sorting and transporting the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site for off-site sorting). Waste haulers using off-site sorting operation shall provide a written description of the sorting process used, and their method for calculating project-specific recycling rates.
5. Packaging Waste: The contractor shall note whether suppliers will eliminate or take back packaging for major materials delivered to the site.
6. Implementation and Supervision: The contractor shall include provisions in the Construction Waste Management Plan for addressing conditions in the field that do not adhere to the CWM Plan, including provisions to rectify non-compliant conditions.
7. Additional Information: The contractor shall include any additional information deemed relevant to describe the scope and intent of the CWM Plan to the Owner and Architect.

D. Construction Waste Management and recycling requirements shall be incorporated into all Subcontractors' contracts.

1.5 SUBMITTALS

A. Waste Management Plan: Submit 3 copies of plan within 30 days of date established for the Notice to Proceed.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and

disposal facilities.
5. Review waste management requirements for each trade.

1.7 WASTE MANAGEMENT PLAN

A. General: Develop plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Include separate sections in plan for demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing, and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement waste management plan as approved by Architect and Owner. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

B. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

3.2 RECYCLING CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Owner.

C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.

1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

3.3 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Site-Clearing Wastes: Chip brush, branches on-site.

C. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

3.4 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

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.

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, Final Completion construction photographs, damage or settlement surveys, property surveys, 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. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect 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 Architect, 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 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
2. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
3. Submit lien waivers and/or certificate of payment received, as required by Owner, from all subcontractors.
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, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect 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.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit list, including 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 Architect.
    d. Name of Project Manager.
    e. Name of Contractor.
    f. Page number.

1.6 WARRANTIES

A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-½ -by-11-

inch paper.

2. 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.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

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 building.
    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. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    h. Sweep concrete floors broom clean in unoccupied spaces.
    Clean transparent materials, including and glass in windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.

i. Remove labels that are not permanent.
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.

1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

j. Leave Project clean and ready for occupancy.

2. Before requesting final inspection for determining date of Final Completion, complete cleaning operations listed above as required following Substantial Completion and completion of all punch list items.

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.

1. Comply with waste ban regulations of the Massachusetts Department of Environmental Protection (MassDEP), 310 CMR 19.017, for disposal of concrete, metal and wood.

3.2 REPAIR OF THE WORK

A. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

END OF SECTION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.1A, entitled “Related Documents.”

1.2 SUMMARY

A. This Section specifies the general requirements for the site work included in the Contract.

B. These requirements supplement those contained in the Standard General Conditions of the Construction Contract and their Supplemental Conditions.

C. References are included in this Section to Articles of the General Conditions to call the Contractor's attention to frequently needed requirements.

1.3 PERMITS

A. Unless otherwise provided in the Supplementary Conditions, the Contractor shall obtain and pay for all construction permits and licenses. The Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. The Contractor shall pay all charges and inspection fees necessary for the prosecution of the Work, and shall pay all charges of utility owners for connections to the Work.

1.4 LAWS AND REGULATIONS

A. Contractor shall give all notices and comply with all laws and regulations applicable to furnishing and performance of the Work.

B. If the Contractor performs any work that is contrary to laws or regulations, the Contractor shall bear all claims, costs, losses and damages caused by, arising out of or resulting therefrom.

1.5 UTILITIES

A. Shown or Indicated*:* The information and data shown or indicated in the Contract Documents with respect to existing underground facilities (utilities) at or contiguous to the site is based on information and data furnished to Owner or Architect by the owners of such underground facilities (utilities) or by others.

1. The Owner and Architect shall not be responsible for the accuracy or completeness of any such information or data; and

2. The cost of all of the following will be included in the Contract and Contractor shall have full responsibility for: (i) reviewing and checking all such information and data; (ii) locating all underground facilities (utilities) shown or indicated in

the Contract Documents; (iii) coordination of the Work with the owners of such underground facilities (utilities) during construction; and (iv) the safety and protection of all such underground facilities (utilities) and repairing any damage thereto resulting from the Work.

B. Not Shown or Indicated: If an underground facility (utility) is uncovered or revealed at or contiguous to the site which was not shown or indicated in the Contract Documents, the Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency), identify the owner of such underground facility (utility) and give written notice to that facility (utility) owner and to Owner and Architect. Architect will promptly review the underground facility (utility) and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence of the underground facility (utility). If the Architect concludes that a change in the Contract Documents is required, revised plans and specifications will be issued to reflect and document such consequences. During such time, the Contractor shall be responsible for the safety and protection of such underground facility (utility).

B. Contractor shall notify all municipal agencies and utility companies owning or operating utilities, of proposed work affecting the utilities, or agencies.

C. Contractor shall give written notification within the time period required by the agency or company for advance notification. A copy of the notification shall be furnished to the Architect.

D. Contractor shall notify "DIG SAFE" before commencing any work in the vicinity of existing subsurface utilities.

E. Contractor shall secure in-place existing utilities whose support is affected by the work and cooperate and assist the agency or company operating the utility in maintaining the utility services. Contractor shall correct any damage to the utilities caused by construction operations by repair or replacement, as required by the utility owner. When the repair or replacement is made by the utility owner, Contractor shall pay all costs assessed by the utility owner for the work.

F. If the existing utilities are found to conflict with the proposed work, the Contractor shall protect and maintain the utilities and take measurements to determine the location, type and dimensions of the utility. The information shall be furnished to the Architect who will determine the changes required in the proposed work or existing utilities to resolve the conflict as soon thereafter as is reasonable.

G. Contractor shall verify the location, size, invert elevation and type of existing facilities at all points of connection prior to ordering new utility materials.

1.6 REFERENCED STANDARDS

A. References are made to technical societies, organizations and groups using the following abbreviations. All work so referred shall conform to the current edition of the referenced standard.

ACI	American Concrete Institute
AGC	Associated General Contractors of America
ANSI	American National Standards Institute
AOAC	Association of Official Agricultural Chemists
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
OSHA	Occupational Safety and Health Administration

1.7 STATE AND LOCAL REFERENCE STANDARDS

A.	Building Code	780 CMR Massachusetts State Building Code (2015 International Building Code with Mass. Amendments)
B.	DEP	Massachusetts Department of Environmental Protection Laws, Regulations and Policies

END OF SECTION

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PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Work of this section requires trade sub-bids and is governed by the provisions of the Massachusetts general laws (MGL), Public Bidding Law Chapter 149, Sections 44A to 44J inclusive; and applicable section of the MGL, Public Contract Law Chapter 30 as amended.

1.2 RELATED DOCUMENTS

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

1.3 SUMMARY

A. Work of this Section includes the following:

1. Demolition work of existing construction and building elements indicated on Drawings or by provisions of this Section.
2. Removal of existing resilient sheet flooring in existing Kitchen, Shower and Toilet rooms.
3. Removal of existing panel underlayment in existing Kitchen, Shower and first floor Toilet rooms under Alternate No. 1.
4. Salvage of existing items to be reused or recycled.

B. Related work of other Sections includes the following:

1. Division 01 Section “Alternates”
2. Division 06 for installation of wood siding, trim and sheathing after removal of existing damaged items.
3. Division 07 for installation of roofing system after removal of existing roof is specified in.

1.4 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse or store as noted on Drawings.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

F. Historic Wood: Wood that may date back to the original 1800 construction date, the mid 1800's ell or the 1908 addition of the neoclassical trim on the North elevation of the 2 story structure. It is not the intention of the Architect that historic wood in sound condition shall be removed or discarded.

1.5 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.6 SUBMITTALS

A. Landfill Records: Indicate receipt and acceptance of demolished material by a landfill facility authorized to accept such material.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 DEMOLITION, GENERAL

A. Carry out all demolition work in a neat and orderly manner. Keep noise, dust, and similar nuisances to a minimum. Do not collapse walls. Do not throw or drop materials.

B. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

    a. Siding and trim indicated on elevation drawings to be removed have been assumed by the Architect to be rotted or otherwise unsound. If, upon removal, they are found to be sound material they shall be re-employed in the same location or elsewhere in the work.
    b. It is possible that siding in sound condition may exist over sheathing that has deteriorated. In that case the Contractor shall comply with paragraph B.4.a., above.
    c. Door casing in Cottage shall be removed and temporarily stored for reemployment in the work after veneer plaster wall finishes have been installed.
    d. Doors in Cottage shall be stockpiled in Basement on treated WD 4x4 skids over 6 mil polyethylene sheet placed on floor.

C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Owner's Representative, items may be removed to a suitable, protected storage location off-site during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

3.2 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent materials to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect existing utilities and services indicated to remain in service and protect them against damage during demolition operations.
4. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
5. Cover and protect furniture, furnishings, and equipment that have not been removed.
6. Patch, repair or replace materials and items accidentally damaged during demolition operations.
7. Re-roofing Project Demolition: Removal of existing roofing materials shall not expose more of the underlying construction than can be recovered in one day with the specified roofing system.
8. Confine dust and debris to immediate area of demolition activity to the greatest extent practicable.

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

C. Remove temporary barricades and protections where hazards no longer exist.

3.3 DEMOLITION OF ARCHITECTURAL FINISHES

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. Do not use cutting torches without written permission from Owner's Representative. Comply with provisions of the Standard General Conditions and Owner's rules and procedures.
4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loading on supporting walls, floors, or framing.
5. Dispose of demolished items and materials promptly.

B. Remove all loose material from partially demolished work leaving only sound and secure construction.

3.4 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.

1. Remove and transport debris in accordance with the Standard General and Supplemental General Conditions.

3.5 RECYCLING OF MATERIALS

A. Recycling of Materials:

1. Contractor shall recycle any such items for which there exists an established local or state recycling program.

END OF SECTION

PART 1. - GENERAL

1.1 GENERAL PROVISIONS

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

1.2 SCOPE OF WORK

A. Provide all labor, materials, equipment, services, and transportation and perform all operations necessary to:

1. Design, fabricate, furnish, place and set all concrete formwork for all plain reinforced concrete on the project including site development and utilities outside the building.

2. Furnish and place all concrete reinforcing steel and welded wire fabric.

3. Complete all concrete work as shown on Drawings, as specified herein, or both.

B. All work shall be performed to secure for the entire job homogenous concrete having required strength, durability and weathering resistance without planes of weakness, and other structural defects, and free of pronounced honeycombs, air pockets, voids, and projections, offsets of plane, and other defacements on exposed surfaces.

1.3 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Anchor bolts are furnished under Section 05100 Structural Steel.

1.4 REFERENCES

A. Comply with Provisions of the following codes and standards, except as otherwise shown or specified.

1. American Concrete Institution Publications:

ACI 211.1 Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.

ACI 301 Specifications for Structural Concrete for Buildings

ACI 302 1R-04 Guide for Floor and Slab Construction

ACI 305R Hot Weather Concreting.

ACI 306R Cold Weather Concreting.

ACI Standard Practice for Curing Concrete

ACI 315 ACI Detailing Manual

ACI 318 Building Code Requirements for Reinforced Concrete.

ACI 347 Guide to Formwork for Concrete.

ASTM C 260 Standard Specification for Air Entraining Admixtures for Concrete.

ASTM C 494 Standard Specification for Chemical Admixtures for Concrete.

B. The Contractor shall at all times keep available on the site for reference the above codes and standards.

1.5 SUBMITTALS

A. Submit in accordance with Section 01300, for conformance with these Specifications and the related ACI recommendations the following items:

1. Name and Location of the Concrete Supplier and Plant.
2. Concrete Design mix.
3. Reports of Concrete Tests.
4. Manufacturer's Information on admixtures and curing agents.
5. The methods proposed for hot and cold weather curing and protection of concrete.

B. Submit shop drawings in electronic format (Adobe Acrobat) to the Architect for approval prior to fabrication in accordance with the General Conditions. In each submittal, pages shall be bound into one file for each specification section. Shop drawings shall include but shall not be limited to the following:

1. Bar reinforcement shop drawings shall include setting plans, wall elevations, bending diagrams, cutting lists, and other information so as to completely and unambiguously define and establish the location, spacing, size, length, bending, splicing, keying at construction joints, and all other pertinent information as required. Drawings shall show grades of reinforcing steel. Opposite hand reinforcing shall be detailed separately. Wall reinforcing shall be detailed on wall elevations.
2. Type, size and location of all accessories required for the proper assembling, placing and support of the reinforcement.
3. All openings, depressions, construction and control joints, trenches, sleeves, inserts and all other project requirements affecting reinforcing details and placing.
4. Furnish shop drawings showing the size and placement of the welded wire fabric specified for floor slabs and supported slabs on metal decking.

C. Before being submitted to the Architect, all shop drawings shall be properly checked and coordinated by the fabricator and by the Contractor and shall be stamped and signed accordingly. Drawings not complying with requirements will be returned unchecked and stamped "NOT APPROVED".

D. Preparation and submittal of shop drawings shall be arranged so as to afford ample time for checking, correcting and resubmitting as necessary until approval is obtained. No materials shall be fabricated until these drawings have been approved.

1.6 MOCK-UPS

A. Prepare sample apparatus slab panel 6 feet by 6 feet by 8” one metal form same thickness as the apparatus floor in a shaded area on site. Include all additives and surface treatments approved for construction, Carry out all steps -- placing, screeding, floating, troweling, finishing, curing and protection -- to produce a sample product for approval.

1.7 FIELD TESTS AND INSPECTIONS

A. The Architect will select a qualified Testing Laboratory or Materials Engineer to make inspection tests during the course of work as specified herein and as otherwise considered necessary. The Owner will pay costs of all tests.

B. All measuring, mixing, placing, and curing shall be subject to inspection by the Testing Laboratory and approval by the Architect. However, such inspection and approval shall in no way relieve the General Contractor of his responsibility to fulfill the requirements of this Contract.

C. Contractor shall cooperate in making tests and shall be responsible for notifying designated laboratory in sufficient time to allow making of cylinders at time of pour.

D. Compression Tests shall consist of four (4) cylinders for each test made, cured and tested by the laboratory during the progress of the job. At least one (1) test shall be made for each strength of concrete up to 60 cubic yards poured and at least one (1) test per strength for each 60 cubic yards thereafter. When pouring other concrete, at least one (1) test shall be made for each pour in excess of 30 cubic yards. Concrete for each set of cylinders shall be from one (1) sample representative of entire batch. If the Contractor wishes to establish the probable strength of the on site concrete with job cured cylinders for stripping or shoring, the contractor will arrange and pay for these additional sets of cylinders.

E. Slump test, to check consistency, shall be made from samples used to mold cylinders. Slump tests shall be made for each set of cylinders. Do not place concrete having slump outside of allowable slump range.

F. Test for determination of air content shall be made for approximately every third set of test cylinders in compliance with ASTM C138.

G. Contractor shall provide a covered box large enough to contain four (4) standard sets of concrete cylinders. At temperatures below 60 degrees F., box shall be electrically heated to maintain inside temperature of 60 to 80 degrees F. Cylinder shall be covered with moist burlap until delivery to laboratory, 24 to 72 hours after molding.

H. Sampling, molding, curing, and testing of cylinders shall conform to ASTM C31 and C39. Specimens shall be cured under laboratory conditions. Architect may require additional cylinders to be cured under field conditions when unusual conditions may tend to reduce concrete strength. Contractor shall cure these cylinders at the site under job conditions which approximate the curing conditions of the representative concrete.

I. One (1) cylinder of each set shall be tested for seven-day strength and three (3) for 28-day strength, unless otherwise directed by the Architect.

J. Report of tests submitted to Architect shall include: name of job, date and location of pour, design strength of concrete, mix data, slump, air content (if tested), compressive strength, age and condition of test cylinder, submitted in six copies.

K. Architect has authority to order, for any strength of concrete, increase in cement content and mix redesign for remaining work if either:

1. Average 7 day strength of any two (2) tests representing a particular design is less than 66% of specified strength; or

2. Average 28 day strength of any two (2) sets of 3 cylinders representing a particular design strength is less than 90% specified strength.

L. Average of all 28-day compression cylinder tests, as well as average of any five (5) consecutive strength tests of 3 cylinders each, representing each design strength, shall equal or exceed specified strength. No strength test of 3 cylinders each shall have average value of less than 85% of specified strength.

M. Where concrete does not comply with these requirements, Architect shall have the right to require, at Contractor's expense:

1. Test of hardened concrete cores according to ASTM C42.

2. Load test on portion of structure affected.

N. Where tests show that concrete is below specified strength, the Contractor shall remove all such concrete as directed by the Architect. Full cost of removal of low strength concrete and replacement with concrete of proper specified strength shall be borne by the Contractor, as shall all work required by such remedial action.

PART 2. - PRODUCTS

2.1 SLUMP

A. Use the stiffest mix possible that can be placed efficiently as listed in the following table.

Types of Construction	**Slump**	
	Maximum	**Minimum**
Reinforced foundation walls and footings	3	1
Plain footings, caissons, and substructure walls	3	1
Beams and reinforced walls	4	1
Pavements and slabs	3	1

May be adjusted according to Table 6.3.1 in ACI 211.1-91

2.2 APPROXIMATE DESIGN MIX PROPORTIONS

A. Concrete shall be proportioned based on the following tables computed on a weight basis.

28-day Compressive Strength (psi)	**Non Air Entrained** [a, b]				**Use**
	Cement [c] (Lb/yd)	**W/C**	**Coarse** [d] **Aggregate** (Lb/yd)	**Fine Aggregate** (Lb/yd)	
4000	596	0.50	1,701	1,365	Footings & Interior slabs on grade, slabs, walls, beams, and columns
4500	708	0.48	1,701	1,211	Slabs
5000 [e]	850	0.40	1,701	1,069	Slabs resistant to water

28-day Compressive Strength (psi)	Air Entrained [a, b]				Use
	Cement [c] (Lb/yd)	W/C	Coarse [d] Aggregate (Lb/yd)	Fine Aggregate (Lb/yd)	
4000	663	0.48	1,701	1,291	Footings, Foundation walls; exterior beams, columns, walls, and slabs exposed to water
4500	693	0.44	1,701	1,261	Slabs, beams, walls, and columns subject to freezing when wet or exposed to deicing salts
5000	763	0.40	1,701	1,191	For corrosion protection and in walls, columns, beams, and slabs when wet and exposed to deicing slats or sea water

a. Adjust proportions according to Table 6.3.3 in ACI 211.0-91
b. Based on ¾ maximum aggregate and four-inch slump.
c. Cement content based on W/C ratios listed in Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass concrete (ACI 211.1-91) Reapproved 1997, Table 6.3.4(a).
d. Based on a fine aggregate fineness modulus of 2.7.
e. Fire Station Apparatus Slab, substitute up to 15% GGBS or fly ash. Include midrange water reducing agent, calcium nitrate corrosion inhibitor. Class 5 floor as specified in ACI 302.1R-04.

2.3 CONCRETE CONTROL

A. Concrete producer shall furnish concrete, which meets strength and quality requirements specified herein.

B. The Contractor shall retain the services of a qualified testing agency or materials engineer approved by the Architect to test aggregate and to prepare mix design for each strength of concrete specified and shall submit such mix designs and test results to the Architect for approval. The cost of all such preliminary services shall be borne by the Contractor.

C. Concrete mix design shall be carried out in accordance with Chapter 3, "Proportioning" of ACI 301, Specifications for Structural Concrete Buildings. Required reports shall be submitted to the Architect in six copies.

D. Before start of concrete operations, the testing agency shall submit to the Architect the following data:

1. Fine aggregate: Organic content, sieve analysis and fineness modulus.

2. Coarse aggregate: Sieve analysis and results of sodium sulfate soundness test.

3. Concrete strength: Mix designs for each strength, including cement brand, proportions of aggregates by weight, slump, water-cement ratio and percentage of air.

4. Result of compressive strength tests on proposed mixes conforming to ASTM C192 and ASTM C39; (Submit 28 day test results on completion of test).

E. The material acceptance tests, trial mix data, and recommended job mixtures shall be presented to the Architect for approval as soon as possible and at least ten (10) working days prior to the proposed beginning of the concreting. Materials shall not be delivered to the site or used until the samples have been approved, and as used they shall in all respects be equal to the approved samples.

F. Proportion changes made after submission of initial mix designs shall be submitted by the testing agency to the Architect.

2.4 CEMENT

A. Cement shall be Portland cement conforming to ASTM C-150 Type I. One brand and type of cement shall be used for all structural concrete.

B. Submit to the Architect upon request, manufacturer's statement attesting to the compliance of each shipment with standard specification.

C. Handle and store cement to protect from air, ground or other moisture, to permit ready access for inspection and to protect from contamination by foreign materials. Cement stored longest shall be used first. Caked or hardened cement shall not be used.

2.5 OTHER CEMENTITIOUS MATERIALS

A. The following cementitious materials may be substituted for Portland cement as approved by the Architect.

1. Fly ash and natural pozzolans meeting ASTM C 618.

2. Ground Granulated Blast Slag (GGBS) meeting ASTM C 989.

3. Silica fume conforming to ASTM C 1240.

2.6 AGGREGATE

A. Fine Aggregate: Shall be natural sand consisting of clean, hard, durable, uncoated particles, conforming to ASTM C33. Organic content shall be determined according to ASTM C40, and supernatant liquid above test sample shall show color no darker than referenced standard color solution prepared at the same time.

1. Allow no frozen or partially frozen aggregate in the mix.

2. Aggregate Protection: Protect aggregates from foreign materials, and store each separately until placed in mixer.

B. Coarse Aggregate: Shall be crushed stone or gravel from approved source conforming to ASTM C33. Lightweight aggregate shall conform to ASTM C330. Coarse aggregate shall not contain greater amounts of deleterious materials than specified in ASTM C33 Table III.

1. Grading requirements shall be as given in ASTM C33, Table II. Nominal sizes of coarse aggregate shall range from No. 4 minimum size as follows:

Location	Maximum Size
• Wearing Courses	5/8"
• Heavily Reinforced Sections such as slabs, beams, girders, columns and walls	3/4"
• Lightly Reinforced Sections such as footings	1"
• Stair and Floor Fill	3/8"

2. Coarse aggregate shall be subjected to sodium sulfate soundness test according to ASTM C88.

3. Aggregate Protection: Protect aggregates from foreign materials, and store each separately until placed in mixer.

2.7 WATER

A. Water: Shall be from approved source, potable, clean and free from oils, salt, alkali, organic matter and other deleterious materials.

2.8 ADMIXTURES

A. Water-reducing, air-entraining agents, corrosion inhibitors, and shrinkage reducers used in concrete, shall be used in strict accordance with the manufacturer's printed instructions. Agents shall be stored safe from adverse temperature in accordance with manufacturer's printed instructions. Admixtures shall be from a single manufacturer. The following are acceptable admixtures. Approved equals are acceptable:

Manufacturer	**WR Grace Company**	**BASF Master Builders**	**SIKA**
Water-Reducing Agent meeting ASTM C494 Type A 3-6 oz/100 lb cement	WRDA 64	POZZOLITH 200 N	Plastiment NS
Air-Entraining Agent meeting ASTM C260 Total air entrained 5.0%	Darex AEA	MB-AE 90	SIKA AEA-14
Corrosion Inhibitor , Calcium nitrate meeting ASTM C 494 4 gal/yd	DCI S	Rheocrete CNI	SIKA CNI
Shrinkage Reducer 1 gal/yd	Eclipse	Tetraguard AS20	SIKA Control 40

B. No other admixtures may be used without Architect's approval. Admixtures containing calcium chloride are not permitted.

2.9 SURFACE CONDITIONERS

A. Surface conditioners shall be used in strict accordance with the manufacturer's printed instructions. Agents shall be stored safe from adverse temperature in

accordance with manufacturer's printed instructions. The following are acceptable conditioners. Approved equals are acceptable:

Manufacturer	**Dayton Superior**	**Euclid Chemical Company**	**L&M Construction Chemicals**
Shake-on Floor hardener for skid resistance	Quartz Tuff non metallic	Surflex Light Reflective	Quartzplate FF Light Reflective
Floor hardener	Intraseal	Tamms Hardener	Chem Hard
Bonding agent	Strong Bond	Rheocrete CNI	Everbond

2.10 OTHER MATERIALS

A. Filler Strips for Expansion Joints: Where used with caulking or sealants shall be cork type, non-extruding, bituminous type in accordance with ASTM D1751.

B. Filler strips for exterior expansion joints: Closed-cell polyethylene having a density of two pounds per cubic foot, temperature resistance of -65 to 170 ° Fahrenheit, and compressive strength of 4 psi for 25% deflection/10.5 psi for 50% deflection and a tensile strength of 60.5 psi for machine direction/30 psi for cross direction meeting ASTM D 3575.

C. Polyethylene vapor film barrier: .006" Visgueen, "Gerpak" by Monsanto, "Zendel" by Union Carbide, or equal approved by the Architect.

D. Kraft Paper: Waterproof, reinforced meeting ASTM C171.

E. Sleeves: Sleeves through structural concrete beams, ribs, and columns shall be steel pipe conforming to ASTM A120. Sleeves through slabs and topping may be sheet metal or plastic.

F. Water Stops: PVC dumbbell type without center bulb.

2.11 FORM MATERIALS

A. Concrete surfaces exposed to view in final construction shall be formed with new high density plastic overlaid Grade A Douglas Fir Plywood not less than 5/8" thick.

B. Concrete surfaces concealed in finished work shall be formed with not less than 5/8" exterior plywood according to ACI Standards listed.

C. Form ties for use at exposed walls shall have 1-1/2" outside diameter wood or plastic cones 1-1/2" deep. The cone voids shall be left partially unfilled in the finish work and the location of coned ties shall be subject to the approval of the Architect. Form ties for concealed work shall be steel wire type designed to break off at least 1-1/2" from exterior surface and 1" from interior surfaces.

D. Forms shall be coated before initial pour and between subsequent pours in accordance with manufacturer's printed instructions, with form release agent approved by the Architect. Form coatings used shall not impart any stain to concrete nor interfere with the adhesion of any finish material to any concrete surfaces

2.12 REINFORCEMENT MATERIALS

A. Bar Reinforcement: ASTM A615, Grade 60.

B. Welded Wire Fabric Reinforcement: ASTM A185.

C. Reinforcement Accessories: Include all spacers, chairs, ties, slab bolsters, clips, chair bars and other devices for properly assembling, placing, spacing, supporting, and fastening the reinforcement. Tie wire shall be annealed wire not less that No. 18 gauge. All accessories touching interior formed surfaces exposed to view or exterior surfaces exposed to earth or weather shall be stainless steel. Individual and continuous slab bolsters and chairs shall be of a type to suit the various conditions encountered and must be capable of supporting a 300-pound concentrated load without measurable permanent deformation of the reinforcement or supports or indentation of the supporting surfaces. Precast concrete bricks, of a type approved by the Architect shall support reinforcement for structural slabs on grade. Wood blocks, stones, brick chips, etc., will not be permitted.

D. Galvanizing:

1. Standard Bars:

a. Galvanized reinforcement shall meet ASTM A767.

b. Touch up field cut ends and abrasions with 90 percent zinc rich paint.

c. For galvanized reinforcing bars, furnish certificates of compliance with ASTM A767.

2. Welded Wire Fabric

a. Galvanized welded wire fabric reinforcement shall meet ASTM A123, for hot-dipped galvanizing of welded wire sheets/mats

b. Touch up field cut ends and abrasions with 90 percent zinc rich paint.

c. For galvanized WWF, furnish certificates of compliance with ASTM A123.

2.13 REINFORCEMENT FABRICATION

A. Reinforcement shall be accurately formed to dimensions on the approved shop drawings, details and schedules.

1. Fabrication shall not commence until shop drawings, details and schedules have been approved by the Architect.

2. Reinforcement shall be bent cold and shall not be heated for any purpose except as specifically approved by the Architect.

3. Bars reduced in section will not be accepted.

4. Bars with kinks or bends not shown on the drawings will be rejected. Bars shall not be formed in a manner injurious to the bars.

5. Bars may be moved laterally as necessary to avoid interference with other reinforcing steel, conduits, or embedded items. If bars are moved more than one bar diameter or enough to exceed the above tolerances; the resulting arrangement of bars shall be subject to approval.

PART 3. - EXECUTION

3.1 MIXING OF CONCRETE

A. Cast-in-place concrete shall be ready-mixed and delivered in conformance with requirements of ASTM C94.

B. Mixing and conveying equipment shall be thoroughly cleaned and free from hardened concrete and foreign materials before concrete operation is started. Liquid admixtures shall be dispensed by automatic metered devices with at least 5 percent accuracy.

C. Mixer shall produce thoroughly mixed uniform mass, and discharge mixture without segregation. Entire batch shall be discharged before mixer is recharged. Maximum time from inclusion of water in the mix to placing of the concrete shall be placed within 90 minutes and concrete within 60 minutes after arriving at the site.

D. Partially hardened concrete shall not be retempered or used.

E. Concrete placed in air temperature below 40 degrees F., shall have batch temperature of 60 degrees F. Temperature of individual materials, including mixing water, shall not exceed 140 degrees F.

3.2 PLACING CONCRETE

A. Notify Architect 24 hours before each pour, so that forms and reinforcing may be examined. Do not place concrete until inspection has been made or waived.

B. Before concrete is placed, check forms for construction and detail. Secure reinforcement, sleeves and inserts in correct position. Forms shall be free of water and all debris and shall be coated as specified.

C. Deposit concrete continuously and rapidly to prevent segregation and loss of ingredients. Concrete shall be placed within five (5) feet vertically and five (5) feet horizontally of its final position in form. Avoid rehandling. Deposit concrete in a manner that will prevent segregation of concrete materials and the spattering or accumulation of concrete on forms or reinforcement above the surface of the concrete. Maintain a plastic and approximately horizontal surface on the concrete as the pour progresses to avoid vertical or inclined pour lines. Place concrete in accordance with ACI 306R (Cold Weather Concreting) and ACI 305R (Hot Weather Concreting), when applicable. Wall pours shall have a maximum drop of 4'-0" unless deposited with a tremie or by other suitable method.

D. Vibrate concrete during depositing with internal type high frequency mechanical vibrator having a speed of not less than 7000 rpm. Do not use vibrators to move concrete. Supplement all vibration by wood spading between reinforcing and forms into corners. Air or water pockets, laitance, sand streaking and honeycombing are not acceptable.

E. Do not, under any circumstances, place hardened concrete in forms. Concrete shall have quality required when in final position regardless of handling methods employed.

F. Pumping: Should the Contractor elect to use a pumping process to convey concrete, the established field mixture in each case shall not be altered by more than the following.

Cement:	+20 lbs./Cu. yd.
Fine Aggregate:	+50 lbs./Cu. yd.
Coarse Aggregate:	-50 lbs./Cu. yd.

G. Slabs on grade, including basement slabs, shall be provided with a vapor barrier, placed on the compacted base consisting of a 0.006" minimum thickness polyethylene film. Lap and seal all joints and around all projections with manufacturer's recommended tape.

H. Where indicated, slope floor surfaces to floor drains.

I. Before placing fresh concrete on or against hardened concrete, tighten forms and clean hardened concrete surface of laitance and loose materials, roughen by chipping and saturate with water. Then coat roughened surface with thin layer of neat cement paste. Place the fresh concrete before the paste has attained its initial set.

J. Cast columns or walls supporting adjacent floor construction at least 12 hours prior to casting slabs or beams above unless specifically authorized by the Architect for an isolated instance.

K. Hard steel trowel tops of parapets, overhangs, canopies, etc. to provide maximum protection from weathering.

L. No penetrations shall be placed in the slabs until approved by the Architect.

3.3 CURING AND PROTECTION

A. Protect all concrete work against injury and defacement during construction operations.

B. Commencing with the first frost of each year, cold weather curing and protection techniques must be employed in accordance with ACI 306R Cold Weather Concreting." All temporary heating, insulation and other required items shall be supplied without additional cost to the Owner. Use of calcium chloride or other admixes except as noted above is prohibited.

C. When heat of any kind is used it shall be gradually reduced, after the required heating period, at the rate of not more than two (2) degrees F., per hour before discontinuing.

D. During periods of hot weather, curing and protection shall be as described in ACI 305R Hot Weather Concreting", at no additional cost to the Owner.

E. All concrete and particularly exposed surfaces, shall be treated immediately after concreting or cement finishing is completed to provide continuous moist curing above 50 degrees F., for at least seven (7) days regardless of ambient air temperatures and, in the case of exposed slabs, for at least fourteen (14) days.

F. Walls and vertical surfaces may be cured by maintaining wood forms continuously wet during curing period, or by wrapping with continuous 6 mil polyethylene with taped joints as approved by the Architect.

G. Floors:

1. Floor surfaces after hardening sufficiently to prevent damage, and normally within several hours after final troweling, shall be covered by reinforced waterproof Kraft paper with lapped seams at least four inches wide, taped with waterproof Scotch type tape. Maintain paper intact for at least seven (7) days. Use of continuously operating sprinklers or "ponding" shall be employed wherever possible. Sawdust shall not be used. Protect slabs from exposure to direct sunlight, wind and dust. Curing compounds shall not be used.

2. Where surface treatments call for alternative curing, follow manufacturer’s instruction.

3.4 FINISHING OF CONCRETE SURFACES

A. It is the intent of this Specification to require forms, mixture or concrete and workmanship so that concrete surfaces, when exposed, will require no patching or repairs. Concrete exhibiting defects on surfaces exposed to public view shall be removed and replaced or repaired in accordance with a method that achieves a surface, which is acceptable to the Architect. All such removal or repairs shall be at the Contractor's expense.

B. At formed surfaces exposed to view, chip off fins and other projections and trowel patch all voids, honeycombs and air pockets exceeding 1/2" in any dimension. Pull tie-rods and patch voids formed by tie-rod cones flush with adjacent surfaces. At outside faces of foundation walls, except for surfaces to receive waterproofing membranes, trowel patch all voids, honeycombs and air pockets exceeding 3/4" in depth. At other concealed surfaces, patching if any, shall be as directed by the Architect and shall in general be only such as is required to assure or protect the structural integrity of concrete or reinforcing.

C. In all cases, concrete surfaces shall be sound and dense. Pull tie-rods to full depth of cones or, at concealed work where other types are allowed, to a point 1-1/2" from exterior surfaces and 1" from interior surfaces. Where patching of voids and honeycombs is required, it shall be done as soon as possible after removal of forms, and in accordance with the following instructions:

1. Patching mortar shall be same materials as concrete except for omission of coarse aggregate and the addition of small quantities of white Portland cement as required to match color of adjacent surfaces. Proportions of Portland cement to sand shall be approximately one to two, as required to make a dense, workable mix. use as little mixing water as consistent with requirements of handling and placing. Mix mortar at least one (1) hour before it is to be used and remix occasionally during hour without additional water to prevent setting.

2. Where trowel patching is permitted, cut out void for removal of obviously soft or porous material. Wet area and apply grout. Apply mortar with trowel and finish smooth and level with adjacent surfaces in same operations.

D. Concrete for finish floor slabs shall be poured as dry as practicable within allowable slump range. Except when otherwise indicated or specified, concrete finish floor slabs shall be monolithically finished at required level by screeding, floating, and troweling to provide smooth, even, non-porous finish, free of trowel marks. Floors shall be placed to meet the following classes as specified in “ACI 302.1R-04 Guide for Concrete Floor and Slab Construction:”

1. Exposed slabs for foot traffic: Class 1, Normal steel trowel finish.

2. Covered surface for foot traffic: Class 2, Light steel trowel finish.

E. Do not begin finish troweling until concrete has hardened sufficiently to prevent excess fines from working to the surface. After troweling is complete and slabs have set sufficiently to ring the trowel, the surfaces of all slabs to be exposed in the finished work shall be given a second steel troweling to a burnished finish. Where floor forms are cambered due to length of span, camber screeds to match.

1. Finished surface shall not vary more than 1/8" when measured by a 10'-0" straight edge. Leveling of the slab by the Contractor to this tolerance for resilient flooring and thin set tile will be allowed by use of latex type underlayment as approved by the Architect.

2. Concrete slabs to receive Portland cement setting beds shall be given rough wood float or broom finish. Where liquid waterproofing is indicated, such concrete slabs shall receive a light soft broom finish.

3. All interior concrete floors remaining exposed or receiving carpet in the finished work shall be treated with chemical hardener. Apply hardener in three-coat application, not sooner than 28 days after pouring of slab, in strict accordance with manufacturer's printed application instructions.

4. Protect floors from damage until completion of job.

F. No dry cement or mixture of sand and cement shall be applied to surface of any concrete slab to absorb moisture.

G. Where required for slip resistance, add mineral aggregates floors to concrete during finishing by sprinkling on the surface of the wearing course just before final troweling. Apply about ¼ to ½ pound of aggregate for every one square foot of floor as recommended by manufacturer and approved by the Architect. Apply the aggregate directly to the floor, dampen the abrasive aggregate thoroughly before spreading, and tamp it flush with the unhardened surface with a steel trowel. Be careful not to bury the chips. After curing, scrub the floor with a floor machine, using steel wool pad (or rub it with an abrasive brick and water) to remove cement film and slightly expose the nonslip aggregate.

3.5 GROUTING OF ANCHOR BOLTS AND BASE PLATES

A. Grout Mixtures:

1. Use only approved prepackaged non-shrink grout for grouting under column base plates.

2. Where clearances are less than 2 inches or where the size and shape of the space make placement difficult, grout shall comprise only cement, non-metallic aggregate, sand, and water.

3. Where clearances are over 2 inches in thickness and free passage of the grout will not be obstructed by coarse aggregate, pea gravel shall be added to the mixture.

4. With either mix, use the minimum amount of water required to produce a flowable grout. Take care to avoid the use of excessive water, which may cause segregation or bleeding.

5. Minimum ultimate compressive strength of grout shall be 5,000 psi at 7 days and 7,500 psi at 28 days.

B. Mixing:

1. The materials and water shall be mixed in a paddle type mortar mixer for not less than 3 minutes or it shall be thoroughly mixed by hand turning the entire mass over enough times to ensure even distribution of components.
2. Mix as close to the area to be grouted as possible. Provide adequate means to transport the mixed grout as quickly as possible, and in such manner as to prevent segregation.
3. Place grout within a period of 15 minutes or less after mixing. After the grout has been mixed, do not retemper by adding water.

C. Preparation:

1. Remove all defective concrete, laitance, dirt, oil, grease and loose material from the concrete foundation by bush hammering, chipping, or other approved means until sound, clean concrete is obtained. Leave the surface of the concrete reasonably rough but not so rough as to interfere with proper placing of the grout. Cover the area as completely as possible with a waterproof paper to prevent contamination prior to grouting.
2. Clean the bottom of the base plate or bearing plate of all dirt, oil, grease and loose material. Align and level the plate in its final position and maintain in that position during grouting.
3. Take special care in hot or cold weather to ensure proper setting and gain of strength, in accordance with instructions of the manufacturer of the grouting material. Bring the concrete and plate to be grouted to a temperature of 65 to 75 degrees F., just prior to grouting.
4. Prior to grouting, clean the concrete surface by compressed air or other means. Saturate the surface of the concrete thoroughly with clean water. Remove free water just prior to placing the grout.
5. Take care that vibration of equipment or machinery operation nearby does not affect the normal set, strength and bond of the grout.

D. Grouting:

1. Place the grout quickly and continuously to avoid undesirable effects of overworking which might result in segregation, bleeding, or breaking down of initial set.
2. Grout may be poured in place, pressure grouted by gravity, or pumped.
3. Grout shall completely fill the space to be grouted. It shall be thoroughly compacted and free of air pockets.
4. Pour grout from one side only, so as to make it flow across to the open side to avoid air entrapment.

E. Finishing Unconfined Grout:

1. After the grout has acquired its initial set and will not sag, cut off all unconfined, exposed edges, leaving sloping "shoulders".

3.6 FORMWORK

A. Design of formwork shall comply with ACI 347, and wind loads as specified by the State Building Code.

B. Formwork shall be constructed plumb, true, water and mortar tight; sufficiently rigid and strong to prevent sagging between supports and to maintain true position and shape during and after placing concrete, without waves or bulges. Take exceptional care at plywood forms exposed to concrete to minimize fins, ridges, off-sets, leaking of fins and other defects as it is intended that the forming of these surfaces shall be such as to require only a nominal amount of finishing to achieve a true, even surface. Use tape at joints where required to achieve tightness. Plywood for forms shall be in as large size as possible. Joints shall occur at reglets, edges and intersections as far as possible.

C. Only workmen experienced in formwork construction shall be used for this work.

D. Forms for beams shall be designed to permit removal of at least one (1) side without disturbance to its bottom portion of form or its support.

E. Temporary openings shall be provided at the base of wall forms and at other points where necessary to facilitate cleaning and observations immediately before concrete is deposited.

F. Use side forms at footings not cast directly against existing foundations.

G. Form reglet joints in concrete where indicated, using varnished wood battens on forms, milled to indicated profiles. Install chamfer strips in form corners where indicated. Battens and co-strips shall be carefully inspected before concrete is placed and damaged pieces replaced.

H. Install anchor bolts, plates, sleeves, frames, reglets, and inserts for attachment of other work. Coordinate with requirements of mechanical work and other trades for proper lines locations, and spacing. Install dovetail anchor slots at locations and spacing indicated on Drawings and as specified.

I. Cooperate and coordinate work with other trades as necessary to assure proper placement and location of all sleeves, inserts, reinforcing steel, duct openings, chases, conduits, etc., and give ample notification to all responsible for such items prior to time installation is required.

J. All forms shall be thoroughly cleaned before reuse. Replace portions of plywood forms which become damaged or otherwise present an unacceptable surface.

K. An experienced workman shall be employed during concrete placing to inspect formwork and supports.

L. Notify Architect 24 hours before placing footing forms for examination of bearing materials.

M. Construct forms for sample panels as indicated or directed by the Architect using all materials and techniques as they will be used in actual construction.

3.7 FORM REMOVAL

A. Contractor shall be solely responsible for safety of construction during and after form removal, and no act of Architect shall relieve him of this responsibility.

B. Formwork for walls, sides of beams and slabs, and other parts not supporting the weight of the concrete may be removed a soon as the concrete has hardened sufficiently to resist damage from removal operations.

C. Formwork for beam soffits, slabs and other parts that support the weight of concrete, shall remain in place until the concrete has reached its specified 28 day strength, except that after the concrete has reached its 7 day strength, the form facing material may be removed in sections so that no span exceeds one-quarter (1/4) of the final design span. Each section thus removed shall be securely reshored before the removal of adjacent sections. Reshoring shall remain in place until the concrete has reached its specified 28 day strength.

D. In no case shall supporting forms or shoring be removed until members have acquired sufficient strength to safely support their weight and the load thereon. Until full 28-day strength has been achieved, all concrete shall be protected from shock vibration, and heavy loads. Particular attention shall be given to assure self-supporting members, whether at 28-day strength or not, are not over-stressed.

E. Exercise care in form removal to prevent chipping of corners or other damage to concrete. Competent and experienced foremen shall supervise for removal, and at no time shall more men be engaged in this work than can be properly supervised.

F. Protect corners of columns and other columns from damage after form removal by boxing, corner boards or other approved means.

3.8 PLACING

A. All reinforcing bars shall be supported and wired together to prevent displacement by construction loads or the placing of concrete beyond the tolerances as noted above. On ground supporting concrete blocks may be used. Over formwork, concrete, metal, plastic or other approved bar chairs and spacers shall be furnished. Where the concrete surface will be exposed to the weather in the finished structure or where rust would impair architectural finishes, the portions of all accessories in contact with the formwork shall be stainless steel.

B. Before being placed in position, reinforcement shall be thoroughly cleaned of loose mill scale, rust, dirt, ice, and other coatings that may reduce or destroy bond. Where there is delay in depositing concrete after reinforcement in place, bars shall be reinspected and cleaned as necessary.

C. Welded wire fabric shall have lapped end and side splices so made that the overlap measured between outermost cross wires of each fabric sheet is not less than 2 full squares. It shall be supported as required for reinforcing bars.

D. Vertical bars in piers shall be offset at least one bar diameter at lapped splices. To ensure proper placement, templates shall be furnished for all column and pier dowels.

E. All splices not shown on the project drawings or approved shop drawings shall be approved prior to concrete placement.

F. Concrete cover to reinforcement shall be in accordance with ACI 318 unless otherwise indicated on the drawings.

G. Reinforcement shall not be bent after being partially embedded in hardened concrete unless otherwise noted.

3.9 CONSTRUCTION JOINTS

A. Joints not shown on the drawings shall be so made and located as to least impair the strength of the structure and shall be approved by the Architect. Joints in walls and piers shall be at the underside of floors or slabs and at the top of

footings or floor slabs. Beams, girders, brackets, column capitals, haunches and drop panels shall be placed at the same time as slabs. Joints shall be perpendicular to the main reinforcement.

B. All reinforcing steel and welded wire fabric shall be continued across joints. Keys and inclined dowels shall be provided as directed by the Architect. Longitudinal keys at least 1-1/2" deep shall be provided in all joints in walls and between walls and slabs or footings.

C. The surface of the concrete at all construction joints shall be thoroughly cleaned and all laitance removed.

D. Bond shall be obtained by one of the following methods:

E. The use of an approved adhesive.

F. The use of an approved chemical retardant which delays but does not prevent setting of the surface mortar. Retarded mortar shall be removed within 24 hours after placing to produce a clean exposed aggregate bonding surface.

G. By roughening the surface of the concrete in an approved manner which will expose the aggregate uniformly and will not leave laitance, loosened particles of aggregate or damaged concrete at the surface. Brush coat the concrete surface with a cement slurry immediately prior to concreting.

END OF SECTION 03300

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section "Summary", Paragraph 1.01A, entitled "Related Documents."

1.2 SUMMARY

A. This Section includes unit masonry assemblies consisting of the following:

1. Concrete masonry units (CMUs) for infilling of Basement window in Cottage.
2. Mortar and grout.
3. Masonry waste disposal.

B. Related Sections include the following:

1. Division 02 Section "Selective Demolition" for salvaging historic cinder blocks for re-employment as indicated.

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

1.4 PERFORMANCE REQUIREMENTS

A. Provide unit masonry that develops indicated net-area compressive strengths (f'_m) at 28 days.

B. Determine net-area compressive strength (f'_m) of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.6 QUALITY ASSURANCE

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units 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. If units become wet, do not install until they are dry.

1.8 PROJECT CONDITIONS

A. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602/1.8D, whenever the ambient air temperature exceeds the following:

1. 100° F, or 90° F with a wind velocity > 8 mph.
2. Implement hot weather protection in accordance with Article 2.1.2.1(d).
3. Do not spread mortar beds more than 4 feet ahead of masonry. Set masonry units within one minute of spreading mortar.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not uses units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

2.2 CONCRETE MASONRY UNITS (CMUs)

A. Concrete Masonry Units: ASTM C 90.

1. Products: Subject to compliance with requirements, provide products by one of the following:

   a. A. Jandris & Sons.
   b. Nitterhouse Masonry Products, LLC.
   c. Westbrook Block, Inc.

2. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
3. Weight Classification: Normal
4. Size (Width): Manufactured to dimensions $^{3}/_{8}$ in. < nominal dimensions.
5. Exposed Faces: Manufacturer's standard color and texture.

2.3 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207, Type S.

D. Masonry Cement: The use of masonry cement is not permitted.

E. Cold-Weather Admixture: Non-chloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of

composition indicated.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. The Euclid Chemical Company;" Accelguard 80".
    b. Grace Construction Products, Div. W. R. Grace & Co.; "Morset".
    c. Sonneborn Products, Div. BASF; "Trimix-NCA".

F. Water: Potable.

2.4 MORTAR MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Limit cementitious materials in mortar to portland cement and lime.
3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Mortar Mixes: At Contractor's option, provide job-mixed mortar or preblended dry mortar mix. Provide colors required for each application indicated.

C. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

1. Product: Subject to compliance with requirements, provide the following:

    a. Spec Mix; Portland Lime & Sand and Portland Lime and Sand/Color.

D. Mortar Types for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated:

1. Type S: Exterior, above-grade, non-load-bearing walls.

2.5 GROUT MATERIALS AND MIXES

A. Aggregate for Grout: ASTM C 404.

B. Grout for Unit Masonry: Comply with ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.

    a. Use fine grout for 6 inch thick concrete masonry wythes.
    b. Use course grout for 8-inch thick or greater concrete masonry wythes.

2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143.

2.6 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

B. Detergent Solution, Job Mixed: Solution prepared by mixing 2 cups of tetrasodium pyrophosphate (TSPP), 1/2 cup of laundry detergent, and 20 quarts of hot water for every 5 gal. of solution required.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
2. Verify that foundations are within tolerances specified.

3.2 INSTALLATION, GENERAL

A. Thickness: Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

C. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by > + ½ in. or – ¼ in.

2. For location of elements in plan do not vary from that indicated by > +/- ½ in.

B. Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:

3.4 LAYING CMU CURB, MORTAR BEDDING AND JOINTING

A. Lay masonry units over concrete frost wall at Shed Ell Porch. At South wall of Shed Ell, remove soil over existing rubble stone frost wall, wash bonding surface with potable water and create level mortar bed for installation of CMU curb.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed 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 or polyethylene film and waterproof masking tape.
3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
4. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
5. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.5 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

1. Disposal: Separate, salvage, recycle and dispose of materials in accordance with the Commonwealth of Massachusetts “Waste Ban” 310 CMR 19.017.

END OF SECTION

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PART 1 - GENERAL

1.1 GENERAL PROVISIONS

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

1.2 SCOPE OF WORK

A. Furnish labor, materials, equipment and services necessary for proper and complete fabrication and erection of all structural metal and related items as shown on drawings and as herein specified.

B. Work shall include all anchor bolts for column bases, column setting plates, base and bearing plates, beams, columns, beam bearing plates and anchor bolts.

C. Refer to notes on drawings for specific additional requirements.

D. Structural Steel materials: steel fabricator shall furnish all steel connection material supporting steel to steel, steel to concrete, steel to masonry, and steel to wood.

1.3 RELATED WORK IN OTHER SECTIONS

A. Section 05 00 01 – Miscellaneous Metals and Ornamental Iron.

1.4 REFERENCES

A. The current rules and practices set forth by the American Institute of Steel Construction entitled "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" and the "Code of Standard Practice for Steel Buildings and Bridges" shall apply to the design, fabrication, and erection work of this Contract, except as otherwise modified by this Specification.

B. All welding shall be done in accordance with the requirements of the current edition of the "Code for Welding in Building Construction" AWS D1.1.

C. The definition of all terms herein relating to welds, welding and oxygen cutting shall be interpreted in accordance with the "Standard Definitions, Welding, and Cutting" of the American Welding Society.

D. Welding requirements shown on the design drawings shall be designated by symbols interpreted in accordance with the "Standard Welding symbols", current edition, of the American Welding Society. Shop details prepared by the fabricator shall designate the welding to be performed by these same symbols.

E. High-strength bolting shall be in accordance with the current "Specifications for Structural Joints, Using ASTM A325 Bolts".

1.5 SUBMITTALS

A. *Submit shop drawings in electronic format (Adobe Acrobat) to the Architect for approval prior to fabrication in accordance with the General Conditions. In each submittal, pages shall be bound into one file for each specification section.* Erection plans and shop details are required for all structural steel work. Do not begin fabrication until the Architect approves shop drawings.

B. Submit three copies of electrode specification sheets for all electrodes used by the fabricator and erector.

C. Details and connections shall be made in conformity with the best modern practices as set forth in the requirements of the American Institute of Steel Construction, "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings", latest edition.

1.6 HANDLING AND STORAGE

A. Structural steel shall be protected from moisture and damage at the job site. Adequate shoring and protection shall be provided to prevent distortion and other damage. Structural steel shall be stored on timber and shall not be laid on mud or snow, or otherwise handled so as to damage shop paint. All sections, which are to be placed in ground storage, shall be readily accessible for inspection. Damaged and defective pieces shall be repaired or replaced.

1.7 TESTING

A. All welding and bolting performed shall be subject to inspection and tests by an independent testing laboratory and supervised by the Architect and paid for by the Owner.

B. The costs of all inspection and tests shall be borne by the Owner except where additional tests and inspection are required due to unacceptable work, in which case, the Contractor shall be charged for the cost of such additional tests and inspection. The Contractor shall cooperate with the inspectors and shall furnish all materials, scaffolding and facilities as may be required, and shall provide convenient access to all parts of the work for the purpose of inspection.

C. This testing of the work by the Owner will commence only after the Contractor and Steel Fabricator/Erector have completed their own quality control review and reported in writing to the Architect that all the structural work specifically enumerated in their report has been completed in accordance with the Specifications and approved shop drawings and is ready for inspection by the Owners Testing Agency.

1.8 FIRE PREVENTION

A. Oxygen cutting and welding of structural steel in the building at the site.

1. Burning and welding shall only be done on the property with written approval from the fire department with a fire watch on standby from the fire department.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel W shapes: ASTM A992.

B. Steel Plates, bars, M, S, C, MC, and L shapes: ASTM A36

C. Steel Pipe: ASTM A53.

D. Steel to Steel Bolts: ASTM A325. 3/4" diameter unless otherwise shown. Where galvanized, provide by hot dipped process.

E. Washers: ASTM F436.

F. Nuts: ASTM A563.

G. Anchor Bolts: ASTM F1554, Grade 36, size and length as scheduled on the drawings

H. Welding Electrodes: AWS A5.1, A5.5, A5.17, A5.20, A5.23 and A5.29 with proper rod to produce optimum weld joint considering material, weld position and size of joint. All filler metal used for complete penetration groove welds shall have a minimum Charpy V Notch value of 20 ft-lbs. at 40 degrees F for enclosed and heated structures and 20 ft.-lbs. at 0 degrees for all other structures.

I. Shop Paint: All steel with the exception of galvanized steel to be given one coat of 10-99 Tnemec Primer in accordance with manufacturer's directions.

2.2 FABRICATION

A. Structural steel shall be fabricated and assembled in the shop to the greatest extent possible.

B. Shearing and chipping shall be performed in such manner as not to impair the strength and workability of the steel.

C. Holes shall be drilled or punched at right angles to the surface of the metal, in accordance with AISC Specifications. Holes shall not be made or enlarged by burning and violation of this clause will be sufficient cause for rejection of any pieces in which such holes occur. Holes in base plates shall be drilled. Holes shall be clean-cut without torn or ragged edges. Outside burrs resulting from drilling operations shall be removed with suitable tools forming a 1/16" bevel. Holes shall be provided in members to permit connections to the work of other trades, and suitable templates and/or necessary information will be furnished as may be required for the various installation. Hung lintels and other steel requiring accurate alignment and provisions for expansion/contraction shall be provided with slotted holes.

D. Manual oxygen cutting shall be done only with a mechanically guided torch. An unguided torch may be used provided the cut is not within 1/2" of the finished dimension and final removal is completed with a means, such as chipping or grinding, to produce a surface quality equal to that of the base metal.

E. Conform to the American Welding Society Standards and Code for Welding for all welding. Welds shall be made only by welders who have been prequalified by tests prescribed in the AWS Code. Submit affidavits certifying that each welder working on the project or in the shop is qualified for the work assigned to him.

F. Oxygen cutting of structural steel in the field shall not be done except with the written consent of the Architect.

G. Coordinate requirements for openings in beams with approved Mechanical Shop Drawings and shop fabricate openings required.

PART 3 - EXECUTION

3.1 ERECTION

A. Errors in shop fabrication or deformations resulting from handling and transportation that prevent the proper assembly and fitting or parts shall be reported immediately to the Architect, and approval of the method of correction shall be obtained. Approved Corrections shall be made at no additional cost to the Owner.

B. Anchor bolts and other required anchorage items shall be verified for proper size and accurate location prior to erection of structural steel work.

C. Column and beam bearing plates shall be supported and aligned on steel wedges or shims. After the supported members have been plumbed and properly positioned and the anchor nuts tightened, the entire bearing area under that plate shall be packed solidly with grout. Wedges and shims shall be cut off flush with the edges of plates and shall be left in place.

D. All members shall be aligned, leveled, and adjusted accurately prior to final fastening. Tolerance shall conform to the AISC Code of Standard Practice. Fastening of splices of compression members shall be done after the abutting surfaces have been brought completely into contact. Bearing surfaces and surfaces that will be in permanent contact shall be cleaned before the members are assembled.

E. As erection progresses, the work shall be fastened securely to take care of all dead load, wind, and erection stresses. Splices will be permitted only where indicated on the contract drawings or the approved shop drawings. Poor matching of holes shall be corrected by drilling to the next larger size, and the use of larger size bolts. Welding for redrilling will not be permitted. Drift pins may be used only to bring together the several parts and shall not be used in such manner as to destroy or damage the metal. All structural steel shall have suitable temporary braces and stays to hold it in position until permanently secured.

F. The use of gas-cutting torch in the field for correcting fabrication errors will not be permitted on any major member in the structural framing. The use of a gas-cutting torch will be permitted only on minor members, when the member is not under stress, and then only after the approval of the Architect has been obtained through field authorization.

G. Guy and brace steel framing at all times until permanent connections are installed and floors are cast.

H. Plumb building to tolerances listed in AISC Code of Standard Practice prior to installation of final connections.

I. Weld steel studs to beams through metal decking using equipment and procedures recommended by the stud manufacturer. Welds must be capable of developing loads shown in the AISC Specification table I4.1, for each stud size and concrete strength used.

3.2 FIELD BOLTING

A. Bolts shall be driven accurately into the holes without damaging the thread. Bolt heads shall be protected from damage during driving. Bolt heads and nuts shall rest squarely against the metal. Where structural members have sloping flange faces, bolted connections shall be provided with approved beveled washers to afford square seating for bolt heads or nuts. Bolt threads for unfinished bolts shall be nicked to prevent the nuts from backing off.

3.3 FIELD WELDING

A. Workmanship of welds shall conform with the requirements of Section 2 Part 3 and Section 4 of the AWS Code, except as modified and supplemented herein. Before welding, particular attention shall be paid to surface preparation, fit up and cleanliness of surface to be welded.

B. All welding shall be done by manual shielded metal arc welding with covered electrodes or by Flux-Core arc welding.

C. The heat, input, length of weld and sequence of weld shall be controlled to prevent distortions. The surfaces to be welded and the filler metals to be used shall be subject to inspection before any welding is performed.

D. All elements of weldments shall be welded together to full strength of the elements as specified hereafter using "V" or "J" grooving except as otherwise shown on the drawings. All welds shall be continuous and of full penetration unless otherwise indicated on the drawings.

E. Welds made without the aid of a backing shall have their roots chipped, ground, or gouged out to sound metal from the second side, before welding is done from the second side.

F. All welds shall be sound throughout. There shall be no crack in any weld or weld pass. Welds may be considered sound if it contains only slight porosity or fusion defects which are well dispersed.

G. Undercut shall not be more than 0.01 inch deep when its direction is transverse to the primary stress in the part that is undercut. Undercut shall not be more than 1/32 inch deep when its direction is parallel to the primary stress in the part that is undercut.

H. Welds shall be free from overlap.

I. All craters shall be filled to the full cross section of the welds.

J. All welders and welding operators shall be qualified by tests as prescribed in Part 2 (Welders) and Part 3 (Welding Operators) of the AWS Code.

3.4 MILLING

A. The following surfaces shall be milled:

1. Contact surfaces between column and base plates and end of columns at column splices.

2. Stiffeners and angle closures between flanges.

3.5 GALVANIZING

A. Galvanizing shall be required for all exterior lintels, relieving angles, and other exposed members.

B. Galvanizing for steel shall be 2.0 ounces per square foot minimum by hot dip method.

C. Galvanizing shall conform to ASTM A123 "Specification for Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars and Strips".

D. Assembled steel products shall be hot-dip galvanized in accordance with ASTM A386 latest edition.

E. All hot-dip galvanizing shall be done after fabrication.

F. All hot-dipped galvanized material shall be stamped to indicate ASTM designation and ounces per square foot of zinc coating required by the specifications.

G. A notarized affidavit of compliance to the galvanizing specified shall be submitted from the galvanizing upon request.

3.6 QUALITY CONTROL BY THE CONTRACTOR

A. Regardless of any testing done by the Owner, the Contractor is responsible for completing the structural steel work in complete compliance with these Specifications.

B. The Contractor must set up a quality control program in the shop and in the field to ensure compliance with the Specifications.

C. Report in writing to the Architect the results of the Contractor's inspection.

D. When the Contractor is satisfied that the work is satisfactorily completed, notify the Architect who will make arrangements with the Testing Engineer to be retained by the Owner to verify that the work complies with these Specifications.

3.7 TESTING AND INSPECTION

A. A qualified Testing Engineer will be retained by the Owner to review welding materials, procedures, qualification or personnel and equipment used to fabricate and erect the structural steel.

B. The materials and workmanship to be furnished under this section shall be subject to inspection and testing in the mill, shop and field by the Architect or the Testing Agency. Such inspection and testing shall not relieve the Contractor of his responsibility to provide his own inspection and quality control and to furnish materials and workmanship in accordance with the requirements of the Contract Documents.

C. The Contractor shall cooperate with and facilitate inspection and testing by the Testing Agency. The Contractor shall, at his own expense, furnish the Testing Agency, upon request, with the following:

D. Complete sets of approved erection drawings, detailed shop drawings, schedules and corrective work procedures at the fabricating shop or shops and in the field.

E. Cutting list, order lists, materials bills, and shopping lists.

F. Information as to time and place of all rolling and shipments of materials to shops.

G. Representative sample pieces requested for testing.

H. Assistance for testing materials and proper facilities for inspection of the work, in the mill shop and field.

I. The Testing Engineer will inspect all full and partial penetration welds by ultrasonic means. All bolted connections including anchor bolts. Testing Agency to spot check tightening of at least 15% of bolted connections and other field welded connections.

J. Weldments and bolted connections that are required by the Testing Engineer to be corrected, shall be corrected without delay at the Contractor's expense and to the satisfaction of the Testing Engineer.

K. Testing Engineer to review credentials and current certification of welders in shop and field and report to Architect on status of certified welders. No welding is to be done by other than certified welders approved by the Testing Agency.

L. Any material or workmanship which is rejected by the Architect or the Testing Engineer either in the mill shop or field, shall be replaced promptly by the Contractor to the satisfaction of the Architect or Testing Engineer.

M. The fact that steel work has been accepted at the shop does not prevent its final rejection at the job site, or even after it has been erected, if it is found to be defective in any way.

N. Inspect the fabrication of the steel at the plant during fabrication to ensure that proper materials and techniques are being employed.

O. Inspect field bolting and welding including welding of the decking for compliance with these specifications and good workmanship. Report any deficiencies to the Architect.

P. Submit to the Architect the following information regarding the quality control of the welding:

1. Welder's Certifications.
2. Shop and Field Inspection Reports.
3. Record Copies of all Tests.
4. Certification that the minimum number of connections specified to be tested have been done and found to be in conformance with the Specifications.

END OF SECTION

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PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Work of this Section requires Trade Sub-Bids and is governed by the provisions of the Massachusetts General Laws (MGL), Public Bidding Law Chapter 149, Sections 44A to 44J inclusive; and applicable Section of the MGL, Public Contract Law Chapter 30 as amended.

1.2 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.3 SUMMARY

A. This Section includes the following:

1. Repair of rust-corroded steel balustrade and cage-type newel posts at Mansion front porch entrance.
2. Steel pipe handrails at Cottage Ramp and Porch Stairs.
3. Sloped steel exterior basement door at Cottage.
4. Steel pipe post for sign in parking lot.

B. Products furnished, but not installed, under this Section include the following:

1. Anchor bolts indicated to be cast into concrete.

C. Related Sections include the following:

1. Division 03 Section "Cast-in-Place Concrete" for installing anchor bolts and other items indicated to be cast into concrete.
2. Division 04 Section “Masonry” for preparing surface a sloped stone Basement entry to receive sloped steel exterior door.
3. Division 06 Section “Rough Carpentry”, “Exterior Finish Carpentry” for wood surfaces at stairs and ramps to receive steel pipe handrails and guardrails.
4. Division 09 Section “Painting” for field finishing of metal fabrications including paint removal as indicated.
5. Division 10 Section “Signage” for galvanized steel pipe post accessible parking space signs.

1.4 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for metal fabrications. 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.

1.5 ACTION SUBMITTALS

A. Product Data: For the following:

1. Paint products.
2. Grout.

B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
2. Provide templates for anchors and bolts specified for installation under other Sections.
3. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer licensed in the Commonwealth of Massachusetts responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Qualification Data: For professional engineer.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

D. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

1.7 QUALITY ASSURANCE

A. American Society of Mechanical Engineers (ASME):

1.	B 18.2.1	Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series).
2.	B 18.6.1	Wood Screws (Inch Series).
3.	B 18.6.3	Machine Screws and Machine Screw Nuts.
4.	B 18.21.1	Washers: Helical Spring-Lock, Tooth Lock, and Plain Washers (Inch Series).
5.	B 18.22.1	Metric Plain Washers.

B. American Society for Testing and Materials (ASTM):

1.	A 36	Structural Steel.
2.	A 47	Ferritic Malleable Iron Castings.
3.	A 53	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
4.	A 123	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
5.	A 153	Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
6.	A 307	Carbon Steel Bolts and Studs, 60,000 psi Tensile.
7.	A 489	Carbon Steel Eyebolts.
8.	A 563	Carbon Alloy Steel Nuts.
9.	B 633	Electrodeposited Coatings of Zinc on Iron and Steel.
10.	C 1107	Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
11.	D 1187	Asphalt-Based Emulsions for Use as Protective Coatings for Metal.
12.	E 488	Strength of Anchors in Concrete and Masonry Elements.
13.	F 593	Stainless Steel Bolts Hex Cap Screws and Studs.

14. F 594 Stainless Steel Nuts.
15. F 1554 Anchor Bolts, Steel, 36, 55, and 105 ksi Yield Strength.

C. American Welding Society (AWS):

1. D1.1 Structural Welding Code—Steel.
2. D1.3 Structural Welding Code—Sheet Steel.
3. D1.6 Structural Welding Code—Stainless Steel.

D. Commonwealth of Massachusetts (Mass.):

CMR 521 Regulation, Architectural Access Board

1.8 PROJECT CONDITIONS

A. Temporary Support Facilities: Furnish and install all labor and materials, and temporary support to perform all operations in connection with the installation of this Work. Remove all temporary support facilities when no longer required.

B. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Provide allowance for trimming and fitting at site.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120° F, ambient; 180° F, material surfaces.

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.3 METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36.

B. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

2.4 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36.

1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.

D. Lag Bolts: ASME B18.2.1.

E. Wood Screws: Flat head, ASME B18.6.1.

F. Plain Washers: Round, ASME B18.22.1.

G. Lock Washers: Helical, spring type, ASME B18.21.1.

H. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Material for Anchors in Exterior Locations: Alloy Group 1 stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.

2.5 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.

C. Galvanizing Repair Paint: High-zinc-dust-content paint for re-galvanizing welds in steel, complying with SSPC-Paint 20.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.6 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately $^{1}/_{32}$ inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work true to line and level with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

G. Welding shall be done according to the following AWS publications:

1. Steel - D1.1.
2. Sheet Steel - D1.3.
3. Stainless Steel - D1.6.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, $^{1}/_{8}$ by 1-$^{1}/_{2}$ inches, with $\geq$ 6-in. embedment and 2 in. hook, $\geq$ 8 in. from ends and corners of units and 24 in. o.c., unless otherwise indicated.

2.7 RECONSTRUCTION OF METAL BALUSTRADE AND NEWEL POSTS AT MANSION

A. All metal balusters and newel post members shall be removed as one unit and repaired as required in the metal fabricators shop. Remove the rusted portion of each rod baluster and square bar of the newel post cage by neatly saw cutting above the corroded portion at 90^{o} to the member length.

B. Metal balustrade and newel posts shall have all paint removed to bare metal. At the Contractors option, this may as be done in the shop by the shot blasting method.

C. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Both the existing and appended members shall have parting surfaces ground to create a vee into which the continuous weld may be placed. When completed, the weld shall be ground smooth so as to be imperceptible in the finished work

D. Non-shrink, Nonmetallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.8 STEEL PIPE HANDRAIL

A. Handrail and railing shall conform to Mass. CMR 521, and as indicated.

B. Handrail, railing, fastenings, and accessories shall be designed to safely withstand 300 lb. force applied in any direction at any location or 50 lb./ft. force applied in any direction to entire length of top rail, whichever results in the greatest stress to specific point under analysis.

C. Except as otherwise indicated on drawings pipe shall be 1-½ inch IPS standard weight (schedule 40) black steel pipe conforming to ASTM A53.

D. Railing shall be shop-fabricated in sections of as long of length as can be conveniently handled to eliminate as much field welding as possible.

E. Brackets shall be simple wrought, cast or malleable iron design such as Part No. 306 manufactured by Julius Blum & Co., or equivalent product as approved by Architect. Bracket shall be bolted to wall using one bolt each.

2.9 SLOPED STEEL EXTERIOR BASEMENT DOOR

A. Sloped Steel Exterior Basement Door shall be fabricated from.0.100 thick hot-rolled steel, dip coated with alkyd resin primer, complete with all hardware, 44-½ in. x 62 in pair of doors, with pair of 14 in. x 84 in. with 3 in. turn-down along the long dimension extension plates at each side of door. Basis of design is Model No. RD-1 manufactured by Gordon Corporation, Southington, CT 06489. Equivalent products by other manufacturers will be considered for approval by Architect.

B. Components shall include following:

1. Full door width 1-piece header.
2. Twin handles with lock cylinder in active leaf (right) handle..
3. Automatic hold-open safety catch.
4. Internal locking device.
5. Torsion spring at each door leaf.
6. Galvanized steel sills.
7. Stainless steel hinges.

2.10 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

2.11 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:

1. ASTM A 123, for galvanizing steel and iron products.
2. ASTM A 153, for galvanizing steel and iron hardware.

B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:

1. Exteriors (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."

C. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

2. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
3. Obtain fusion without undercut or overlap.
4. Remove welding flux immediately.
5. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

E. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings

3.3 STEEL PIPE HANDRAIL

A. Handrail and railing shall be free from burrs, sharp edges, and protruding points which might cause injury or tear clothing.

B. Bends in pipe shall be machine bent, or manufactured elbows of same OD as pipe shall be employed. Bends shall be free from buckles and twist, with smooth finished surfaces.

3.4 METAL BALUSTRADE AND NEWEL POSTS AT MANSION

A. Existing remnants of steel embedded in stone steps shall be removed so as to not damage the stone. The holes shall have all of the existing grout removed. Before installing the repaired balusters and newel posts, hole shall be cleared of remaining dust and debris by the use of a compressed air nozzle. Hole shall be dry before setting the repaired balusters and newel posts. Balusters and newel posts shall be set in hydraulic grout, which shall be pitched-up from the stone surface to the metal member at an angle of 30^{o} to shed water away from the metal.

3.5 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

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

1.2 SCOPE OF WORK

A. Work Performed Under This Section: The work required shall consist of labor, materials, tools, staging, scaffolding and services to accomplish the following:

1. Perform all rough carpentry work including but not limited to framing repairs, new framing, roof sheathing, and other miscellaneous work as indicated in the drawings and specified herein.

2. Perform miscellaneous structural repairs as indicated in the drawings and specified herein.

3. The scope of work is indicated on the Drawings. The Owner makes no representation of the exact quantities of work required. It shall be the responsibility of the Contractor to do all work within the designated areas to complete fulfillment of the requirements of these Specifications.

4. Wood framing steel materials: Furnish all fabricated steel assemblies using shapes, plates, rods, shims, clevises, turnbuckles, and other steel materials used to install wood to steel, wood to masonry, and wood to wood. Bolt locations shall conform to the National Design Specification for Wood Construction published by the American Forest & Paper Association.

1.3 RELATED WORK IN OTHER SECTIONS

A. Section 03100 - Concrete Formwork

1.4 QUALIFICATIONS OF WORKMEN

A. Provide sufficient journeymen carpenters and supervisors who shall be present at all times during execution of this portion of the work, and who shall be thoroughly familiar with the type of construction involved and the materials and techniques specified.

B. In the acceptance or rejection of rough carpentry the Architect will make no allowance for lack of skill on the part of the workmen

1.5 SUBMITTALS

A. General: Submit wood literature in electronic format (Adobe Acrobat) to the Architect for approval prior to fabrication in accordance with the General Conditions. In each submittal, pages shall be bound into one file for each specification section. Submit the following in accordance with Conditions of the Contract and Division 1 Specification Sections.

B. Submit the following data:

1. Wood species, grade, moisture content, and Mill source.

1. Manufacturer's or applicator's specification for wood preservative treatment and treatment procedure to be sure that a satisfactory treatment will be obtained.

2. Manufacturer's specification data sheets for all fasteners to be used, clearly identifying such as their intended use.

PART 2 - PRODUCTS

2.1 PRODUCT DELIVERY, PROTECTION AND STORAGE

A. Grade and trademark shall be required on each piece of lumber (or bundle); use only the recognized official marks of association under whose rules it is graded.

B. All new rough framing lumber shall be delivered to the job site with a measured moisture content no greater than 19%. Plywood shall have a measured moisture content not greater than 12%.

C. Store all materials in such a manner as to ensure proper ventilation and drainage, and to protect it against damage and the weather.

D. Keep all materials clearly identified with all grade marks legible. Keep all damaged material clearly identified as damaged, and store separately to prevent its inadvertent use.

E. Do not allow damaged or non-complying materials to be installed.

F. Use all means necessary to protect the installed work and materials of all other trades.

2.2 LUMBER

A. All new lumber shall be the best of its respective kind, free from stain, rot, knots, or other imperfections impairing its strength, durability, and appearance when exposed.

B. Provide lumber surfaced four sides dry.

C. All structural framing lumber and lumber for rafters, joists, headers and studs shall be of species and grades as follows:

Spruce-Pine-Fir (South), Joists, rafters, headers	No. 1 or better
Spruce-Pine-Fir (South), studs	Stud
Spruce-Pine-Fir (South), blocking	Utility

D. Use one species for the project.

2.3 PLYWOOD

A. Plywood shall be manufactured in conformance with Product Standard PS1-95 for Construction and Industrial Plywood and each sheet shall bear the American Plywood Association's APA grade trademark. Plywood should be used as follows:

1. Exterior walls, roofs, designated interior walls, and bracing diaphragms : plywood shall be APA Structural 1 Rated Sheathing, C-C grade with exterior glue (Exposure 1), Group I Species, C grade with Exposure 1 glue on inner plies.

2.4 LAMINATED VENEER LUMBER (LVL)

A. Members shall be laminated veneer lumber using 1/10" or 1/8" thickness Douglas-Fir veneer or Southern Pine, glued up in a continuous process with all

grain parallel with the length of the member. Members shall be one single piece, free of finger joints, scarf joints or mechanical connections. Veneers shall be dried as required, and after drying shall be graded by an ultrasonic or other approved non-destructive method. Members shall meet or exceed the following grades and allowable design values: grade, 1.9E; Flexural Stress Fb, 2,600 psi; Modulus of Elasticity, 1,900,000 psi; and Shear Modulus of Elasticity, 118,750 psi; and Horizontal Shear, 285psi.

B. Laminating shall be with waterproof adhesive.

C. Members must be manufactured in a plant and under processes approved by the National Research Board. Each member shall carry stamps noting the manufacturer's name and plant number, the grade, National Research Board number, and quality control agency.

2.5 PARALLEL STRAND LUMBER (PSL)

A. Members shall be manufactured from parallel strand lumber using strands of Douglas-Fir or Southern Pine wood fiber glued up in a continuous process with all grain parallel with the length of the member and then pressed. Members shall be one single piece, free of finger joints, scarf joints or mechanical connections. Members shall meet or exceed the following grades and allowable design values: grade, 2.0E; Flexural Stress Fb, 2,900 psi; Modulus of Elasticity, 2,000,000 psi; and Shear Modulus of Elasticity, 125,000 psi., and Horizontal Shear, 290 psi.

B. Gluing shall be with waterproof adhesive.

C. Members must be manufactured in a plant and under processes approved by the National Research Board. Each member shall carry stamps noting the manufacturer's name and plant number, the grade, National Research Board number, and quality control agency.

2.6 PRESSURE TREATED LUMBER

A. Pressure treated lumber as required shall be ACQ (Alkaline Copper Quaternary) pressure impregnated to 25 pounds per cubic foot as made by Weyerhaeuser.

B. Treated wood must be kiln-dried or air seasoned to an average moisture content of 16% or less.

C. Wood blocking, nailing blocks, nailing cleats and strips, and other wood set in exterior wall or roofs or in contact with masonry, concrete and/or flashing, shall be impregnated under pressure with wood preservative.

2.7 PRESERVATIVE TREATMENT (FIELD APPLIED):

A. Field apply Bora-care, a patented liquid formulation to protect structural wood from attacking wood destroying organisms, to the underside of all first floor framing, all areas within three feet of replaced rotted wood framing, and all wood in contact with masonry.

2.8 CARPENTRY FASTENERS

A. The Contractor shall provide all nails, spikes, screws, anchor and tie bolts, nuts, washers, anchors, joist hangers, manufactured metal connections, ties, and similar items. All shall be properly sized to rigidly secured members in place. All nails shall be sinkers, common wire nails, galvanized, conforming to FS-FF-N-105. All steel shapes and connectors shall be ASTM A36 and bolts shall be unfinished ASTM A307, unless otherwise noted.

B. For exterior framings, all pressed metal fasteners, nails, screws, and otherwise manufactured metal fasteners shall be made from stainless steel.

2.9 EPOXY RESTORATION MATERIALS

A. Provide West System Brand 105 Epoxy as made by Gougeon Brothers, Inc. Mix with West System 205 or 206 Hardener as appropriate to ambient working temperature. Use West Systems 405 Fillet Blend Wood flour filler. Follow manufacture's recommended handling and application procedures.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

B. Verify to the Architect that rough carpentry work may be performed in strict accordance with the original design and pertinent codes and requirements.

3.2 WORKMANSHIP

A. General: All rough carpentry shall produce joints true, tight, and well nailed, with all members assembled in accordance with the Drawings and with all pertinent codes and regulations.

3.3 SELECTION OF LUMBER PIECES

A. Carefully select all members. Select individual pieces so knots and obvious defects will not interfere with placing bolts or proper nailing or making connections.

B. Cut out and discard all defects which will render a piece unable to serve its intended function. Lumber may be rejected by the Architect, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, insect infestation, as well as for improper cutting and fitting.

3.4 SHIMMING

A. Do not shim joints, short studs, trimmers, headers, lintels, or other framing components.

3.5 GENERAL FRAMING

A. In addition to all framing operations normal to fabrication and erection indicated on the Drawings, install all backing required for work of other trades.

B. Set all horizontal or sloped members with crown up.

C. Do not notch, bore, or cut members for pipes, ducts, conduits, or other reasons except as shown on the Drawings or as specifically approved in advance by the Architect.

D. Make all bearings full unless otherwise indicated on the Drawings.

E. Finish all bearing surfaces on which structural members are to rest so as to give sure and even support. Where framing members slope, cut or notch the ends as required to give a uniform bearing surface.

3.6 BLOCKING AND BRIDGING

A. Install all blocking required to support all items of finish and to cut off all concealed draft openings, both vertical and horizontal, between ceiling and floor areas. Install solid wood bridging at centerline of span for all new joists and rafters.

3.7 STUD WALLS AND PARTITIONS

A. Studs: Make all studs single length, unspliced, and platform framed. Unless otherwise indicated, exterior walls shall be 2 x 6 studs spaced 16" o.c. and interior walls shall be 2 by 4 studs 16”o.c.

B. Corners and Intersections: Unless otherwise indicated on the Drawings, frame all corners and intersections with three or more studs and all required bearing for wall finish.

C. Shoes and wall caps: Walls studs shall fully bear on a continuous 2-by shoe. Wall studs shall be capped with two continuous 2-by’s. Butt joints in top plates shall be offset a minimum of four feet; in walls at roof edges and shear walls, splice the butt joints with metal plates.

D. In bearing walls not covered with any sheathing, provide solid 2-by bridging at quarter and half points of span.

3.8 RAFTERS AND JOISTS

A. Rafters and joists: Provide solid blocking at supports of rafters and joists. Provide continuous rows of bridging spaced no more than 8 feet apart. Provide continuous 1 by 3 furring at undersides of joists and rafters spaced at 16-inch centers.

3.9 INSTALLATION OF LVL MEMBERS

A. LVL lumber beams shall be installed in accordance with the plans and approved manufacturer's drawings and details. Erection shall be under the direction of a qualified construction supervisor.

B. Temporary construction loads shall be limited to avoid exceeding the allowable design stress.

C. Holes, cuts or notches should not be made without the prior approval of the Architect.

D. Where multiple members are called for on drawings, two or more lumber sections or LVL beams shall be nailed together in accordance with the manufacturer's recommendations using a minimum of two rows of 16d nails 12" on center, staggered, or more if required by the design.

3.10 ALIGNMENT

A. On all framing members to receive a finished wall or ceiling, align the finish subsurface to vary not more than 1/8 inch from the plane of surfaces of adjacent framing and furring members.

3.11 FASTENING

A. Refer to the Massachusetts State Building Code (International Building Code), Table 2304.9.1: Fastening Schedule, for the minimum fastening requirements not directly shown on the drawings.

B. Nailing:

1. Use only sinkers, common wire nails or spikes of the dimension shown on the Nailing Schedule, except where otherwise called for on the Drawings.

2. For conditions not covered in Nailing Schedule, provide penetration into the piece receiving the point of not less than 1/2 the length of the nail or spike provided, however, that 16d nails may be used to connect two pieces of two inch nominal thickness.

3. Do all nailing without splitting wood. Pre-bore as required. Replace all split members.

C. Bolting: Drill holes 1/16 inch larger in diameter than the bolts used. Drill straight and true from one side only. Bolt threads shall not bear on wood. Use washers under head and nut where both bear on wood; use washers under all nuts.

D. Screws: For lag screws and wood screws, pre-bore holes the same diameter as root of thread; enlarge holes to shank diameter for length of shank. Screw, do not drive, all lag screws and wood screws.

3.12 INSTALLATION OF PLYWOOD

A. Placement:

1. Place all plywood with face grain perpendicular to supports, except where otherwise specifically shown on Drawings. Align tongue-in-groove where used.

2. Center joints accurately over supports; unless otherwise specifically shown on Drawings, stagger the end joint of plywood panels to achieve a minimum of continuity of joints.

3. Unless indicated otherwise on drawings, nail plywood with 8d "stronghold" nails, 6 inches apart on panel edges and 10 inches apart on all intermediate bearing edges. Stagger all plywood joints. The long length of panel shall be laid perpendicular to framing.

3.13 INSTALLATION OF LVL and PSL MEMBERS

A. LVL and PSL lumber beams shall be installed in accordance with the plans and approved manufacturer's drawings and details. Erection shall be under the direction of a qualified construction supervisor.

B. Temporary construction loads shall be limited to avoid exceeding the allowable design stress.

C. Holes, cuts or notches should not be made without the prior approval of the Architect.

D. Where multiple members are called for on drawings, two or more LVL beams shall be nailed together in accordance with the manufacturer's recommendations using a minimum of two rows of 16d nails 12" on center, staggered, or more if required by the design.

3.14 EPOXY ADHESIVE REPAIRS

A. Preparation. Cut out rotted wood into sound wood having no signs of rot. Cut ends of members square to surfaces.

B. Cleaning. Clean surfaces free of any contaminants such as grease, oil, wax or mold release. Clean contaminated surfaces with a silicone and wax remover such as DuPont Prep-Sol™ 3919S. Acetone or lacquer thinner works well on many contaminants. Wipe the surface with plain white paper towels before the solvent dries. Clean surfaces before sanding to avoid sanding the contaminant into the surface. CAUTION! Follow all safety precautions when working with solvents.

C. For mild ambient temperatures, mix five parts (by weight) epoxy resin to one part hardener. Refer to manufacture’s literature for various working temperatures.

D. Wetout. Apply a straight resin/hardener mixture (without fillers) to the surfaces to be joined

E. Thickened coat. Modify the resin/hardener mixture by stirring in the wood filler until it becomes thick enough to bridge any gaps between the mating surfaces and to prevent "resin-starved" joints. Apply an even coat of the thickened mixture to one of the surfaces to be joined.

F. Clamping. Use just enough clamping pressure to squeeze a small amount of the epoxy mixture from the joint, indicating that the epoxy is making good contact with both mating surfaces. Avoid squeezing all of the epoxy mixture out of the joint by using too much clamping pressure. Shape or remove any excess adhesive that squeezes out of the joint as soon as the joint is secured.

3.15 PRESERVATIVE TREATMENT (FIELD APPLIED):

A. Field apply Bora-care, a patented liquid formulation to protect structural wood from attacking wood destroying organisms, to the underside of all first floor framing, all areas within three feet of replaced rotted wood framing, and all wood in contact with masonry.

B. Basements and crawl spaces may be treated by applying one (1) coat of diluted BORA-CARE® solution to the point of wetness to all infested and susceptible wood surfaces including sill plates, piers, girders, subfloors, floor joists and any wood exposed to vertical access from the soil. On wood where access is limited to one (1) or two (2) sides of wood members such as sills and plates on foundation walls, apply two (2) coats of diluted BORA-CARE. Wait at least 20 minutes between applications. Apply at a rate of approximately one (1) gallon of diluted BORA-CARE per 200 square feet of floor area (400 square feet of wood surface area).

C. The underside of wood flooring can be treated by spray, brush, or roller application. It will be necessary to remove any existing finish prior to application.

Apply a two (2) parts water to one (1) part BORA-CARE (2:1) solution at a rate of approximately one (1) gallon of diluted solution per 500 square feet of floor surface. For treating infestations of subterranean or Formosan termites, two (2) coats may be required, waiting at least one (1) hour between applications. Allow floor to completely dry (typically 48 to 72 hours).

D. For treating voids, wall studs and wood members not accessible by conventional application methods, spray or mist solution into voids and channels in damaged and suspected infested wood and/or through small holes drilled into walls and baseboard areas. Holes should be spaced no more than 24" apart along each member to be treated and at least one (1) hole must be drilled between each wall stud when treating base plates. Use sufficient amount of material to cover all areas to the point of wetness.

END OF SECTION 06100

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. This Section includes the following:

1. Wood blocking in partition framing.
2. Wood furring and grounds.
3. Wood lumber and plywood for Carriage House and Cottage Basement Stair construction.
4. Plywood backing panels.

B. Related Sections include the following:

1. Division 06 Section “Rough Carpentry” for framing with dimension lumber and engineered wood products.
2. Division 06 Section “Exterior Finish Carpentry” for trim.
3. Division 06 Section "Sheathing" for plywood wall and roof sheathing, and subflooring for attic walkway.
4. Division o8 Section “Hollow Metal Doors and Frames” for rough framing at Cottage Basement door.
5. Division 08 Section "Door Hardware" for door hardware and additional installation requirements.

1.3 DEFINITIONS

A. Dimension Lumber: Lumber of $\geq$ 2 inches nominal but $\leq$ 5 inches nominal in least dimension.

B. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NeLMA: Northeastern Lumber Manufacturers' Association.
2. NLGA: National Lumber Grades Authority.

1.4 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.

2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:

1. Preservative-treated wood.
2. Power-driven fasteners.
3. Powder-actuated fasteners.
4. Expansion anchors.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

B. Deliver interior wood materials that are to be exposed to view only after building is enclosed and weatherproof, wet work other than painting is dry, and HVAC system is operating and maintaining temperature and humidity at occupancy levels.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
3. Provide dressed lumber, S4S, unless otherwise indicated.

B. Plywood: DOC PS 1.

1. Thickness: As needed to comply with requirements specified, but $\geq$ thickness indicated.
2. Factory mark panels to indicate compliance with applicable standard.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic, chromium or chromated copper arsenate (CCA).

B. Kiln-dry lumber after treatment to a moisture content $\leq$ 19 %. Do not use material that is

warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat miscellaneous carpentry, including the following:

1. Wood sills, sleepers, blocking, furring, and similar concealed members in contact with masonry or concrete.

E. Manufacturers: Subject to compliance with requirements, provide products by one the following:

1. Georgia Pacific.
2. Hoover Treated Wood Products, Inc.
3. Osmose, Inc.

2.3 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Furring.
4. Cants.
5. Grounds.
6. Rooftop equipment bases and support curbs.

B. For items of dimension lumber size, provide Construction or No. 2 lumber with moisture content $\leq$ 15 % and the following species:

1. Hem-fir (north); NLGA.

C. Wood Strapping: Provide exterior wood strapping in size indicated, the following species or equivalent wood species with specific gravity $\geq$ 0.42:

1. Spruce-pine-fir; NLGA.

D. For blocking not used for attachment of other construction Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.4 PLYWOOD BACKING PANELS

A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. Where carpentry is exposed to weather, in ground contact, fire retardant treated, or in area of high relative humidity, provide stainless steel fasteners.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1.

F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 x the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

C. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.

D. Do not splice structural members between supports, unless otherwise indicated.

E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips $\leq$ 16 inches o.c.

F. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and ≤ 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
2. Fire block concealed spaces behind combustible cornices and exterior trim at ≤ 20 feet o.c.

G. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

H. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2305.2, "Fastening Schedule," in the Massachusetts State Building Code.

I. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.

3.2 WOOD BLOCKING AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

3.3 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

B. Furring to Receive Plywood: Install 1-by-3-inch nominal- size furring vertically 24 inches o.c.

3.4 FINISH HARDWARE INSTALLATION

A. General: Comply with requirements indicated below and in Division 08 Section “Door Hardware.”

B. Mounting Heights: Mount door hardware units at heights indicated as follows unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

C. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface- mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

D. Thresholds: Set thresholds for exterior doors in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

3.5 PROTECTION

A. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA- registered label.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.1A, entitled “Related Documents.”

1.2 SUMMARY

A. This Section includes the following:

1. Wall sheathing.
2. Roof sheathing.

B. Related Sections include the following:

1. Division 01 Section “Unit Prices” for additional sheathing replacement.
2. Division 06 Section “Rough Carpentry” for structural wood framing.
3. Division 06 Section "Miscellaneous Rough Carpentry" for wood blocking.
4. Division 06 Section “Exterior Finish Carpentry” for mold, fungus, insect and termite repellant.

1.3 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack plywood and other panels flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS, GENERAL

A. Plywood: DOC PS 1.

1. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
2. Factory mark panels to indicate compliance with applicable standard.

2.2 WALL AND ROOF SHEATHING

A. Span Rating $\geq$ 16/0.

B. Plywood Sheathing: Exposure I (Exterior), Structural I sheathing.

1. Nominal Thickness: $\geq$ ¾ in., to match existing board thickness.

C. Board Sheathing.

1. Kiln-dried spruce/pine/fir, unsurfaced 4 sides.

2.3 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. For wall and roof sheathing, provide stainless steel fasteners.

B. Nails, Brads: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

2.4 PRESERVATIVE WOOD TREATMENT

A. Preservative wood treatment for the prevention of mold, fungus, insect, and termite infestation shall be a proprietary 2 component system manufactured by Nisus Corporation, Rockford, TN 37853. Components shall be as follows:

1. Anti-Mold solution: “Mold-Care Moldicide Concentrate”.

a. Active ingredient: Didecyl dimethyl ammonium chloride, 80%.
b. Inert ingredients: 20%.
c. EPA conformance: Reg. No. 6836-212-64405 and Est. 64405-TN-1.

2. Anti-Fungus, anti-Insect and anti-Termite solution: “Bora-Care Termiticide, Insecticide and Fungicide Concentrate”,

a. Active ingredient: Disodium Octaborate Tetrahydrate, 40%, CAS No. 12280-03-4.
b. Others ingredient: 60%.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Board sheathing shall be employed for the replacement of damaged board sheathing in existing construction. Plywood panels shall be employed at new construction only such as at the Cottage porches.

B. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

C. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.

D. Securely attach to substrate by fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2305.2, "Fastening Schedule," in 780 CMR Massachusetts Building Code.

E. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

F. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

G. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

H. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

A. General: Comply with applicable recommendations in APA Form No. E30S, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:

1. Wall Sheathing:

   a. Nail to wood framing.
   b. Space panels $^{1}/_{8}$ in. apart at edges and ends.

2. Roof Sheathing:

   a. Nail to wood framing.
   b. Space panels $^{1}/_{8}$ in. apart at edges and ends.

3.3 PRESERVATIVE WOOD TREATMENT

A. Preservative wood treatment solutions are non-restrictive use materials but are eye irritants and require special care in handling and application. Contractor shall follow the manufacturer’s printed Safety Data Sheets for both products and OSHA safety regulations. Personal protective equipment (PPE) shall be employed as specified in the manufacturer’s material data sheets.

B. Contractor shall follow manufactures written instructions when handling and installing the solutions and as follows:

1. Existing surfaces to receive solution shall be broom swept or vacuum-cleaned of all dust and debris.

2. Solution shall be applied to following surfaces:

   c. Exposed surfaces of existing sheathing. New sheathing shall be treated on all surfaces prior to situating and fastening in place.
   d. Exposed surfaces of existing wood structural members and studs at exterior walls. Entire surface of new wood structural members and studs.
   e. Saw-cut and raw edges of lumber and panel products.
   f. New fastener locations shall be re-coated.

3.4 WASTE MANAGEMENT

C. Separate wood waste in accordance with the Construction Waste Management plan.

D. Separate the following categories for salvage or reuse on site:

1. Sheet materials > 2 ft^2.

E. Set aside damaged wood for acceptable alternative uses, such as, bracing, blocking, cripples, or ties.

F. Separate the following categories for disposal and place in designated areas for hazardous materials:

1. Treated, stained, painted, or contaminated wood.

G. Separate, store, and dispose of hazardous wastes in compliance with local regulations.

H. Avoid disposal by incineration of wood products and wastes treated with CCA or other compounds.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. This Section includes exterior standing and running trim and the following:

1. Wood trim boards for corner boards, facias, soffits, frieze boards, window and door surrounds, eaves, and rakes.
2. Wood railings and balusters at stairs, porches and ramps.
3. Composite stair, porch and ramp deck planks.
4. Wood lattice fence and mechanical unit screening.
5. Wood privacy fence.
6. Wood molding profiles.
7. Wood siding including clapboards and shingles.
8. Wood gutters.
9. Window and sash repair at Mansion and Cottage.
10. Exterior Wood Shutters on Mansion.
11. Exterior Wood Shutters on Cottage – Alternate No. 3.
12. Repair and replacement in kind of finish carpentry items as indicated.
13. Mold, fungus, insect and termite retarder application.

B. Related Sections include the following:

1. Division 01 Section “Alternates” for bidding requirements of this Section.
2. Division 02 Section “Selective Demolition” for damaged items to be replicated and replaced.
3. Division 03 Section “Cast-In-Place Concrete” for setting of fence posts.
4. Division 05 Section “Miscellaneous Metals and Ornamental Iron” for steel handrails and handrail brackets.
5. Division 06 Section “Miscellaneous Rough Carpentry” for wood blocking.
6. Division 06 Section “Sheathing” for plywood roof and wall sheathing.
7. Division 07 Section “Synthetic Roof Shingles” for drip edge.
8. Division 07 Section “Sheet Metal Flashing and Trim” for gutter liner, fence components as indicated, and termite shields.
9. Division 07 Section “Weather Barriers” for clapboard and shingle underlayment.
10. Division 09 Section “Painting” for back-priming and field finishing wood trim boards, and replacement porch decking at Mansion.

1.3 DEFINITIONS

A. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NeLMA: Northeastern Lumber Manufacturers' Association.
2. NLGA: National Lumber Grades Authority.

1.4 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.

B. Shop Drawings:

1. Shutters

C. Samples for Verification:

1. Moldings
2. Balusters
3. Post caps

D. Warranties: Special warranties for manufactured products specified in this Section.

1.5 QUALITY ASSURANCE

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

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store trim materials and sheets on a flat and level surface on a full shipping pallet. Handle materials to prevent damage to product ends and corners. Provide for air circulation within and around stacks and under temporary coverings.

1.7 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecast weather conditions permit work to be performed and at least one coat of specified finish can be applied without exposure to rain, snow, or dampness.

B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 STANDING AND RUNNING TRIM

A. Trim lumber: Premium grade cedar or cypress, select, S4S, thoroughly-seasoned, kiln-dried to moisture content $\leq$ 12%. Exposed wood surfaces shall be free from blemishes that will show after second paint coating Finger-jointed material shall not be accepted.

1. Moldings shall be solid wood in profiles as indicated. Finger-jointed boards shall not be acceptable. Product numbers indicated are those of Copper Beech Millwork.

2. Full-size and dimensioned profiles have not been indicated. Contractor will have possession of the profiles being replaced shall utilize them to reproduce the required

material.

3. Products: Subject to compliance with existing profiles being replaced and wood species requirements, products by 1 of the following may be acceptable, pending Architect's approval:

   a. Ponders Hollow Millwork, Inc.
   b. Forester Millwork, LLC.
   c. Princeton Classic Moldings.

2.2 CLAPBOARD SIDING

A. Provide ½ in. x 6 in. bevel clapboards, Select Grade White or Red Cedar.

2.3 SHINGLE SIDING

A. Provide CSSB (Cedar Shake and Shingle Bureau) No. 1 Grade taper-sawn red cedar shingles. Shingles shall be fabricated from clear heartwood, 100 percent edge grain, no defects, 16 inches long, ≥ 4 inches wide, 5/2 inch thick (5 butts together equal 2 inches aggregate thickness). Shingles shall be installed as indicated with exposure to match existing adjacent condition in field. In no case shall exposure be > 7 inches.

2.4 WOOD GUTTERS

A. Wood Gutter: Douglas Fir, 4 in. x 5 in. manufactured by F. D. Sterritt Lumber Co., Watertown, MA 02472, J.P. Moriarty Millwork, Somerville, MA 02144 or equivalent product by other manufacturer approved by Architect. Each gutter run shall be 1 piece, without splices.

2.5 STAIR AND PORCH

A. Components shall be fabricated of red or white cedar. The basis of design is "Rail Simple" which products are distributed by BROSCO/Brockway-Smith Co., Wilmington, MA 01887. Equivalent products by other manufacturers will be considered by the Architect:

1. Top Rail: Dual Slot Red Cedar Clear Model No. CE201, 3-$^{1}/_{8}$ x 1-$^{3}/_{8}$ in., in 6, 8 and 12 foot lengths, with Cedar Fillet Model No. CE136EB36F.
2. Bottom Rail: Cedar 3-$^{1}/_{8}$ x 1-$^{3}/_{8}$ in., square edged.
3. Balusters: Red Cedar Model CE60900036W, 2-¼ x 2-¼ inch.
4. Post Caps: "Pewter Peak" Model CE9903600W, for 3-½ in. square posts.

2.6 RAMP, PORCH AND STAIR DECKING

A. Solid mono-extruded composite material comprised of cellular PVC and Agrifiber, 1 x 5-$^{1}/_{2}$ inch, UV- and heat-stabilized, rigid material. Basis of design "AZEK Mono Harvest Deck Boards" by AZEK Building Products, Inc.

1. Products: Subject to compliance with requirements, provide products by one of the following:

   a. AZEK Building Products, Inc.
   b. "ChoiceDek": Advanced Environmental Recycling Technologies, Inc.
   c. Fiberon, LLC.

B. Replacement Decking at Mansion: Fir 1 x 4 and 5/4 x 5-½, to match existing adjacent decking.

2.7 WOOD PRIVACY FENCE

A. Wood for Privacy Fence shall be white or red cedar, “Colonial” board fence. Basis of design, Northeastern Fence Corporation, Saugus, MA 01906.

1. Products: Subject to compliance with requirements, provide products by one of the following:

   a. Northeastern Fence Corporation, Saugus, MA 01906.
   b. Reliable Fence Boston, Woburn, MA 01801.
   c. Walpole Woodworkers, Walpole, MA

2. Wood Panels:

   a. Wood boards: $\geq$ $^3/_8$ inch and $\leq$ $^5/_8$-inch thick x $\leq$ 6 inches.
   b. Panels: 6 ft. high x 6 ft. and 8 ft. long panel sections,

3 Wood Post:

   a. Pressure treated cedar, 5 x 5 in. x 10 ft. long posts.
   b. Caps: “Pewter Peak” Model CE9903200W, for 5-½ in. square posts.

2.8 WOOD LATTICE FENCE AND EQUIPMENT ENCLOSURE

A. Wood for Wood Lattice Fence and Equipment Enclosure shall be white or red cedar, fabricated in shapes as indicated.

2.9 WINDOW AND SASH REPAIR

A. Wood Consolidant: Ready-to-use product designed to penetrate, consolidate, and strengthen soft fibers of wood materials that have deteriorated due to weathering and decay and designed specifically to enhance the bond of wood-patching compound to existing wood.

B. Wood-Patching Compound: Two-part epoxy-resin wood-patching compound; knife-grade formulation as recommended in writing by manufacturer for type of wood repair indicated, tooling time required for the detail of work, and site conditions. Compound shall be designed for filling voids in damaged wood materials that have deteriorated due to weathering and decay. Compound shall be capable of filling deep holes and spreading to feather edge.

C. Traditional Glazing Products: Glazing points and oil-based glazing putty or latex glazing compound. Tint to required color according to manufacturer's written instructions.

D. Glazing Compound: “DAP® '33'® Glazing” knife-grade consistency ready-mixed glazing compound manufactured by DAP Products, Inc., Baltimore MD 21224, or equal approved by Architect.

E. Primers and Cleaners for Glazing: As recommended in writing by glazing material manufacturer.

F. Sash Cord: Natural cotton fiber rope specifically manufactured for use as sash cord.

G. Sash Stop Screws: Chrome-plated oval-head wood screws with chrome-plated beauty

washers.

H. Weather-Stripping Material: Match existing materials and profiles as much as possible unless otherwise indicated.

2.10 WOOD SHUTTERS

A. Wood shutters shall be old growth Western Red Cedar. Basis of design are shutters fabricated by New England Shutter Mills, Lawrence, MA 01840 or equivalent product deemed acceptable by the Architect.

1. Shutter Sizes, to be verified by Contractor prior to fabrication:

   a. Mansion: 1'-6" x 5'-5-½"x 1 inch thick stiles and rails.
   b. Alternate No. 3 - Cottage: 1'-6" x 4'-0" x 1 inch thick stiles and rails.

2. Construction: Mortise-and-tenon stile-and-rail with true open vent slats.
3. Lumber shall be vertical grain. Finger jointing shall not be allowed.
4. Hardware: Traditional cast or wrought iron pintle and gudgeon hinge with traditional hold-back.
5. Finish: Shop painted with oil-base primer. Shop painted finish enamel coat shall match color of existing shutters on mansion, to be selected by Architect during Submittals Phase process.
6. Warranty: 20 year replacement warranty when primer and finish coats are shop painted.

2.11 MISCELLANEOUS MATERIALS

A. Fasteners for Exterior Finish Carpentry: Provide stainless steel nails with thin shank, blunt point and full round head in sufficient length to penetrate $\geq$ 1 ½ in. into wood substrate.

1. The use of staples, brads, finish nails and wire nails is not permitted.

B. Gutter Liner and Flashing: Comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim" for flashing materials installed in exterior finish carpentry.

C. Sealants: Urethane based sealants without silicone, complying with applicable requirements in Division 07 Section "Joint Sealants"; recommended by sealant manufacturer and manufacturer of substrates for intended application.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Commencement of the work indicates acceptance of substrates.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

3.3 INSTALLATION, GENERAL

A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.

1. Do not use manufactured units with defective surfaces, sizes, or patterns.
2. Do not install material until it has been back-prime painted.

B. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.

1. Scribe and cut exterior finish carpentry to fit adjoining work.
2. Install to tolerance of $^1/_8$ inch in 96 in. for level and plumb. Install adjoining exterior finish carpentry with $\leq$ $^1/_{32}$-inch offset for flush installation and $\leq$ $^1/_{16}$ inch offset for reveal installation.
3. Coordinate exterior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate exterior finish carpentry.

3.4 STANDING AND RUNNING TRIM INSTALLATION

A. Install trim with minimum number of joints practical, employing full-length pieces from maximum lengths of trim available. Do not use pieces < 24 inches long except where necessary.

1. Use scarf joints for end-to-end joints.
2. Stagger end joints in adjacent and related members.

B. Fit exterior joints to exclude water. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Plane backs of casings to provide uniform thickness across joints, where necessary for alignment.

C. Install trim boards with two fasteners per every framing member. Trimboards $\geq$ 12 in., and sheets, require additional fasteners per manufacturer's recommendation. Install fasteners $\leq$ 2 in. from the end of the board.

1. Face nail all trim boards and sheets.
2. Predrilling for fasteners may be required in low temperatures. Comply with manufacturer's recommendations.
3. Allow for $^1/_8$ in. / 18 ft. of run for expansion and contraction.

D. Install sealant in all nail holes prior to finish painting by Division 09 Section "Painting."

3.5 SIDING

A. Install clapboards and shingles to align with existing adjacent construction.

3.6 GUTTERS

A. Install gutters level, without camber or pitch. Gutters shall be lined over 100% of its interior with lead sheet, fully bedded in mastic, and tack-fastened 2' – 0" oc. With copper nails.

3.7 WOOD FENCE

A. Posts: Posts shall be set true to line and grade, set in 12-inch diameter concrete footings, with top slightly beveled to wash water away from post, extending ≥ 24 inches into undisturbed natural or properly compacted fill.

B. Panels: Panels shall be erected straight and true. Top rails shall be covered with Revere Freedom gray copper flashing as detailed

3.8 WINDOW AND SASH REPAIR

A. Clean wood windows of mildew, algae, moss, plant material, loose paint, grease, dirt, and other debris by scrubbing with bristle brush or sponge and detergent solution. Scrub mildewed areas with mildewcide. After cleaning, rinse thoroughly with fresh water. Allow to dry before repairing or painting.

B. Condition replacement wood members and replacement units to prevailing conditions at installation areas before installing.

C. Execution of the Work: Window frames and sash shall be fully reconditioned. In repairing wood windows, disturb them as minimally as possible. Specific tasks shall include the following:

1. Stabilize and repair wood windows to reestablish structural integrity and weather resistance while maintaining the existing form of each item.
2. Remove coatings and apply borate preservative treatment before repair. Remove coatings according to "Maintenance Repainting" paragraph in Section 09 91 00 – Painting, unless otherwise indicated.
3. Repair items in place where possible.
4. Fill and sand pitted and weather-worn wood surfaces of frames and sash.
5. Replace rotted frame members as indicated and where necessary.
6. Remove and replace all sash wood divider beads.
7. Provide wood sash stops where indicated as missing.
8. Remove and replace all unsound glazing compound.
9. Replace cracked and broken glass panes as indicated and as required.
10. Replace all sash cords and reattach existing cast iron sash weights. Where cord has deteriorated and weight is absent, it shall be retrieved from the bottom of the jamb well and reattached.
11. Install temporary protective measures to protect wood window work that is indicated to be completed later.
12. Refinish wood windows according to Section 090190.52 "Maintenance Repainting" unless otherwise indicated.

D. Repair and Refinish Existing Hardware: Dismantle window hardware; strip paint, repair, and refinish it to match finish samples; and lubricate moving parts just enough to function smoothly.

E. Repair Wood Windows: Match existing materials and features.

F. Repair wood windows by consolidating, patching, splicing, or otherwise reinforcing wood with new wood matching existing wood or with salvaged, sound, original wood.

H. Protection of Openings: Where sash or windows are indicated for removal to be reconditioned off-site, cover resultant openings with temporary enclosures as indicated on Widows sheet so that openings are weathertight during repair period.

3.9 ADJUSTING

A. Replace exterior finish carpentry that is damaged or does not comply with requirements.

Exterior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.10 CLEANING

A. Clean exterior finish carpentry on exposed and semi-exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.11 PROTECTION

A. Protect installed products from damage from weather and other causes during construction.

B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. Section includes:

1. Interior standing and running trim as indicated.
2. Window and door casings and trim.
3. Wood tongue and groove bead board paneling for ceiling and walls in Carriage house.
4. Repair and restoration of stairs in Cottage and Carriage House as indicated, including treads, balusters, handrail and newel post.
5. Interior wood shutters.
6. Wood cabinets and associated hardware.
7. Closet and utility shelving.
8. Miscellaneous accessories.

B. Section also includes:

1. Wood furring, blocking, shims, and hanging strips for installing interior architectural woodwork, unless concealed within other construction before cabinet installation.

C. Related Requirements:

1. Division 01 Section “Alternates” for bidding requirements of this Section.
2. Division 02 Section “Selective Demolition” for salvaging of bead board in Carriage House, and wood doors and window and door casings and trim in Cottage.
3. Division 06 Section “Rough Carpentry” for lumber to construct Carriage House basement stair.
4. Division 06 Section "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, fire retardant treated wood and plywood, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.
5. Division 06 Section “Sheathing” for plywood platform at carriage house basement stair.
6. Division 09 Section “Painting” for field finishing interior woodwork as indicated, including paint removal for salvaged wood items reemployed in the work.
7. Division 09 Section “Painting” for stripping and re-finishing existing wood floors and stair treads including areas patched inn this Contract.
8. Division 22 Section “Plumbing – Design-Build Summary of Work” for sinktop in Coffee Counter in Lower Lobby.

1.3 DEFINITIONS

A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.

1.4 SUBMITTALS

A. Product Data: For all manufactured items such as stair components, trim, casings, brackets, high-pressure decorative laminate, adhesives, and cabinet hardware and accessories.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Cabinetwork.

C. Samples for Initial Selection:

1. Plastic laminates.

1.5 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of product, signed by product manufacturer.

B. Performance Certificates: AWI Quality Certification Program certificate.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a certified participant in AWI's Quality Certification Program.

B. Installer Qualifications: Fabricator of products, or installer approved by fabricator, and a certified participant in AWI's Quality Certification Program.

C. Accessibility: Comply with applicable provisions in the 2010 ADA Standards and AAB.

D. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature $\geq$ 60 and $\leq$ 90° F and relative humidity $\geq$ 25 and $\leq$ 55 percent during the remainder of construction period.

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate locations on Shop Drawings.

1.9 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that comply with requirements of Architectural Woodwork Institute (AWI) AWI Standards, formerly known as the Architectural Woodwork Quality Standards for Architectural Woodwork not specifically indicated as prefabricated or prefinished standard products.

B. Wood Moisture Content: Provide kiln-dried lumber and maintain optimum moisture content in solid wood, both hardwood and softwood, through fabrication, installation, and finishing operations of interior work as follows:

1. Moisture: 5 to 10% range (mild region).

C. Wood for Transparent Finish; Provide the species and grade or cut as follows:

1. Stair Tread: Hard pine (Southern Yellow Pine) clear select.
2. Decorative and Round Handrails: Red Oak.

D. Wood Products: Comply with the following:

1. Softwood Plywood: DOC PS 1.
2. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no urea formaldehyde.

E. Quality Standards: For the following types of architectural woodwork; comply with the indicated standards as applicable. All shall be AWI Custom Grade unless noted otherwise.

1. Standing and Running Trim: AWI Section 6 (Formerly AWI Section 300).
2. Casework: AWI Section 10.
3. Countertops: AWI Section 11 (Formerly AWI Section 400c and 1600c).
4. Shelving AWI Section 6 (Formerly AWI Section 600).
5. Miscellaneous Ornamental Items: AWI Section 6 (Formerly Section 700).
6. Stairwork and Handrails: AWI Section 7 Formerly Section 800).

F. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.

1. Basis of Design Product: Subject to compliance with requirements, provide high- pressure decorative laminates as indicated on the Materials List by one of the following:

a. Formica Corporation.
b. “Pionite” and “Nevamar”: Panolam Surface Systems.
c. Wilsonart International.

2. Colors: As selected by Architects as selected from manufacture's standard colors.

2.2 MILLWORK AND TRIM

A. A. Wood species shall be poplar unless noted otherwise, AWI Custom Grade. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.

B. Millwork Products: Subject to compliance with existing profiles being replaced and wood species requirements, products by 1 of the following may be acceptable, pending Architect's approval:

1. Ponders Hollow Millwork, Inc. (Formerly Copper Beech Millwork).
2. Forester Millwork, LLC.
3. Princeton Classic Moldings.

C. Baseboards in Cottage: Ponders Hollow Part No. "Base 21", 1 x 7-¼ in. with routed top.

D. Crown Molding in Cottage – Alternate No. 4: Ponders Hollow Part No. "CR 71", $^{9}/_{16}$ x 2-¼ inch.

E. Window and Door Casings in Cottage: As salvaged, stripped of existing coatings, primed and reinstalled. Existing door heads are too narrow so head members shall match existing in profile or be a WD 1x 5 carried over the jam casings and overhanging $^{1}/_{8}$ inch at both ends with cut ends sanded smooth.

2.3 STAIRS

A. Repair and reconstruction of stair to 2nd floor in Carriage House and reconfiguration of stair to 2nd floor on Cottage:

1. Treads: Hard pine (Southern Yellow Pine) clear select, ¾ x 10-½ x 36 inches, to be trimmed to suit stairs as indicated.
2. Stair Components, "Hampton Collection" manufactured by Crown Heritage and distributed by BROSCO/Brockway-Smith Co., Wilmington, MA 01887. Wood species shall be poplar, prime painted unless noted otherwise. Equivalent products by other manufacturers will be considered by the Architect:

   a. Balusters: Decorative turned baluster, Part No. "5300 3-Length System", 1-¾ in. square at base x 34 inches long.
   b. Newel Post: Decorative turned newel, Part No. "4507 Plain", ball top, 4-¼ in. square at base.
   c. Decorative Handrail: Red oak, Part No. 6210.

3. Wall-Mounted Handrail: Red Oak, Ponders Hollow Part No. HR3, 1 13/32 x 1-½ inch diameter with flat bottom.

   a. Wall Bracket: Decorative cast iron "Victorian Restoration Black Painted Handrail Bracket Hardware with Swivel Top" manufactured by The King Bay, Hardeeville, SC 29927.

2.4 CLOSET AND STORAGE ROOM HARDWARE

A. Shelf: WD 1x12.

B. Shelf Bracket: “Everbilt 9.5 in. x 11 in. x 0.87 in. White Shelf and Rod Bracket” manufactured and sold by Home Depot.

C. Clothes Pole: Fir or pine, 1- 5/16 in. diameter, unfinished.

2.5 BEAD BOARD PANELING

A. Wood Tongue-and-Groove, pine or fir $^{11}/_{16}$ in. x 3 in. exposed face not including tongue, in profile indicated on Dwg. No. A-305.

2.6 WOOD SHUTTERS

A. Wood shutters shall be poplar. Basis of design are shutters fabricated by New England Shutter Mills, Lawrence, MA 01840 or equivalent product deemed acceptable by the Architect.

1. Shutter Sizes, per hinged leaf, to be verified by Contractor prior to fabrication:

   a. Cottage – Under Stair Closet: pair, 1’-2” x 3’-7” x 1 inch thick stiles and rails.
   b. Cottage – Women’s Toilet: 3 pair, 1’-3” x 2’-8” x 1 inch thick stiles and rails.
   c. Cottage – Men’s Toilet: 1 leaf, 1’-1” x 3’-2” x 1 inch thick stiles and rails.
   d. Cottage – Men’s Toilet: 1 leaf, 1’-4” x 2’-9” x 1 inch thick stiles and rails.

2. Construction: Mortise-and-tenon stile-and-rail with true open vent slats.
3. Finger jointing shall not be allowed.
4. Hardware: Standard hinge, sized to suit shutter leaf size and weight. Color: US 16/BHMA 622 – Flat Black, Coated.
5. Finish: Shop prime and finish painted. Finish color to be selected by Architect during Submittals Phase process.

2.7 WOOD STRIP FLOOR PATCHING

A. Wood Strip Flooring: Unfinished quartered oak strip flooring, select and better grade continuous tongue and groove (T&G), end matches. Flooring bundle and each flooring strip shall bear clearly NOFMA grade and trademark. And conform with Federal Specification MM-L-736, Type III.

1. Size: ¾ x 2 inch at Upper Lobby.

B. Fasteners for blind nailing of flooring shall be 8d screw or cut nails. Machine-driven fasteners, 2 inch long, will also be acceptable.

1. Building paper shall be $\geq$ 15 lb. asphalt-saturated felt.

2.8 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried < 15% moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

C. Adhesives, General: Do not use adhesives that contain urea formaldehyde.

D. Adhesive for Bonding Plastic Laminate: Contact cement.

E. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Wood Glues: 30 g/L.
2. Multipurpose Construction Adhesives: 70 g/L.
3. Contact Adhesive: 250 g/L.

2.9 FABRICATION, GENERAL

A. Interior Woodwork Grade: Unless otherwise indicated, provide AWI Custom-grade interior woodwork complying with referenced quality standard.

B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

C. Fabricate woodwork to dimensions, profiles, and details indicated.

D. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

1. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.

E. Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

1. Seal edges of openings in countertops with a coat of varnish.

2.10 WOOD CABINETS

A. Grade: AWI Custom, painted.

B. Type of Construction: Frameless.

C. Case Body: Cabinet Grade Plywood, $^{23}/_{32}$ in thick.

D. Cabinet, Door, and Drawer Front Interface Style: Shaker style.

E. Shelving: Fabricated from lumber, thicknesses nominal 1 in. thick, painted.
F. Cabinet Hardware:

1. General: Provide cabinet hardware and accessory materials associated with architectural cabinets.
2. Hinges: European-style concealed, adjustable hinges.

3. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish, US 16/BHMA 622 – Flat Black, Coated.
4. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.

B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

A. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.

B. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.

Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of $^1/_8$ in. in 96 in.

C. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

E. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces < 96 in. long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.

1. Install standing and running trim with no more variation from a straight line than 1/8 in. in 96 in.

F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

1. Install cabinets with $\leq$ $^1/_8$ in. in 96 in. sag, bow, or other variation from a straight line.
2. Fasten wall cabinets through back, near top and bottom, at ends and $\leq$ 16 in. o.c. with No. 10 wafer-head screws sized for 1 in. penetration into wood framing, blocking, or hanging strips.

G. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

H. Refer to Division 09 Section “Painting” for final finishing of installed architectural woodwork.

3.3 SHELVING INSTALLATION

A. Install shelf brackets according to manufacturer's written instructions, spaced ≤ 36 in. o.c. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors.

B. Cut shelves to neatly fit openings with only enough gap to allow shelves to be removed and reinstalled. Install shelves, fully seated on cleats, brackets, and supports.

1. Fasten shelves to brackets to comply with bracket manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

1. Adjust all locks in all casework to ensure the lock and unlock position is the same position.

C. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS – TRADE SUB-BID REQUIRED

A. Work of this Section requires Trade Sub-Bids and is governed by the provisions of the Massachusetts General Laws (MGL), Public Bidding Law Chapter 149, Sections 44A to 44J inclusive; and applicable Section of the MGL, Public Contract Law Chapter 30 as amended.

1.2 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.3 REQUIREMENTS FOR FILING SUB-BIDS

A. Time, Manner and Requirements for Submitting Sub-Bids:

1. Sub-bids for work under this Section shall be for the complete work and shall be filed in a sealed envelope with the Public Agency at a time and place as stipulated in the “Instructions to Bidders.”
2. Each sub-bid submitted for work under this Section shall be on forms furnished by the Awarding Authority as required by Section 44F of Chapter 149 of the General Laws, as amended.
3. Sub-bids filed with the Awarding Authority shall be accompanied by Bid Bond, Cash, Certified Check, Treasurer’s Check, or Cashier’s Check issued by a responsible bank or trust company payable to the Town of Templeton in the amount of 5% of the sub-bid. A sub-bid accompanied by any other form of bid deposit than those specified will be rejected.

B. Sub Sub-Bid Requirements: None required under this Section.

1.4 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including the following Specification Sections:

1. Division 07 Section “Synthetic Roof Shingles.”
2. Division 07 Section “Roof Specialties”.
3. Division 07 Section “Sheet Metal Flashing and Trim.”
4. Division 07 Section “Snow Guards.”

B. The Work of this Section is shown on the following Drawings:

G-101	LEGENDS & ABBREVIATONS
A-102	MANSION - ELEVATIONS
A-203	COTTAGE – EXTERIOR – EAST ELEVATION
A-204	COTTAGE – EXTERIOR – WEST ELEVATION
A-205	COTTAGE – ENTRANCE PORCH

The Trade Contractor shall also examine all other Drawings and all other Sections of the Specifications for requirements therein affecting the Work of this Section, not just those pertaining to this Sub-trade.

C. Alternates: Refer to Division 01 Section “Alternates.”

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. This Section includes the following:

1. Thermal insulation.
2. Sound attenuation (acoustical) insulation.
3. Spray-applied cellulosic insulation.
4. Vapor retarders.

B. Related Sections:

1. Division 06 “Rough Carpentry” for partition framing.
2. Division 06 “Miscellaneous Rough Carpentry” for placing of blocking.
3. Division 26 “Electrical Work” for wiring and junction boxes to be placed prior to placing of insulation.

1.3 DEFINITIONS

A. Mineral-Fiber Insulation: Insulation composed of rock-wool fibers, slag-wool fibers, or glass fibers; produced in boards and blanket with latter formed into batts (flat-cut lengths) or rolls.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification: Full-size units for each type of exposed insulation indicated.

C. Low-emitting product certification.

1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

B. Research/Evaluation Reports: For foam-plastic insulation, from ICC-ES.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of building insulation through 1 source from a single manufacturer.

B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test- response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Surface-Burning Characteristics: ASTM E 84.
2. Fire-Resistance Ratings: ASTM E 119.
3. Combustion Characteristics: ASTM E 136.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect plastic insulation as follows:

1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

C. Indoor Air Quality Requirements: The following practices shall be implemented in accordance with Division 01 Section “Indoor Air Quality Requirements.”

1. Insulations shall be stored per manufacturer’s recommendations for allowable temperature and humidity range. Insulations shall not be allowed to become damp. Where feasible, fiberglass, mineral wool, and other fibrous insulations shall be stored separately from materials which have high short-term emissions. Materials with high short-term emissions include, but are not limited to: adhesives, sealants and glazing compounds (specifically those with petrochemical vehicles or carriers); paint, wood preservatives, and finishes; control and/or expansion joint fillers; hard finishes requiring adhesive installation; gypsum board (with associated finish processes and products); and composite or engineered wood products with formaldehyde binders.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BLANKET INSULATION (SOUND ATTENUATION)

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CertainTeed Corporation; “CertaPro AcoustaTherm Batts”.
2. Johns Manville; “Sound Control Batts”.
3. Owens Corning; “Sound Attenuation Batt Insulation” (SAB).

B. Sound Attenuation Insulation: Provide insulating materials as follows:

1. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with flame-spread and smoke- developed indexes $\leq$ 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

a. Thickness: As indicated, $\geq$ 3 ½ in.

2.2 MINERAL-WOOL BATT INSULATION (THERMAL)

A. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:

1. Johns Manville; “Mineral Wool Temp Control Batts”.
2. Owens Corning: “Thermafiber Ultrabatt”
3. Roxul Div. of Rockwool Group; “Comfortbatt”

B. Unfaced, Mineral-Wool Board Insulation: ASTM C C665, Type I (blankets without membrane facing); consisting of fibers; passing ASTM E136 for combustion characteristics.

1. Flame-Spread Index: ≤ 25 when tested in accordance with ASTM E84.
2. Smoke-Developed Index: ≤ 50 when tested in accordance with ASTM E84.
3. Labeling: Provide identification of mark indicating R-value of each piece of insulation ≥ 12 inches in width.
4. Thickness: As indicated, ≥ 3 ½ in.

2.3 AUXILIARY INSULATING MATERIALS

A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.

2.4 VAPOR BARRIER SHEET

A. Polyethylene Vapor Retarders: ASTM D 4397, 6 mils thick, with permeance rating ≤ 0.1 perm.

B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

C. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected. Commencement of work shall indicate acceptance of substrates.

3.2 PREPARATION

A. Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

3.3 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.

C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.4 INSTALLATION SCHEDULES

Location - Cottage	Material	Thickness	Value
Basement Ceiling	Mineral Wool Thermal Batt	3-½ inch	R-15
Basement Ceiling	Polyethylene Sheet Vapor Barrier[1]	6 mil	0
Exterior Wood Stud Walls	Mineral Wool Thermal Batt	3-½ inch	R-15
Exterior Wood Stud Walls	Polyethylene Sheet Vapor Barrier[2]	6 mil	0
Office Perimeter Partitions	Glass Fiber Sound Attenuation	3-½ inch	52[3]
Second Floor Ceiling	Mineral Wool Thermal Batt	3-½ + 9-½ in.	R-52

Location – Carriage House	Material	Thickness	Value
Main Function Space Walls[4]	Mineral Wool Thermal Batt	3-½ inch	R-15
Alcove Walls and Ceiling[5]	Mineral Wool Thermal Batt	3-½ inch	R-15
Stair Walls and Ceiling	Mineral Wool Thermal Batt	3-½ inch	R-15

Footnotes for Schedules
[1] = Fastened to underside of floor joist.
[2] = Fastened to interior stud face.
[3] = STC rating of completed partition assembly per test conducted by Pabco Gypsum.
[4] = At North, East, and South walls.
[5] = At North, South, and West walls.

3.5 INSTALLATION OF GENERAL BUILDING INSULATION

A. Install glass fiber blanket acoustical insulation in cavities formed by framing members where indicated on the drawings. Install according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3 in. clearance of insulation around recessed lighting fixtures.

B. Install mineral wool insulation in penetrations in all non-fire rated horizontal floor/ceiling assemblies. Fill annular space of penetration to resist the free passage of flame and the products of combustion.

3.6 INSTALLATION OF VAPOR RETARDERS

A. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

B. Seal vertical joints in vapor retarders over framing by lapping ≥ 2 wall studs. Fasten vapor retarders to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 in. o.c.

C. Seal overlapping joints in vapor retarders with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.

D. Firmly attach vapor retarders to solid substrates with vapor-retarder fasteners as recommended by vapor-retarder manufacturer.

E. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.

F. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

3.7 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

3.8 WASTE MANAGEMENT

A. Plan and coordinate insulation work to minimize generation of off-cuts and waste. Reuse insulation scraps to the maximum extent feasible.

B. Construction Waste Management: Comply with Division 01 Section “Construction Waste Management and Disposal” and as follows:

1. Separate and recycle waste materials in accordance with the Waste Management Plan and to the extent economically feasible.
2. Reuse insulation scraps in ceiling spaces and other locations where out of view.
3. Give preference to suppliers who take waste back for reuse or recycling.

END OF SECTION

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. Section Includes:

1. Building wrap.
2. Flexible flashing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For building wrap, include data on air and water-vapor permeance based on testing according to referenced standards.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For water-resistive barriers and flexible flashing, from ICC-ES.

PART 2 - PRODUCTS

2.1 WATER-RESISTIVE BARRIER

A. Building Wrap: ASTM E 1677, Type I air barrier; with flame-spread and smoke-developed indexes < 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.

1. Product: Subject to compliance with requirements, provide one of the following, or equal:

a. DuPont; Tyvek CommercialWrap.
b. James Hardie; HardieWrap.

2. Water-Vapor Permeance: $\geq$ 20 perms per ASTM E 96/E 96M, Desiccant Method (Procedure A).
3. Air Permeance: $\leq$ 0.004 cfm/ft^2 at 0.3 in. wg when tested according to ASTM E 2178.
4. Allowable UV Exposure Time: $\geq$ 3 months.

B. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

2.2 MISCELLANEOUS MATERIALS

A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable,

rubberized-asphalt compound, bonded to a high-density polyethylene film to produce an overall thickness of ≥ 25 mil.

1. Basis of Design Product: Subject to compliance with requirements, provide the following, or equal:

    a. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Vycor Plus Self-Adhered Flashing.

B. Primer for Flexible Flashing: Product recommended by manufacturer of flexible flashing for substrate.

C. Nails and Staples: ASTM F 1667.

PART 3 - EXECUTION

3.1 WATER-RESISTIVE BARRIER INSTALLATION

A. Immediately cover exposed exterior surface of sheathing with water-resistive barrier securely fastened to framing in areas where sheathing is installed. Cover exterior of strapping with water-resistive barrier securely fastened to strapping in areas where strapping is installed.

B. Apply water-resistive barrier as follows:

1. Cut back barrier ½ inch on each side of the break in supporting members at expansion- or control-joint locations.
2. Apply barrier to cover vertical flashing with ≥ 4 in. overlap unless otherwise indicated.

C. Building Wrap: Comply with manufacturer's written instructions.

1. Seal seams, edges, fasteners, and penetrations with tape.
2. Extend into jambs of openings and seal corners with tape.

3.2 FLEXIBLE FLASHING INSTALLATION

A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.

1. Prime substrates as recommended by flashing manufacturer.
2. Lap seams and junctures with other materials ≥ 4 in. except that at flashing flanges of other construction, laps need not exceed flange width.
3. Lap flashing over water-resistive barrier at bottom and sides of openings.
4. Lap water-resistive barrier over flashing at heads of openings.
5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS – TRADE SUB-BID REQUIRED

A. Work of this Section requires Trade Sub-Bids and is governed by the provisions of the Massachusetts General Laws (MGL), Public Bidding Law Chapter 149, Sections 44A to 44J inclusive; and applicable Section of the MGL, Public Contract Law Chapter 30 as amended.

1.2 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.3 SUMMARY

A. This Section includes the following:

1. Synthetic shingles for sloped roofs.
2. Underlayment and self-adhering sheet underlayment.
3. All hoisting and scaffolding necessary for the completion of the roof work.
4. Waste disposal.

B. Related Sections include the following:

1. Division 06 Section “Sheathing” for plywood roof sheathing.
2. Division 06 Section “Exterior Finish Carpentry” for wood trim.
3. Division 07 Section “Sheet Metal Flashing and Trim” for metal valley flashing, step flashing, drip edges, and other sheet metal work.
4. Division 07 Section “Snow Guards” for pad type snow guards installed with shingle roofing.

1.4 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of shingle indicated.

C. Samples for Verification: For the following products, of sizes indicated, to verify color selected.

1. Roof Shingle: Full-size shingle panel.
2. Ridge and Hip Cap Shingles: Full-size ridge and hip cap asphalt shingle.

D. Qualification Data: For Installer.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for asphalt shingles.

F. Research/Evaluation Reports: For asphalt shingles.

G. Maintenance Data: For roof shingles to include in maintenance manuals.

H. Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A firm or individual that is approved, authorized, or licensed by asphalt shingle roofing system manufacturer to install roofing system indicated.

B. Fire-Test-Response Characteristics: Provide Synthetic Slate-Look Shingle and related roofing materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108 or UL 790, for application and roof slopes indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store roofing materials in a dry, well-ventilated, weathertight location according to asphalt shingle manufacturer's written instructions. Store underlayment rolls on end on pallets or other raised surfaces. Do not double-stack rolls.

1. Handle, store, and place roofing materials in a manner to avoid significant or permanent damage to roof deck or structural supporting members.

B. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.

1.8 PROJECT CONDITIONS

A. Temporary Support Facilities: Furnish and install all temporary lifts, hoists, staging, scaffolding, rigging, labor and materials, and temporary support to perform all operations in connection with the installation of this Work. Remove all temporary support facilities when no longer required.

B. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit asphalt shingle roofing to be performed according to manufacturer's written instructions and warranty requirements.

1. Install self-adhering sheet underlayment within the range of ambient and substrate temperatures recommended by manufacturer.

1.9 WARRANTY

A. Standard Warranty: Standard form in which manufacturer agrees to repair or replace asphalt shingles that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Manufacturing defects.
b. Structural failures seal after a reasonable time.

2. Material Warranty Period: Lifetime, prorated, with first 10 years non-prorated.
3. Wind-Speed Warranty Period: Asphalt shingles will resist blow-off or damage caused by wind speeds ≤ 130 mph for 15 years from date of Substantial Completion.

4. Algae-Discoloration Warranty Period: Asphalt shingles will not discolor 10 years from date of Substantial Completion.
5. Workmanship Warranty Period: 10 years from date of Substantial Completion.

B. Special Project Warranty: Roofing Installer's Warranty, signed by roofing Installer, covering the Work of this Section, in which roofing Installer agrees to repair or replace components of asphalt shingle roofing that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 2 years from date of Substantial Completion.

1.10 EXTRA MATERIALS

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

1. Roof Shingles: 100 ft^2 of each type, in unbroken bundles.

PART 2 - PRODUCTS

2.1 SYNTHETIC SLATE-LOOK SHINGLES

A. Injection molded synthetic polymer slate-look shingles: Rated to perform at 110 mph.

1. Basis-of-Design Product: Provide “Aledora V-Series” shingles manufactured by Inspire Roofing Products - Headwaters Roofing Group, South Jordan, UT 84095.
2. Height: 18 in.
3. Width: 12 in.
4. Tile Thickness: ½ in.
5. Tile Sizes Varied Width Mix: 6, 8, 10 and 12 inches.
6. Tiles/Square at 6 in. exposure: Approximately 231.
7. Fire Resistance Classification: Class A.
8. Color: No. 804 “Steel Gray”, to match shingles on Carriage House.

B. Hip and Ridge: 18 in. long x 6 in. wide on each side of hip or ridge.

C. Slate Starter Tile: 14 in. high x 12 in. wide.

2.2 UNDERLAYMENT MATERIALS

A. Self-Adhering Sheet Underlayment, Polyethylene Faced: ASTM D 1970, ≥ 40 mil thick, slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release paper backing; cold applied.

1. Obtain self-adhering sheet underlayment from same manufacturer of asphalt shingles, or equal product approved in writing by manufacturer, as required to maintain specified warranty of system.
2. Products: Subject to compliance with requirements, provide one of the following or equal:

a. CertainTeed; ‘WinterGuard Granular”.
b. Grace, W. R. & Co.; “Grace Ice and Water Shield”.
c. Johns Manville International, Inc.; “Roof Defender”.
d. Owens Corning; “WeatherLock M”.
e. Polyguard Products, Inc.; “Polyguard Deck Guard”.

2.3 ACCESSORIES

A. Roofing Nails: ASTM F 1667; hot-dip galvanized steel wire shingle nails, minimum 0.120-inch- diameter, barbed shank, sharp-pointed, with ≥ 3/8 in. diameter flat head and of sufficient length to penetrate 3/4 in. into solid wood decking or extend ≥ 1/8 in. through plywood sheathing.

1. Where nails are in contact with metal flashing, use nails made from same metal as flashing.

2.4 METAL FLASHING AND TRIM

A. General: Comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim."

B. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item.

1. Step Flashings: Fabricate with a headlap of 2 in. and extension of ≥ 5 in. over the underlying asphalt shingle and up the vertical surface.
2. Open Valley Flashings: Fabricate in lengths ≤ 10 ft. with 1 in. high inverted-V profile at center of valley and equal flange widths of 10 in.
3. Drip Edges: Fabricate in lengths ≤ 10 ft. with 2 in. roof deck flange and 1½ in. fascia flange with 3/8 in. drip at lower edge.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored; and that provision has been made for flashings and penetrations through asphalt shingles.
3. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. General: Comply with underlayment manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.

B. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free, on composite nailbase insulated sheathing. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install at locations indicated on Drawings, lapped in direction to shed water. Lap sides ≥ 3 ½ in. Lap ends ≥ 6 inches staggered 24 in. between courses. Roll laps with roller. Cover underlayment ≤ 7 days.

3.3 METAL FLASHING INSTALLATION

A. General: Install metal flashings and other sheet metal to comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim."

B. Step Flashings: Install with a headlap of 2 in. and extend over the underlying asphalt shingle and up the vertical surface. Fasten to roof deck only.

C. Open Valley Flashings: Install centrally in valleys, lapping ends at least 8 inches in direction to shed water. Fasten upper end of each length to roof deck beneath overlap.

1. Adhere 9 in. wide strip of self-adhering sheet to metal flanges and to self-adhering sheet underlayment.

D. Rake Drip Edges: Install rake drip edge flashings over underlayment and fasten to roof deck.

E. Eave Drip Edges: Install eave drip edge flashings over underlayment and fasten to roof sheathing.

3.4 SYNTHETIC SLATE-LOOK SHINGLE INSTALLATION

A. Install synthetic slate-look shingles according to manufacturer's written instructions.

1. Fasten shingles with 2 fasteners/tile and 2 in. from penetrations, flashings and vertical seams. Fasteners must be long enough to penetrate sheathing ≥ ¾ in. through.
2. Install hip and ridge tiles over hips and ridges. Hip and ridge fasteners shall be longer than standard tile fasteners to maintain the deck penetration requirement of ≥ ¾ in. through.
3. Valleys: Install metal flashing per manufacturer’s instructions.
4. Installation temperature: > 20° F.

3.5 WASTE DISPOSAL

A. Disposal: At completion of roofing work, transport demolished materials and waste off Owner's property. Separate, salvage, recycle, and legally dispose of materials in accordance with the Commonwealth of Massachusetts Waste Ban, 310 CMR 19.017.

END OF SECTION

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PART 1 - GENERAL

1.1 GENERAL PROVISIONS – TRADE SUB-BID REQUIRED

A. Work of this Section requires Trade Sub-Bids and is governed by the provisions of the Massachusetts General Laws (MGL), Public Bidding Law Chapter 149, Sections 44A to 44J inclusive; and applicable Section of the MGL, Public Contract Law Chapter 30 as amended.

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. Section Includes:

1. Formed Products:

   a. Formed steep-slope roof sheet metal fabrications.
   b. Roof flashing.
   c. All hoisting and scaffolding necessary for the completion of the work.
   d. Waste disposal.

2. Formed Products: Furnished and installed by Division 07 Section “Roof Shingles”:

   a. Formed continuous wall flashing and drip edges.

3. All hoisting and scaffolding necessary for the completion of the work.

4. Waste disposal.

B. Related Sections:

1. Division 06 Section “Exterior Finish Carpentry” for wood gutters.
2. Division 06 Section “Miscellaneous Rough Carpentry” for wood nailers and blocking.
3. Division 07 Section “Roof Specialties” for copper downspouts.

A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.

1. Temperature Change (Range): 120° F, ambient; 180 ° F, material surfaces.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material

descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Fabrication Samples: For roof edge flashings made from 12 in. lengths of full-size components including fasteners, cover joints, accessories, and attachments.

C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Sheet Metal Flashing: 12 in. long x actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
2. Accessories and Miscellaneous Materials: Full-size Sample.

D. Qualification Data: For qualified fabricator.

E. Maintenance Data: For sheet metal flashing, trim, and accessories to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

B. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

C. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

D. Pre-installation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Project Manager, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, unit skylights, and roof-mounted equipment.
2. Review methods and procedures related to sheet metal flashing and trim.
3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
4. Review special roof details, roof drainage, roof penetrations, and condition of other construction that will affect sheet metal flashing.
5. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might

cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

1.8 COORDINATION

A. Coordinate installation of manufactured roof specialties with interfacing and adjoining construction to provide a leak-proof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

B. Copper Sheet: ASTM B 370, 20 oz./0.0216 in. material thickness, “Revere Freedom Gray” manufactured by Revere Copper Products, Inc., Rome, NY 13440.

1. Surface: Smooth, flat.
2. As-Milled Finish: Mill.
3. Finish:

    a. Coat both sides with Tin/Zinc alloy > 0.0005 in. thick each side. Alloy composition shall be 50% zinc and 50% tin with trace elements controlled for durability, corrosive-resistance and color

C. Flashing and Metal Components/Fabrications:

1. Component items and locations are as follows:

    a. Gutter Liner.
    b. Drip Edge.
    c. Base Flashings for wall/roof, brick chimney/roof.
    d. Termite Shield.

2.2 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

    a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.

b. Blind Fasteners: High-strength stainless-steel rivets suitable for metal being fastened.

2. Fasteners: stainless steel unless noted otherwise.
3. Fasteners for Gutter Liner: Copper.

C. Solder:

1. For Copper: ASTM B 32, of pure tin or lead-free, high tin or of type recommended by copper sheet manufacturer.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape ½ in. wide and 1/8 in. thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

H. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

I. Gutter Liner Mastic: Cold-applied mastic made for roofing applications.

2.3 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 in./ 20 ft. on slope and location lines as indicated and within 1/8 in. offset of adjoining faces and of alignment of matching profiles.

C. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant.

D. Sheet metal components shall be fabricated in as long of a length as possible to avoid seams.

E. Gutter terminations shall be capped-off so as to not expose wood trim members below the spillway lip to be subjected to water immersion.

F. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, ≥ 1 in. deep, filled with butyl sealant concealed within joints.

G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

H. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" for application, but not less than thickness of metal being secured.

I. Metal Roof Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

J. Seams for Copper: Seams for copper shall be soldered.

K. Do not use graphite pencils to mark metal surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats ≤ 12 in. apart. Anchor each cleat with 2 fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling,

and tool marks.
5. Install sealant tape where indicated.
6. Torch cutting of sheet metal flashing and trim is not permitted.
7. Do not use graphite pencils to mark metal surfaces.
8. Gutter liner shall be fully bedded in mastic, with copper nails at 36 in. o.c. at exterior rim of gutter, but not visible from front.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.

1. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at $\leq$ 10 ft. with no joints allowed $\leq$ 24 in. of corner or intersection. Where lapped expansion provisions cannot be employed or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, $\geq$ 1 in. deep, filled with sealant concealed within joints.

D. Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing $\geq 1\frac{1}{4}$ in. for nails and $\geq \frac{3}{4}$ in. for wood screws.

E. Seal joints as shown and as required for watertight construction.

1. Where sealant-filled joints are used, embed hooked flanges of joint members $\geq$ 1 in. into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, $\geq 40^{o}$F and $\leq 70^{o}$ F, set joint members for 50% movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures < 40^{o} F.
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of $1\frac{1}{2}$ in., except reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Pre-tinning is not required for zinc-tin alloy-coated copper.
2. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

3.3 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3 in. o.c.

D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 in. over base flashing. Lap counterflashing joints ≥ 4 in. and bed with sealant. Secure in a waterproof manner by means of snap-in installation and sealant or lead wedges and sealant.

E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.4 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Opening Flashings in Frame Construction: Install continuous head, sill, and similar flashings to extend 4 in. beyond wall openings.

3.5 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 in./ 20 ft. on slope and location lines as indicated and ≤ 1/8 in. offset of adjoining faces and of alignment of matching profiles.

B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.6 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

3.7 WASTE DISPOSAL

A. Unless otherwise indicated, excess materials are Contractor's property. At completion of roofing work, remove from Project site. Separate, salvage, recycle, and legally dispose of materials in accordance with 310 CMR 19.017 Commonwealth of Massachusetts Waste Ban.

END OF SECTION

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PART 1 – GENERAL

1.1 GENERAL PROVISIONS – TRADE SUB-BID REQUIRED

A. Work of this Section requires Trade Sub-Bids and is governed by the provisions of the Massachusetts General Laws (MGL), Public Bidding Law Chapter 149, Sections 44A to 44J inclusive; and applicable Section of the MGL, Public Contract Law Chapter 30 as amended.

1.2 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. Section Includes:

1. Downspout, also referred to as rainwater leader.
2. Downspout connector.

B. Related Requirements:

1. Division 06 Section "Miscellaneous Rough Carpentry” for wood nailers, curbs, and blocking.
2. Division 06 Section “Exterior Finish Carpentry” for wood gutters
3. Division 07 Section "Sheet Metal Flashing and Trim" for custom- and site-fabricated sheet metal flashing and trim.
4. Division 07 Section "Joint Sealants" for field-applied sealants between roof specialties and adjacent materials.

C. Pre-installation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, roofing-system testing and inspecting agency representative, roofing Installer, roofing-system manufacturer's representative, Installer, structural- support Installer, and installers whose work interfaces with or affects roof specialties, including installers of roofing materials and accessories. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
2. Review special roof details, roof drainage, and condition of other construction that will affect roof specialties.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Samples: For each type of roof specialty and for each color and texture specified.

C. Samples for Verification:

1. Include Samples of each type of roof specialty to verify finish and color selection, in manufacturer's standard sizes.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer.

B. Product Certificates: For each type of roof specialty.

C. Sample Warranty: For manufacturer's special warranty.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are ANSI/SPRI ES-1 tested to specified design pressure.

B. Source Limitations: Obtain roof specialties approved by manufacturer providing roofing-system warranty specified in Section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.

B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof-specialty installation.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication and indicate measurements on Shop Drawings.

B. Coordination: Coordinate roof specialties with flashing, trim, and construction of parapets, roof deck, roof and wall panels, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120° F, ambient; 180 ° F, material surfaces.

2.2 ROOF-EDGE DRAINAGE SYSTEMS

A. Rainwater Leaders/Downspouts: Fabricate plain copper downspouts at locations indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.

1. Wall Brackets: 1 in box-type fabricated from same material as downspout. Furnish brackets at spacing ≤ 60 in., ≥ 2 brackets per downspout.
2. Sizes: 3 in. x 4 in.
3. Fabricate from the following material:

    a. Copper: 16 oz.
    b. Texture: Smooth.

2.3 MISCELLANEOUS MATERIALS

A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:

1. Fasteners for Copper: Copper or brass.

2.4 FINISHES

A. Copper to be left natural to weather to a verdigris patina.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.

B. Examine wood gutter, walls and roof edges for suitable conditions for roof specialties.

C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage where applicable, and securely anchored.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.

1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
2. Provide uniform, neat seams with minimum exposure of solder and sealant.
3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
4. Torch cutting of roof specialties is not permitted.
5. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

C. Fastener Sizes: Use fasteners of sizes that penetrate wood blocking or sheathing ≥ 1-¼ in. for nails and ≥ ¾ in. for wood screws.

D. Seal concealed joints with butyl sealant as required by roofing-specialty manufacturer.

E. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures < 40° F.

F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1 ½ in.; however, reduce pre-tinning where pre-tinned surface would show in completed Work. Tin edges of uncoated copper sheets using solder for copper. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

3.3 ROOF-EDGE DRAINAGE-SYSTEM INSTALLATION

A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.

B. Downspouts: Join sections with 1 ½ in. telescoping joints.

1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at +/- 60 in. o.c. in between. Hangers shall be non-removable and tamper-proof.
2. Install plumb and true at indicated locations.

3.4 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder and sealants.

C. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.

D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

3.5 WASTE DISPOSAL

A. Unless otherwise indicated, excess materials are Contractor's property. At completion of roofing work, remove from Project site. Separate, salvage, recycle, and legally dispose of materials in accordance with the Commonwealth of Massachusetts Waste Ban, 310 CMR 19.017.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS – TRADE SUB-BID REQUIRED

A. Work of this Section requires Trade Sub-Bids and is governed by the provisions of the Massachusetts General Laws (MGL), Public Bidding Law Chapter 149, Sections 44A to 44J inclusive; and applicable Section of the MGL, Public Contract Law Chapter 30 as amended.

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. Section Includes:

1. Pad-type, flat-mounted snow guards.

B. Related Sections:

1. Division 07 Section “Asphalt Shingles” for installation of pad-type, flat mounted snow guards.

1.3 ACTION SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for snow guards.

B. Shop Drawings: Include roof plans showing layouts and attachment details of snow guards.

1. Include calculation of number and location of snow guards based on snow load, roof slope, roof type, components, spacings, and finish.

C. Samples:

1. Full size pad style.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of snow guard, for tests performed by manufacturer and witnessed by a qualified testing agency.

1.5 PROJECT CONDITIONS

A. Temporary Support Facilities: Furnish and install all temporary lifts, hoists, staging, scaffolding, rigging, labor and materials, and temporary support to perform all operations in connection with the installation of this Work. Remove all temporary support facilities when no longer required.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Performance Requirements: Provide snow guards that withstand exposure to weather and resist thermally induced movement without failure, rattling, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

1. Temperature Change: 120° F, ambient; 180 ° F, material surfaces.

B. Structural Performance: In accordance with 780 CMR- Massachusetts State Building Code.

1. Snow Loads: As indicated on Drawings.

2.2 PAD-TYPE SNOW GUARDS

A. Flat-Mounted Metal Snow Guard Pads:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Model No. PD40 “Half Round Pad-Style Snow Guard” manufactured by Alpine Snow Guards, division of Vermont Slate & Copper Services, Inc., or comparable product by one of the following:

   a. Rocky Mountain Snow Guards, Inc.
   b. Sno Gem, Inc.

2. Material: “Freedom Gray” patented tin-zinc alloy.
3. Fasteners: Stainless steel trim screws, compatible with snow guards and roof deck. Provide $\geq$ 2 fasteners per snow guard.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, snow guard attachment, and other conditions affecting performance of the Work.

1. Verify compatibility with and suitability of substrates including compatibility with existing finishes or primers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean and prepare substrates for bonding snow guards.

B. Prime substrates according to snow guard manufacturer's written instructions.

3.3 INSTALLATION

A. Install snow guards according to manufacturer's written instructions.

B. Attachment for Asphalt Shingle Roofing:

1. Flat-Mounted, Snow Guard Pads: Mechanically anchored through predrilled holes concealed by the shingles.

END OF SECTION

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. Section Includes:

1. Urethane joint sealants.

B. Related Sections include the following:

1. Division 06 Section "Exterior Finish Carpentry" for sealing of certain joints in wood siding and trim.
2. Division 07 “Spray Foam Sealants”.

1.5 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

1.6 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

1.7 QUALITY ASSURANCE

A. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.8 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint- sealant manufacturer or are below 40^{o} F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.9 WARRANTY

A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):

1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Porous Substrates: 775 g/L.

C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 URETHANE JOINT SEALANTS

A. Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 50, for Use NT.

1. Products: Subject to compliance with requirements, provide 1 of the following:

a. BASF Corporation-Construction Systems; “MasterSeal NP 2” (formerly Sonolastic NP2).
c. Pecora Corporation; “Dynatrol II”.
d. Sherwin Williams; “Loxon 2K NS”.
e. Tremco; “Dymeric 240 FC”.

B. Multicomponent, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C 920. Type M, Grade P, Class 25, for Use T and I.

1. Products: Subject to compliance with requirements, provide 1 of the following:

a. BASF Corporation-Construction Systems; “MasterSeal SL 2” (formerly Sonolastic SL2).
b. Pecora Corporation; “Dynatrol II-SG”.
c. Sherwin Williams; “Loxon 2K SL”.
d. Tremco; “THC-900”.

2.3 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and

formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint- sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. 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. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.

B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.

2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

C. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in vertical surfaces.

1. Joint Locations:

a. Joints wood siding and trim, including all penetrations for conduit.
b. Joints in wood trim.
c. Joints between different materials listed above.
d. Perimeter joints between materials listed above and frames of doors and windows.
e. Other joints as indicated.

2. Urethane Joint Sealant: Multicomponent, Non-sag, Urethane Joint Sealant.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

B. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

1. Joint Locations:

a. Isolation joints in cast-in-place concrete slabs and brick walkways.
b. Other joints as indicated.

2. Urethane Joint Sealant: Multicomponent, pourable, traffic grade, Class 25.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors, for each material.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. This Section includes polyurethane spray foam sealant.

B. Related Sections include the following:

1. Division 07 Section "Joint Sealants" for sealants installed in interior and exterior surfaces.

1.3 PERFORMANCE REQUIREMENTS

A. Provide spray foam sealant engineered to fill voids and seal gaps without deteriorating substrates.

1.4 SUBMITTALS

A. Product Data: For spray foam sealant.

B. Product Certificates: For spray foam sealant and accessories, signed by product manufacturer.

C. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming sealant substrates have been tested for compatibility and adhesion with spray from sealant, including all types of aluminum framing systems, fiberglass windows, fluid-applied membrane air barriers, and water-resistive air-barrier membranes.

D. Certification from sealant manufacturer that products supplied comply with Commonwealth of Massachusetts regulations controlling the use of volatile organic compounds (VOC’s).

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain spray foam sealant through one source from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials in original containers in cool, dry area at room temperature $\geq$ 60 and $\leq$ 70^{o}. F. Do not store materials at > 90^{o} F.

PROJECT CONDITIONS

A. Do not proceed with installation of spray foam sealant under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by

sealant manufacturer or are < 45° F.
2. When joint substrates are wet.
3. Contaminants capable of interfering with adhesion have not yet been removed from substrate.

PART 2 - PRODUCTS

2.1 SPRAY FOAM SEALANTS

A. Polyurethane Spray Foam Sealant: Single or two-component, polyurethane foam sealant packaged in self-contained pressurized containers, gun-grade, containing no urea formaldehyde, and UL Classified.

1. In accordance with ASTM E 84, provide products with a flame spread of 25 and smoke developed of 450.
2. Properties:

    a. Cure Time: 8-24 hours at 75° F, 50% relative humidity.
    b. Air infiltration at 6.24 psf pressure per in 1 cm wide gap: ASTM E 283, less than 0.01 cfm/ft^2.
    c. Water Vapor Transmission, per inch thickness: ASTM E 96, less than 4 perms.
    d. R-Value: $\geq$ 4 to 5 / in.
    e. Closed Cell Content: ASTM D 2856, $\geq$ 70%.
    f. Core Density: Minimum 1.7 lbs./ft^3.
    g. Pressure Build: Comply with AAMA 812-04.

3. Products: Subject to compliance with requirements, provide one of the following:

    a. Dow Building Solutions; “Great Stuff Pro Window & Door”.
    b. Fomo Products, Inc.; “Handi-Seal Window and Door Sealant”.
    c. Hilti; “CF 812 Window and Door Low-Pressure Filler Foam”.

B. Cleaner: Manufacturer’s standard for cleaning substrates and to clean up foam spills, overspray, tools and nozzles before foam cures.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine voids and substrates to receive spray foam sealant, with Installer present, for compliance with requirements and conditions affecting foam sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Commencement of work indicates acceptance of substrates.

3.2 PREPARATION

A. Remove foreign material that could interfere with adhesion of spray foam sealant, including dust, oil, grease, water, repellants, water, and surface dirt.

1. Remove laitance and form-release agents from concrete.
2. Clean nonporous surfaces with cleaner that does not stain, harm substrate, or leave residue capable of interfering with adhesion of spray foam sealants.

3.3 INSTALLATION

A. General: Comply with spray foam sealant manufacturer's written instructions for products and applications indicated.

B. Install foam sealant at exterior frames of louvers, doors, and clad wood windows.

1. Fill cavities 30-40%, allowing foam to expand approximately 3 x its original dispensed volume.

3.4 CLEANING AND PROTECTING

A. Protect adjacent surfaces from overspray. If required, clean spills before product cures.

B. Protect spray foam from exposure to sunlight.

C. Proceed with installation of joint sealants by Division 07 Section "Joint Sealants."

END OF SECTION

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. Section Includes:

1. Standard hollow metal doors and frames; Cottage Basement Door No. B01.

B. Related Sections:

1. Division 06 Section “Miscellaneous Rough Carpentry” for sub-buck at Cottage basement door.
2. Division 08 Section "Door Hardware" for door hardware for hollow metal doors.
3. Division 09 Section “Painting” for field painting hollow metal doors and frames.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings.

B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit

and Project-site storage. Do not use non-vented plastic.

B. Deliver welded frames with 2 removable spreader bars across bottom of frames, tack welded to jambs and mullions.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.8 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ceco Door Products; division of Assa Abloy Group, Milan, TN.
2. Curries Company; division of Assa Abloy Group, Mason City, IA 50401.
3. de La Fontaine Industries, Inc., Woburn, MA 01801.
4. Steelcraft; division of Allegion, Blue Ash, OH 45242.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum A60 metallic coating.

C. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

E. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.

F. Grout: Comply with requirements for grout in Division 04 Section “Unit Masonry.”

G. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos

fibers, sulfur components, and other deleterious impurities.

2.3 STANDARD HOLLOW METAL DOORS

A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.

1. Design: Embossed and Flush panel.
2. Core Construction: Manufacturer's standard kraft paper honeycomb, polystyrene, polyurethane, mineral board, or vertical steel-stiffener core that produces doors complying with ANSI A250.8.

    a. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) $\geq$ 10.0° F x h x sq. ft./Btu when tested according to ASTM C 1363.

        1) Locations: Exterior doors.

3. Vertical Edges for Single-Acting Doors: Beveled edge.

    a. Beveled Edge: $^1/_8$ inch in 2 inches.

4. Top and Bottom Edges: Closed with flush or inverted 16 gauge end closures or channels of same material as face sheets.
5. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 2 (Seamless).

    a. Provide 16 gauge face sheets.

2. Exterior doors shall be provided in following styles, as indicated:

    a. Type A: Embossed to resemble 6 panels on both sides of door slab.
    b. Type B: Flush panel.

C. Hardware Reinforcement: Fabricate reinforcement plates from same material as frames to comply with manufacturer's standard gauges and sizes, but not less than the following minimum sizes

1. Hinges: $\geq$ 10 gauge by 1- $^1/_2$ inches wide by 6 inches longer than hinge, secured by $\geq$ 6 spot welds.
2. Lock Face, Flush and Surface Bolts, Closers, and Concealed Holders: $\geq$ 14 gauge.
3. Pull Plates and Bar: $\geq$ 16 gauge.

D. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.4 STANDARD HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Exterior Frames: Fabricated from metallic-coated steel sheet.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames as face welded.
3. Frames for Level 3 Steel Doors: 14 gauge steel sheet.

C. Hardware Reinforcement: Fabricate reinforcement plates from same material as frames to comply with manufacturer's standard gauges and sizes, but not less than the following minimum sizes:

1. Hinges: ≥ 10 gauge by 1-1/2 inches wide x 6 inches longer than hinge, secured by ≥ 6 spot welds.
2. Lock Face, Flush and Surface Bolts, Closers, and Concealed Holders: ≥ 14 gauge.
3. Pull Plates and Bar: ≥ 16 gauge.

2.5 FRAME ANCHORS

A. Floor Anchors: Formed from same material as frames, not less than 16 gauge thick, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

B. Jamb Anchors:

1. Stud-Wall Type: Designed to engage stud, welded to back of frames; ≥ 18 gauge.

2.6 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/NAAMM-HMMA 861.

C. Hollow Metal Doors:

1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.

D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
4. Jamb Anchors: Provide number and spacing of anchors as follows:

a. Stud-Wall Type: Locate anchors ≤ 18 inches from top and bottom of frame. Space anchors ≤ 32 inches o.c. and as follows:

1) Four anchors per jamb ≥ 60 and ≤ 90 inches high.

5. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.

a. Single-Door Frames: Drill stop in strike jamb to receive 3 door silencers.

E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8 and ANSI/NAAMM-HMMA 861.
2. Reinforce doors and frames to receive non-templated, mortised and surface-mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.

2.7 STEEL FINISHES

A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:

1. Squareness: +/- 1/16 inch, measured at door rabbet on a line 90° from jamb perpendicular to frame head.
2. Alignment: +/- 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
3. Twist: +/- 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: +/- 1/16 inch, measured at jambs on a perpendicular line from head to floor.

C. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.

1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

   a. Remove temporary braces necessary for installation only after frames have been properly set and secured.
   b. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

2. Floor Anchors: Provide floor anchors for each jamb that extends to floor, and secure with post-installed expansion anchors.

   a. Floor anchors may be set with powder-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.

3. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

   a. Squareness: +/- 1/16 inch, measured at door rabbet on a line 90° from jamb perpendicular to frame head.
   b. Alignment: +/- 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: +/- 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: +/- 1/16 inch, measured at jambs at floor.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

   a. Jambs and Head: 1/8 inch +/- 1/16 inch.
   b. Between Edges of Pairs of Doors: 1/8 inch +/- 1/16 inch.

c. Between Bottom of Door and Top of Threshold: > 3/8 inch.
d. Between Bottom of Door and Top of Finish Floor (No Threshold): > 3/4 inch.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.1A, entitled “Related Documents.”

1.2 SUMMARY

A. This Section includes the following:

1. Exterior Stile and Rail Wood Doors.
2. Interior Stile and Rail Wood Doors.
3. Bi-Parting Wood Sliding Doors.

B. Related Sections include the following:

1. Division 06 Section “Rough Carpentry” for wood sub-bucks.
2. Division 09 Section "Painting" for finish painting of stile and rail doors.

1.3 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data, including the following:

1. Door schedule indicating door and frame location, type, size, and swing.
2. Door elevations, dimensions, and location of hardware.
3. Details of frame for each frame type, including dimensions and profile.
4. Clearances and undercuts.

1.4 QUALITY ASSURANCE

A. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.

1.5 WARRANTY

A. Submit written agreement in door manufacturer’s standard form signed by the Manufacturer, Installer and Contractor, agreeing to repair or replace defective doors which have warped (bow, cup or twist) or which show photographing of construction below in face veneers, or do not conform to tolerance limitations of the AWI and WDMA. Warranty shall be in effect during the following period after the date of acceptance:

1. Solid Stile and Rail Panel Doors:

a. 2 years for Exterior doors.
b. Finish: 7 years

2. B-Parting Wood Sliding Doors:

a. 1 year.

b. Door Hardware: 5 years.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack doors flat with spacers between each to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Use only materials that comply with referenced standards and other requirements specified.

1. Assemble exterior doors, including components, with wet-use adhesives complying with ASTM D5572 for finger joints and with ASTM D5751 for joints other than finger joints.
2. Assemble interior doors, including components, with either dry-use or wet-use adhesives complying with ASTM D5572 for finger joints and with ASTM D5751 for joints other than finger joints.

B. Panel Products: Veneer-core plywood.

2.2 EXTERIOR STILE AND RAIL WOOD DOORS

A. Exterior Stile and Rail Wood Doors: WDMA I.S. 6.A.

1. Performance Grade WDMA I.S. 6.A Heavy Duty.
2. Architectural Woodwork Standards Grade: Custom.
3. Architectural Style: Square Stick with Flat Panel, aka “Shaker” style.
4. Finish: Opaque.
5. Door Construction for Opaque Finish:

   a. Stile and Rail Construction: Veneered, structural composite lumber.
   b. Panel: Flat-Panel Construction: Veneered, wood-based panel product.

6. Stile and Rail Widths: Manufacturer's standard, but not less than the following:

   a. Stile, Top and Intermediate Rails: 5-$^{3}/_{8}$ inches.
   b. Bottom Rails: 11-$^{3}/_{8}$ inches.

7. Flat Panel Thickness: ½ inch.

8. Mark, label, or otherwise identify stile and rail wood doors as complying with WDMA I.S. 6A and grade specified.

2.3 INTERIOR STILE AND RAIL WOOD DOORS

A. Interior Stile and Rail Wood Doors: WDMA I.S. 6.A.

1. Performance Grade WDMA I.S. 6.A Heavy Duty.
2. Architectural Woodwork Standards Grade: Custom.
3. Architectural Style: Square Stick with Flat Panel, aka “Shaker” style.
4. Finish: Opaque.
5. Wood Species for Opaque Finish: Poplar.
6. Door Construction for Opaque Finish:

a. Stile and Rail Construction: Clear lumber: May be edge glued for width.
b. Panel: Flat-Panel Construction: Veneered, wood-based panel product.

7. Stile and Rail Widths: Manufacturer's standard, but not less than the following:

a. Stile, Top and Intermediate Rails: 4-½ inches.
b. Bottom Rails: 9 inches.

8. Flat Panel Thickness: ½ inch.

9. Mark, label, or otherwise identify stile and rail wood doors as complying with WDMA I.S. 6A and grade specified.

2.4 BI-PARTING WOOD SLIDING DOORS

A. Wood Sliding Door: "Double-Z" two-panel, barn-type double door, fully assembled and with all hardware. Basis of design is "Barn Craft Knotty Alder Barn Door" manufactured by Glass Craft Door Company, Houston, TX or equal, subject to Architect's approval.

B. Sliding Door Leaf Construction: Shall have the following components:

1. Wood Species: Knotty Alder.
2. Leaf Size: 3'-6" x 8'-0" x 1-¾".
3. Plank and Cross Rail Configuration: As Indicated on drawing No. A-306.
4. Top, Intermediate, and Bottom Rails: 5/4 x 4.
5. Diagonal Zee Rails: 5/4 x 4.
6. Vertical Planks: T & G 1 x 4 with joining edges chamfered.

C. Sliding Door Hardware:

1. Pull Handles: "Monterey Wrought Iron", 2 required.
2. Door Rollers: "Philmont", ¼ inch steel with high durometer nylon roller, 4 required.
3. Hardware Kit: The following hardware components are required:

a. Steel Rail Track: ¼ inch steel x 7'-5", 2 required.
b. Rail Stand-Off Bracket: 5 required.
c. Floor Door Guide: 2-piece 1-½ x ½ inch, 1 required.
d. Stopper: 2 required.
e. Anti-Jump Roller: 2 required.
f. Bolts and Anchors: As required with the kit for installation.

4. Hardware Color: Matte black.

2.5 STILE AND RAIL WOOD DOOR FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels unless otherwise indicated:

1. Clearances:

a. Provide 1/8 inch at heads and jambs.
b. Provide ½ inch from bottom of door to top of decorative floor finish or covering.
c. Where threshold is shown on Drawings or scheduled, provide $\leq$ 3/8 inch from bottom of door to top of threshold.

2. Bevel doors 1/8 inch in 2 inches at lock and hinge edges.

B. Fabricate stile and rail wood doors in sizes indicated for field fitting.

C. Factory machine doors for hardware that is not surface applied.

1. Locate hardware to comply with DHI-WDHS-3.
2. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.

D. Exterior Doors: Factory treat exterior doors with water-repellent preservative after fabrication has been completed but before factory finishing.

3. Comply with WDMA I.S. 4.

2.6 FACTORY PRIMING

A. Doors for Opaque Finish: Shop prime faces, all four edges, edges of cutouts, and mortises with one coat of wood primer specified in Section 099113 "Exterior Painting" and "Interior Painting."

2.7 FACTORY FINISHING

A. Comply with referenced quality standard for factory finishing.

1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
2. Finish faces, all four edges, edges of cutouts, and mortises.
3. Fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.

B. Factory finish doors as follows:

1. Exterior: Prime and Finish coats.
2. Interior: Prime coat.

C. Opaque Finish:

1. Architectural Woodwork Standards Grade: Custom.
2. Color: As selected by Architect from manufacturer's full range.
3. Sheen: Semigloss.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install doors and frames to comply with manufacturers written instructions in reference to quality standard as indicated Factory fitted doors.

B. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

C. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project Site.

3.2 FIELD QUALITY CONTROL

A. Repair or remove and replace installations where Architect's inspections indicate that they do not comply with specified requirements.

B. Reinspect repaired or replaced installations to determine if replaced or repaired door installations comply with specified requirements.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

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PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. Section includes following Wood Window Types:

1. Dual (Insulating) Glazed Double Hung at Cottage.
2. Single Glazed Double Hung at Carriage House.
3. Single Glazed Awning Type at Cottage.

B. Related Sections:

1. Division 02 Section “Selective Demolition” for removal of existing windows.
2. Division 06 Section “Exterior Finish Carpentry” for window repair at Mansion and Cottage.
3. Division 07 Section “Joint Sealants” for joint sealants installed with cladwood windows.
4. Division 07 Section “Spray Foam Sealants” for spray foam sealants installed with cladwood windows.
5. Division 08 Section “Glazing” for glazing requirements to the extent not specified in this Section.
6. Division 09 Section “Painting” for finish painting Single Glazed Windows.

1.3 SUBMITTALS

A. Shop Drawings: Submit shop drawings under provision of Section 01 33 23.

B. Product Data: Submit catalog data under provision of Section 01 33 23.

C. Samples:

1. Submit corner section under provision of section 01 33 00.

2. Include glazing system, quality of construction and specified finish.

D. Quality Control Submittals: Certificates: submit manufacturer’s certification indicating compliance with specified performance and design requirement under provision of section 01 33 23

E. Maintenance Data: For operable window sash, operating hardware, weather stripping and finishes to include in maintenance manuals.

F. Warranty: Special Warranty specified in this Section.

1.4 QUALITY ASSURANCE

E. Requirements: consult local code for Mass. Code (2015 IBC-International Building Code) and pertinent revisions for information on:

1. Egress, emergency escape and rescue requirements
2 Basement window requirements

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify window openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.6 STORAGE AND HANDLING

A. Prime and seal wood surfaces including to be concealed by wall construction if > 30 days will expire between delivery and installation.

B. Store window units in an upright position in a clean and dry storage area above ground to protect from weather.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace cladwood windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Failure to meet performance requirements.
   b. Structural failures including excessive deflection, water leakage, air infiltration, or condensation.
   c. Faulty operation of movable sash and hardware.
   d. Deterioration of finishes beyond normal weathering.
   e. Failure of insulating glass.

2. Warranty Periods:

   a. Clear insulating glass with stainless steel spacers is warranted against seal failure caused by manufacturing defects and resulting in visible obstruction through the glass for twenty (20) years from the original date of purchase.
   b. Glass is warranted against stress cracks caused by manufacturing defects from ten (10) years from the original date of purchase.
   c. Factory applied interior finish is warranted to be free from finish defects for a period of five (5) years from the original date of purchase
   d. Window and Glazing: 10 years from date of Substantial Completion.
   e. Hardware and other non-glass components are warranted to be free from manufacturing defects for ten (10) years from the original date of purchase

PART 2 - PRODUCTS

2.1 WINDOW PERFORMANCE REQUIREMENTS FOR DOUBLE GLAZED WINDOWS

A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

1. Window Certification: WDMA certified with label attached to each window.

B. Class & Performance Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:

1. Class: LC
2. Performance Grade: 40-H

C. Air Infiltration: Maximum rate not more than indicated when tested according to AAMA/WDMA 101/I.S.2/NAFS, Air Infiltration Test.

1. Maximum Rate: 0.09 fm^3/ft^2 of area at an inward test pressure of 1.57 lbf/ ft^2.

D. Window Water Penetration, ASTM E 547 for 53.0” x 82.0” unit: No water penetration through window when tested under minimum static pressure of 6.0 lbf/ ft^2. (127 mph) after 4 cycles of 5 minutes each, with water being applied at a rate of 5 gallons hour/ ft^2.

2.2 MANUFACTURED UNITS - FOR DOUBLE GLAZED WINDOWS

A. Basis of Design Product: Subject to compliance with requirements, provide “Ultimate Double-Hung” wood windows as manufactured by Marvin, Warroad, Minnesota 56763, or comparable product by one of the following:

1. Pella Corporation.
2. Marvin Windows and Doors, Inc.

B. Operating Types: Provide the following operating types in locations and sizes as indicated on Drawings:

1. Double hung.

2.3 FRAME DESCRIPTION FOR DOUBLE GLAZED WINDOWS

A. Non-finger-jointed Pine.

1. Kiln-dried to moisture content $\leq$ 12 percent at the time of fabrication.
2. Water repellent, preservative treated in accordance with ANSI/WDMA I.S.4.

B. Frame thickness $^{11}/_{16}$ inch head and jambs.

D. Frame depth overall 5-$^{21}/_{32}$ inch jamb from the nailing fin plane to the interior face of the frame.

E. Sill assembly including the sill liner 2-$^{7}/_{32}$ inches.

F. Factory-applied historic profile extrusion.

2.4 SASH DESCRIPTION FOR DOUBLE GLAZED WINDOWS

A. Interior: Non-finger-jointed Pine.

1. Kiln-dried to moisture content $\leq$ 12 percent at the time of fabrication.
2. Water repellent, preservative treated in accordance with ANSI/WDMA I.S.4.

B. Sash thickness: 1-$^{5}/_{8}$ inch for operable units.

C. Operable sash tilt to interior for cleaning or removal.

D. Sash Option: Standard Equal Sash.

E. Exterior Cope Profile: Putty.

F. Interior Sash Sticking: Standard Ovolo.

2.5 **GLAZING** FOR DOUBLE GLAZED WINDOWS

A. Select quality complying with ASTM C1036. Insulating glass SIGMA/IGCC certified to performance level CBA when tested in accordance with ASTM E2190.

B. Glazing method: Insulating glass.

C. Glazing seal: Silicone glazed.

D. Glass Type: Clear, Low E1.

2.6 FINISH FOR DOUBLE GLAZED WINDOWS

A. Interior/Exterior: Treated bare wood with factory-applied prime coat.

1. Interior: Factory-applied finish coat over primer.

2.7 **INSECT SCREENS** FOR DOUBLE GLAZED WINDOWS

A. Factory-installed half screen. Half screen covers sash opening.

1. Screen Mesh: Charcoal Aluminum Wire.

B. Aluminum Frames Finish: Black..

2.8 SIMULATED DIVIDED LIGHTS (SDL) FOR DOUBLE GLAZED WINDOWS

C. $^{7}/_{8}$ inch wide with internal spacer bar.

D. Muntins: Pine, adhered to glass with acrylic foam tape
.

E. Sticking: Standard Ovolo.

F. Pattern: Rectangular.

G. Finish: Match panel finish.

2.9 GRILLES-BETWEEN-THE-GLASS (GBG) FOR DOUBLE GLAZED WINDOWS

A. 23/32 contoured aluminum bar.

1. Exterior Color: Stone White.
2. Interior Color: Stone White.
3. Pattern: Rectangular.

2.10 SINGLE GLAZED WINDOWS

A Single Glazed Windows shall be pine, mortise and tenon construction, prime painted exterior, 4- $^{9}/_{16}$ inch jamb, weather stripping, and cam lock, “Boston Layout” series distributed by BROSCO/Brockway-Smith Co., Wilmington, MA 01887. Equivalent products by other manufacturers will be considered by the Architect.

1.. Double Hung: “Authentic Divided Light (SSB)”.
2. Basement Awning: “Single Thick Glass (SSB) Cellar Sash” with moisture-repellent.

2.11 ACCESSORIES

A. Installation and Hardware Accessories:

1.Standard latch centered on parting stile.
2.Installation brackets: Provide jamb brackets.

2.12 FABRICATION

A. Fabricate wood windows in sizes indicated. Include a complete system for installing and anchoring windows.

B. Factory glaze windows.

C. Weatherstrip each operable sash to provide weathertight installation.

D. Hardware: Mount hardware through double walls of vinyl extrusions or provide corrosion-resistant steel reinforcement complying with requirements for reinforcing members, or do both.

E. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Comply with Section 01 73 29.

B. Assemble and install window/door unit(s) according to manufacturer's instruction and reviewed shop drawing.

C. Install sealant and related backing materials at perimeter of unit or assembly in accordance with Section 07 92 00 Joint Sealants. Do not use expansive foam sealant.

D. Install accessory items as required.
E. Use finish nails to apply wood trim and moldings.

3.2 FIELD QUALITY CONTROL

A. Remove visible labels and adhesive residue according to manufacturer's instruction.

B. Unless otherwise specified, air leakage resistance tests shall be conducted at a uniform static pressure of 1.57 lb./ft.^{2}. Allowable rate of air leakage shall be $\leq$ 2.3 0.45 cfm/ft^2.

C. Unless otherwise specified, water penetration resistance testing shall be conducted per AAMA 502 and ASTM E1105 at 2/3 of the fenestration products design pressure (DP) rating using "Procedure B" – cyclic static air pressure difference. Water penetration shall be defined in accordance with the test method(s) applied.

3.3 CLEANING

A. Remove visible labels and adhesive residue according to manufacturer's instruction.

B. Leave windows and glass in a clean condition. Final cleaning as required in Section 01 74 00.

3.4 PROTECTING INSTALLED CONSTRUCTION

A. Comply with Section 07 76 00.

B. Protecting windows from damage by chemicals, solvents, paint or other construction operations that may cause damage.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. This Section includes the following:

1. Door hardware for the following:

a. Swinging doors.

B. Related Sections include the following:

1. Division 06 Section "Exterior Finish Carpentry” for custom-fabricated board doors.
2. Division 08 Section “Wood Doors” for doors to receive hardware.
3. Division 08 Section “Hollow Metal Doors and Frames for doors to receive hardware.
4. Division 09 Section "Painting" for field painting of interior wood doors and exterior hollow metal doors.

1.3 SUBMITTALS

A. Product Data: Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Warranty: Special warranty specified in this Section.

C. Other Action Submittals:

1. Keying Schedule: Prepared by or under the supervision of Architectural Hardware Consultant and following Keying Conference, detailing Owner's final keying instructions for locks.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by lock manufacturer.

1. Installer's responsibilities include supplying and installing door hardware and providing a qualified Architectural Hardware Consultant available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.

B. Architectural Hardware Consultant Qualifications: A person who is currently certified by DHI as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered

to Project site.

B. Tag each item or package separately with identification related to the final door hardware sets, and include basic installation instructions, templates, and necessary fasteners with each item or package.

1. Each item to be individually packaged in manufacturer's original container.

C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.6 COORDINATION

A. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

B. Existing Openings: Where new hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide for proper operation.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including excessive deflection, cracking, or breakage.
b. Faulty operation door hardware.
c. Deterioration of metals, metal finishes, and other materials beyond normal

d. Long weathering and use.

2. Warranty Period: 1 year from date of Substantial Completion, except as follows:

a. Locksets and Latchsets: 10 Year Limited.
b. Hinges: Lifetime.

1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish 2 complete sets of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware. Furnish 2 extra fasteners of each type and finish installed.

B. Maintenance Service: Beginning at Substantial Completion, provide 6 months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door hardware operation. Provide parts and supplies same as those used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in this Section, door hardware as indicated.

1. Door Hardware: Provide quantity, item, size, finish or color indicated.

B. Designations: As indicated on Drawing No. A-215. Products are identified by descriptive titles corresponding to requirements specified in Part 2.

2.2 MECHANICAL LOCKS AND LATCHES

A. Bored Locks: BHMA A156.2, Grade 2.

1. Basis-of-Design: “ALX Series” Locksets and Latchsets manufactured by Schlage Commercial Lock Div. of Allegion, Inc. or a comparable product by 1 of the following:

B. Lock Functions: As indicated in door hardware schedule.

C. Lock Throw: ½ inch, deadlocking 1-⅛ x 2-¼ inch face at Locksets.

D. Latch Throw: ½ inch.

E. Backset: 2- ¾ inch standard.

F. Lever Trim: SAT (Saturn), Mass. 521 CMR and ADA compliant.

2.3 HINGES

A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal frames.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Hager Companies.
b. McKinney Products Company; an ASSA ABLOY Group company.
c. Stanley Commercial Hardware.

2. Mounting: Full mortise (butts).
3. Bearing Material: Ball bearing.
4. Grade: Grade 1 (heavy weight).
5. Base and Pin Metal:

a. Exterior Hinges: Stainless steel with stainless-steel pin.
b. Interior Hinges: Steel with steel pin**.**

B. Quantity: Provide the following, unless otherwise indicated:

1. Three Hinges: For doors with heights 61 to 90 in.

C. Fasteners: Comply with the following:

1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
2. Wood Screws: For wood doors and frames.

2.4 SURFACE CLOSERS

A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. LCN Closers; an Ingersoll-Rand Company; 4000 Series.
b. Norton Door Controls; an ASSA ABLOY Group company; PR7500/PR7700.
c. SARGENT Manufacturing Company; an ASSA ABLOY Group company; 351 Series.

B. Surface Closer with Cover: Grade 1; Modern Type with mechanism enclosed in cover.

1. Mounting: Parallel arm, unless otherwise indicated.
2. Type: Regular arm, heavy-duty.

a. Provide delayed action closing where indicated.

3. Backcheck: Adjustable, effective between 60 and 85 degrees of door opening.

a. Where indicated, closer must operate at 180 degree opening.

4. Provide all drop plate brackets, shims and angle brackets as required to complete installation of closers on doors and frames.

2.5 THRESHOLDS

A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:

a. Hager Companies.
b. National Guard Products.
c. Pemko Manufacturing Co.
d. Reese Enterprises.

B. Saddle Thresholds:

1. Type: Fluted top.
2. Base Metal: Aluminum.

2.6 METAL PROTECTIVE TRIM UNITS

A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050 in. thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Burns Manufacturing Incorporated.
b. Hager Companies.
c. IVES Hardware; an Ingersoll-Rand Company.
d. Rockwood Manufacturing Company.
e. Trimco.

B. Kick Plates: 12 in. high x door width, with allowance for frame stops.

2.7 STOPS

A. Wall- and Floor-Mounted Stops: BHMA A156.16.

2.8 AUXILIARY DOOR HARDWARE

A. Silencers for Metal Door Frames: Grade 1; neoprene or rubber; ≥ ½ in. diameter; fabricated for drilled-in application frame.

2.9 WEATHERSTRIPPING

A. Standard: BHMA A156.22.

B. General: Provide continuous weather-strip gasketing on exterior doors. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Hager Companies.
b. National Guard Products.
c. Pemko Manufacturing Co.
d. Reese Enterprises.

2. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

C. Air Leakage: ≤ 0.50 cfm per foot of crack length for gasketing as tested according to ASTM E 283.

D. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

E. Gasketing Materials: ASTM D 2000 and AAMA 701/702.

F. Adhesive-Backed Perimeter Gasketing: Gasket material applied to frame rabbet with self-adhesive.

1. Gasket Material: Vinyl bulb.

G. Door Sweeps: Gasket material held in place by flat metal housing or flange; surface mounted to face of door with screws.

1. Gasket Material: Neoprene.
2. Housing Material: Aluminum.
3. to meet accessibility requirements.

2.10 LOCKS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

B. Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:

1. Number of Pins: Six.
2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.

C. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:

1. Interchangeable Cores: Core insert, removable by use of a special key; usable with other manufacturers' cylinders, employing “restricted keyway.”

D. Construction Keying: Comply with the following:

1. Construction Cores: Provide construction cores that are replaceable by permanent cores.

a. Replace construction cores with permanent cores as directed by Owner.

E. Manufacturer: Owner’s standard.

2.11 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. and as follows:

1. Town of Arlington Grand Master Key System: Cylinders are operated by a change key, a master key, and a grand master key.
2. All doors shall be keyed alike.

2.12 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.

1. Manufacturer's identification is permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and

BHMA A156.18. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.

C. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Fire-Rated Applications:

    a. Wood or Machine Screws: For the following:

        1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
        2) Strike plates to frames.
        3) Closers to doors and frames.

3. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."

2.13 FINISHES

A. Standard: BHMA A156.18.

1. BHMA 601 Black.
2. BHMA 646 Satin Nickel at Door No. B01.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, wall and floor construction, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights indicated on Drawings.

B. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way. Do not install surface- mounted items until

finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Lock Cylinders: Install construction cores to secure building and areas during construction period.

1. Replace construction cores with permanent cores as indicated in keying schedule.
2. Furnish permanent cores to Owner for installation.

D. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

3.3 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.4 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.5 HARDWARE SET SCHEDULE

A. Hardware Set No. HS-1 – Lever Lockset, for each Door No: 101, 105:

- 1 Lockset, ANSI Function F109 – Entry
- 1-½ Pair Butts, Full Mortise, 4 x 4 Square
- 1 Closer
- 1 Threshold
- 1 Kickplate, Door No. 101
- 1 Set Weatherstripping
- 1 Stop

B. Hardware Set No. HS-2 – Lever Lockset, for each Door No. 106, 107, 201, 202, 203:

- 1 Lockset, ANSI Function F109 – Entry (Office):
- 1-½ Pair Butts, Full Mortise, 4 x 4 Square
- 1 Stop

C. Hardware Set No. HS-3 – Lever Lockset, for each Door No. 104:

- 1 Lockset, ANSI Function F84 – Classroom:
- 1-½ Pair Butts, Full Mortise, 4 x 4 Square
- 1 Closer

D. Hardware Set No. HS-4 – Lever Privacy Latchset, for each Door No. 102, 103:

- 1 Lockset, ANSI Function F76 – Privacy
- 1-½ Pair Butts, Full Mortise, 4 x 4 Square
- 1 Closer
- 1 Kickplate

E. Hardware Set No. HS-5 – Lever Passage Latchet, for each Door No. 108, 204, 205, 206:

- 1 Lockset, ANSI Function F75 – Passage:
- 1-½ Pair Butts, Full Mortise, 4 x 4 Square
- 1 Stop

F. Hardware Set No. HS-6 – Lever Lockset, for each Door No. B01:

- 1 Lockset, ANSI Function F86 - Storeroom
- 1-½ Pair Butts, Full Mortise, 4 x 4 Square
- 1 Threshold
- 1 Set Weatherstripping

END OF SECTION

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Replacement of broken or damaged glass panes in existing historic wood sash.

B. Related Sections include the following:

1. Division 06 Section “Exterior Finish Carpentry” for repair of existing historic wood sash.

1.3 DEFINITIONS

A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS

A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated, in same thickness as pane being replaced.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine sash to determine if it has been repaired. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 GLAZING, GENERAL

A. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

3.3 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

B. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

C. Wash glass on both exposed surfaces in each area of Project $\leq$ 4 days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS – TRADE SUB-BID REQUIRED

A. Work of this Section requires Trade Sub-Bids and is governed by the provisions of the Massachusetts General Laws (MGL), Public Bidding Law Chapter 149, Sections 44A to 44J inclusive; and applicable Section of the MGL, Public Contract Law Chapter 30 as amended.

1.2 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section "Summary", Paragraph 1.01A, entitled "Related Documents."

1.3 REQUIREMENTS FOR FILING SUB-BIDS

A. Time, Manner and Requirements for Submitting Sub-Bids:

1. Sub-bids for work under this Section shall be for the complete work and shall be filed in a sealed envelope with the Public Agency at a time and place as stipulated in the "Instructions to Bidders."
2. Each sub-bid submitted for work under this Section shall be on forms furnished by the Awarding Authority as required by Section 44F of Chapter 149 of the General Laws, as amended.
3. Sub-bids filed with the Awarding Authority shall be accompanied by Bid Bond, Cash, Certified Check, Treasurer's Check, or Cashier's Check issued by a responsible bank or trust company payable to the Town of Templeton in the amount of 5% of the sub-bid. A sub-bid accompanied by any other form of bid deposit than those specified will be rejected.

B. Sub Sub-Bid Requirements: None required under this Section.

1.4 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including the following Specification Sections:

1. Division 07 Section "Water Repellants."
2. Division 09 Section "Painting."

B. The Work of this Section is shown on the following Drawings:

G101	SYMBOLS & ABBREVIATIONS
L-104	ACCESSIBILITY RAMP TO COTTAGE - SHEET 2 OF 4 SECTIONS & ELEVATIONS
L-108	ACCESSIBILITY RAMP TO MANSION - SHEET 1 OF 2
L-109	ACCESSIBILITY RAMP TO MANSION - SHEET 2 OF 2
L-110	A/C CONDENSER YARDS & MISC. DETAILS
A-101	MANSION - EXISTING ROOF PLAN
A-102	MANSION - EXTERIOR ELEVATIONS
A-103	MANSION - WINDOWS
A-201	COTTAGE - EXTERIOR - NORTH ELEVATION
A-202	COTTAGE - EXTERIOR - SOUTH ELEVATION
A-203	COTTAGE - EXTERIOR - EAST ELEVATION

A-204 COTTAGE - EXTERIOR - WEST ELEVATION
A-205 COTTAGE - ENTRANCE PORCH
A-210 COTTAGE- BASEMENT & FIRST FLOOR PLANS
A-211 COTTAGE- SECOND & ATTIC FLOOR PLANS
A-212 COTTAGE- STAIR MODIFICATIONS
A-213 COTTAGE- FIRST FLOOR INTERIOR ELEVATIONS
A-214 COTTAGE- SECOND FLOOR INTERIOR ELEVATIONS
A-215 COTTAGE- DOOR & WINDOW SCHEDULE
A-304 CARRIAGE HOUSE - GROUND FLOOR REFLECTED CEILING PLAN
A-305 CARRIAGE HOUSE - INTERIOR ELEVATIONS - SHEET 1 OF 2
A-306 CARRIAGE HOUSE - INTERIOR ELEVATIONS - SHEET 2 OF 2
A-307 CARRIAGE HOUSE - LARGE-SCALE BUILDING/WALL SECTIONS
A-308 CARRIAGE HOUSE - CEILING DETAILS
A-309 CARRIAGE HOUSE - STAIR DETAILS

The Trade Contractor shall also examine all other Drawings and all other Sections of the Specifications for requirements therein affecting the Work of this Section, not just those pertaining to this Sub-trade.

C. Alternates: Refer to Division 01 Section “Alternates.”

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section "Summary", Paragraph 1.01A, entitled "Related Documents".

1.2 SUMMARY

A. This Section includes the following:

1. Gypsum veneer plaster and gypsum base for veneer plaster.
2. Sound attenuation batts, sound dampening gypsum panels and acoustical accessories.

B. Related Sections:

1. Division 02 "Selective Demolition" for removal of existing wood lath and plaster.
2. Division 07 "Building Insulation" for placing of acoustical (sound attenuation) insulation in specified partitions and ceilings, and exterior insulation prior to work of this Section.
3. Division 09 "Painting" for painting after work of this Section is completed.
4. Division 22 "Plumbing - Design-build Summary of Work" for installation of all plumbing piping and tubing in walls and partitions prior to start of work of this Section.
5. Division 24 "HVAC – Design-build Summary of Work" for installation of all HVAC piping and tubing in walls, partitions and ceilings prior to start of work of this Section.
6. Division 26 "Electrical Work" for installation of wiring and junction boxes in walls, partitions and ceilings prior to start of work of this Section.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show locations, fabrication, and installation of control joints, and reveals and trim; include plans, elevations, sections, details of components, and attachments to other work.

C. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch length for each trim accessory.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain gypsum veneer plaster products, including gypsum base for veneer plaster, joint reinforcing tape, and embedding material, from a single manufacturer.

B. STC-Rated Assemblies: Provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by a testing and inspecting agency.

C. Mockups: Provide a full-thickness finish mockup for each type and finish of gypsum veneer plaster and substrate to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select representative surfaces and conditions for application of each type of gypsum veneer plaster and substrate.
2. Provide mockups of ceilings and partitions in sizes $\geq$ 100 ft^2.
3. Apply gypsum veneer plaster, according to requirements for the completed Work, after permanent lighting and other environmental services have been activated.
4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 GYPSUM VENEER PLASTER MATERIALS

A. High-Strength, Two-Component Gypsum Veneer Plaster: ASTM C587, ready-mixed, base-coat plaster and smooth finish-coat veneer plaster containing mill-mixed, fine silica sand; with a compressive strength of 3000 psi when tested according to ASTM C472.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. USG Corporation:

1) Base Coat: Imperial Basecoat Plaster.
2) Smooth Finish Coat: Imperial Finish Plaster.

2.2 PANEL PRODUCTS

A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

B. Gypsum Base for Veneer Plaster: ASTM C588.

1. Regular Type: $^5/_8$ inch thick, unless otherwise indicated.
2. Moisture- and Mold-Resistant Base: With moisture- and mold-resistant core, glass-mat facing on both sides of panel, and 5/8-inch thick.

a. Mold Resistance: ASTM D3273; no mold growth after four weeks' exposure.

C. Sound Dampening Gypsum Panels: ASTM C1766.

1. Basis of Design: “Quiet Rock 510” manufactured by Pabco Gypsum, Newark, CA 94560 or equivalent product approved by Architect.
2. Thickness: ½ inch.
3. Manufactured: ASTM C1369, ASTM C1629 and Fed. Spec.ss-L-30D, Type III, Grade X.
4. STC-Rated Assemblies, E90: 47-52.
5. Surface Burning Characteristics, ASTM E 84:

a. Flame Spread: 15
b. Smoke Developed: 0

6. Combustibility, ASTM E 136: Non-Combustible.

2.3 TRIM ACCESSORIES

A. Standard Trim: ASTM C 1047, provided or approved by manufacturer for use in gypsum veneer plaster applications indicated.

1. Material: Galvanized or aluminum-coated steel sheet
2. Shapes:

a. Cornerbead.
b. Bullnose bead.
c. LC-Bead: J-shaped; exposed long flange receives joint compound.
d. L-Bead: L-shaped; exposed long flange receives joint compound.
e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
f. Curved-Edge Cornerbead: With notched or flexible flanges.
g. Control joints.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Fry Reglet Corporation.
b. Gordon Inc.
c. Pittcon Industries.

3. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, Alloy 6063-T5.
4. Finish: Manufacturer's standard Architectural Class II, Clear Anodic Finish AA-M12C22A31, complying with AAMA 611

2.4 JOINT REINFORCING MATERIALS

A. General: Comply with joint strength requirements in ASTM C 587 and with gypsum veneer plaster manufacturer's written recommendations for each application indicated.

B. Joint Tape:

1. Gypsum Base for Veneer Plaster: As recommended by gypsum veneer plaster manufacturer for applications indicated.

C. Embedding Material for Joint Tape:

1. Gypsum Base for Veneer Plaster: As recommended by gypsum veneer plaster manufacturer for use with joint-tape material and gypsum veneer plaster applications indicated.

2.5 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced product standards and manufacturer's written recommendations.

B. Acoustical Laminating Adhesive: ASTM D3273, high-performing, noise-reducing acoustical glue, “Quiet Glue Pro”’ manufactured by Pabco Gypsum, Newark, CA 94560 or equivalent product approved by Architect.

1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Steel Drill Screws: ASTM C1002, unless otherwise indicated.

1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.

D. Acoustical Sealant: ASTM C 834, VOC < 0.1 g/L, Non-hardening acoustical sealant, “Quiet Seal Pro”’ manufactured by Pabco Gypsum, Newark, CA 94560 or equivalent product approved by Architect.

E. Acoustical Putty: Non-hardening moldable acoustical putty, manufactured in $^{3}/_{16}$ x 7-¼ x 7-¼ inch pads, “Quiet Putty”’ manufactured by Pabco Gypsum, Newark, CA 94560 or equivalent product approved by Architect.

F. Patching Mortar: Dry-pack patching mortar, consisting of 1 part Portland cement to 2-½ parts fine aggregate passing a No. 16 sieve, using only enough water for and placing.

2.6 GYPSUM VENEER PLASTER MIXES

A. Mechanically mix gypsum veneer plaster materials to comply with ASTM C 843 and with gypsum veneer plaster manufacturer's written recommendations.

PART 3 - EXECUTION

3.1 INSTALLING PANELS, GENERAL

A. Gypsum Base for Veneer Plaster: Apply according to ASTM C844 unless manufacturer's written recommendations are more stringent.

1. Do not allow gypsum base to degrade from exposure to sunlight as evidenced by fading of paper facing.
2. Erection Tolerance: Provide offsets $\leq$ $^{1}/_{16}$-inch between planes of gypsum base panels, and $^{1}/_{8}$ inch/8 feet noncumulative, for level, plumb, warp, and bow.

B. Install sound attenuation blankets before installing gypsum base for veneer plaster unless blankets are readily installed after panels have been installed on one side.

1. Sound attenuation blankets shall be installed in partitions abutting Offices (Partition Type B) and Toilet Rooms (Partition Type A_1). Two layers of sound attenuation blankets shall be installed in first floor Office ceilings.

C. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels, not less than one framing member.

D. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

E. Locate edge and end joints over supports except in ceiling applications where intermediate supports or back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints, other than control joints, at corners of framed openings.

F. Attach panels to wood studs.

G. Attach panels to framing provided at openings and cutouts.

H. Wood Framing: Install panels over wood framing, with "floating" internal corner construction. Do not attach panels across the flat grain of wide-dimension lumber, including floor joists and headers. "Float" panels over these members or provide control joints to counteract wood shrinkage.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

1. Electrical Junction Boxes: After installation of junction boxes and wiring thereto for electrical and fire alarm devices have been installed and prior to the hanging of gypsum panels, Acoustical Putty Pad shall be installed. First the surfaces of the junction boxes shall be cleaned of dust, grease, oil, loose materials, rust, or other substances to allow for proper adhesion. Pad shall be molded to cover all five surfaces of the junction box and enough material remaining forward of the face of stud line to allow for a tight compressive seal between the putty and the panel.
2. Panel Penetrations: Acoustical Putty Pads shall also be used to seal all other penetrations in an acoustically rated partition or first floor Office ceiling.

J. Fastener Spacing: Comply with ASTM C844, manufacturer's written recommendations, and fire-resistance-rating requirements.

1. Space screws a maximum of 12 inches along framing members for wall or ceiling application.

3.2 INSTALLING PANELS

A. Install gypsum base panels for veneer plaster in the following locations:

1. Regular Type: Vertical surfaces, unless otherwise indicated.
2. Ceiling Type: Ceiling surfaces.
3. Sound Dampening: At partitions abutting Offices (Partition Type B).
4. Moisture- and Mold-Resistant Base: Toilet Rooms.

B. Single-Layer Application:

1. On ceilings, apply gypsum base panels before wall panels, to the greatest extent possible and at right angles to framing, unless otherwise indicated.
2. On walls, apply gypsum base panels vertically and parallel to framing, unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.

C. Single-Layer Fastening Methods: Apply gypsum base panels to supports with steel drill screws.

D. Double-Layer Application: Apply Sound Dampening Gypsum Panels (SDGP) in accordance with ASTM C840, GA-214 and GA-216. The second/outer, gypsum base panel layer shall be applied horizontally, and fastened to the SDGP with Acoustical Glue, in accordance with the manufacturer's written instructions.

3.3 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install according to ASTM C 844 and in specific locations approved by Architect.

C. Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.

3.4 INSTALLING JOINT REINFORCEMENT

A. Gypsum Base for Veneer Plaster: Reinforce interior angles and flat joints with joint tape and embedding material to comply with ASTM C 843 and with gypsum veneer plaster manufacturer's written recommendations.

B. Moisture- and Mold-Resistant Base: Reinforce joints between moisture- and mold-resistant panels with joint tape and embedding material according to panel manufacturer's written recommendations.

3.5 GYPSUM VENEER PLASTERING

A. Gypsum Veneer Plaster Application: Comply with ASTM C 843 and with veneer plaster manufacturer's written recommendations.

1. Two-Component Gypsum Veneer Plaster:

    a. Base Coat: Trowel apply base coat over substrate to uniform thickness of $\geq$ $^{1}/_{16}$ and $\leq$ $^{3}/_{32}$ inch. Fill all voids and imperfections.
    b. Finish Coat: Trowel apply finish-coat plaster over base-coat plaster to uniform thickness $\geq$ $^{1}/_{16}$ and $\leq$ $^{3}/_{32}$ inch.

2. Where gypsum veneer plaster abuts only door frames, windows, and other units, groove finish coat to eliminate spalling.
3. Do not apply veneer plaster to gypsum base if paper facing has degraded from exposure to sunlight. Before applying veneer plaster, use remedial methods to restore bonding capability to degraded paper facing according to manufacturer's written recommendations and as approved by Architect.

B. Concealed Surfaces: Do not omit gypsum veneer plaster behind cabinets, furniture, furnishings, and similar removable items. Omit veneer plaster in the following areas where it will be concealed from view in the completed Work, unless otherwise indicated or required to maintain fire-resistance and STC ratings:

C. Gypsum Veneer Plaster Finish: Smooth-troweled finish.

3.6 PROTECTION

A. Protect installed gypsum veneer plaster from damage from weather, condensation, construction, and other causes during remainder of the construction period.

B. Remove and replace gypsum veneer plaster and gypsum base panels that are wet, moisture damaged, or mold damaged.

1. Indications that gypsum base panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
2. Indications that gypsum base panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. This Section includes the following:

1. Alternate No. 01
2. Porcelain tile.
3. Stone thresholds installed as part of tile installations.
4. Crack suppression membrane.

B. Related Sections include the following:

1. Division 01 Section “Alternates” for bidding requirements of this Section.
2. Division 01 Section “Selective Demolition” for removal of existing resilient sheet and resilient tile flooring, and panel underlayment layer in Kitchen, Shower and first floor Toilet rooms.
3. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.

1.3 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. Module Size: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.

ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."

C. Facial Dimension: Nominal tile size as defined in ANSI A137.1.

1.5 PRE-INSTALLATION MEETINGS

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

1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.6 PERFORMANCE REQUIREMENTS

A. Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per the DCOF AcuTest in

accordance with ANSI A137.1 – 2012 standard.

1. Level Surfaces: ≥ 0.42 wet.

1.7 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

C. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.

D. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required.
2. Full-size units of each type of trim and accessory for each color and finish required.
3. Stone thresholds in 6-inch lengths.
4. Metal edge strips in 6-inch lengths.

E. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

F. Product Certificates: For each type of product, signed by product manufacturer.

G. Qualification Data: For Installer.

H. Material Test Reports: For each tile-setting and -grouting product.

1.8 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain all tile of same type and color or finish from one source or producer.

1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:

1. Stone thresholds.
2. Joint sealants.
3. Metal edge strips.

D. Pre-construction Testing Service: Moisture testing on new concrete slabs to be performed by manufacturer of moisture vapor reduction admixture in accordance with Division 03 Section “Concrete Moisture Vapor Reduction Admixture.”

E. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Store liquid latexes and emulsion adhesives in unopened containers and protected from freezing.

E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.10 PROJECT CONDITIONS

A. Temporary Support Facilities: Furnish and install all temporary lifts, hoists, staging, scaffolding, rigging, labor and materials, and temporary support to perform all operations in connection with the installation of this Work. Remove all temporary support facilities when no longer required.

B. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.11 EXTRA MATERIALS

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

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 % of amount installed, for each type, composition, color, pattern, and size indicated.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements, unless otherwise indicated.
2. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by

the Tile Council of North America (TCNA) installation methods specified in tile installation schedules, and other requirements specified.

C. ISO 13007 Standards for Ceramic Tile, Adhesives and Grouts.

D. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:

1. As indicated by manufacturer's designations.

E. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

F. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.

1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

G. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by pre-coating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.2 TILE PRODUCTS

A. Porcelain Floor Tile: Glazed Matte cushion-edge flat tile as follows:

1. Basis-of-Design Product: Subject to compliance with requirements, provide “Bordeaux” line by American Olean or comparable product by 1 of the following:

   a. Mannington Tile.
   b. Marazzi Tile.
   c. Dal-Tile Corp.

2. Composition: Porcelain.
3. Module Size: 6 in. in. x 6 in. nominal.
4. Nominal Thickness: $\geq$ $^{5}/_{16}$ in.
5. Face: Plain, with cushion edges.
6. Finish: Matte.
7. Color: As selected by Architect from manufacturer’s full range.
8. Grout Color: As selected by Architect from manufacturer’s full range.

B. Ceramic Wall Tile: Semi-Gloss cushion-edge flat tile as follows:

9. Basis-of-Design Product: Subject to compliance with requirements, provide “Classic Color Wheel Collection” by Dal-Tile Corp. or comparable product by 1 of the following:

   a. American Olean.
   b. Mannington Tile.
   c. Marazzi Tile.

10. Composition: Porcelain.
11. Module Size: 4 in. x 4 in. nominal.
12. Nominal Thickness: ≥ 5/16 in.
13. Face: Plain, with cushion edges.
14. Finish: Matte.
15. Color: As selected by Architect from manufacturer's full range.
16. Grout Color: As selected by Architect from manufacturer's full range.

2.3 THRESHOLDS

A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

1. Bevel edges at 1:2 slope, aligning lower edge of bevel with adjacent floor finish. Limit height of bevel to ≤ ½ in., and finish bevel to match face of threshold, in compliance with Mass. CMR 521 Accessibility Regulations and ADA compliant.

B. Marble Thresholds: ASTM C 503, with abrasion resistance ≥ 10 per ASTM C1353 or ASTM C241 and with honed finish.

1. Description: Uniform, fine- to medium-grained white stone with gray veining.

2.4 CRACK-SUPPRESSION MEMBRANES FOR THIN-SET TILE INSTALLATIONS

A. General: Manufacturer's standard product, selected from the following that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Fabric-Reinforced, Fluid-Applied Product: System consisting of liquid-latex rubber and fabric reinforcement.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Custom Building Products; "Custom 9240 Waterproofing and Anti-Fracture Membrane".
b. Laticrete International Inc.; "Laticrete Blue 92".
a. Mapei Corporation; "Mapelastic AquaDefense".

2.5 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, Type A, in maximum lengths available to minimize end-to-end butt joints.

1. Products: Subject to compliance with requirements, provide one of the following, or equal:

a. National Gypsum; PermaBase Cement Board.
b. USG Corporation; DUROCK Cement Board.
c. James Hardie Building Products: HardieBacker.

2. Thickness: ¼ in.

2.6 SETTING AND GROUTING MATERIALS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Custom Building Products.
2. Laticrete International Inc.
3. Mapei Corporation.

B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:

1. Prepackaged dry-mortar mix containing dry, redispersible, ethylene vinyl acetate additive to which only water must be added at Project site.

a. Product: Subject to compliance with requirements, provide one of the following:

1) Custom Building Products; “Versa Bond”.
2) Laticrete International, Inc.; “253 Gold”.
3) Mapei Corporation; “Ultraflex 2”.

2. For wall applications, provide nonsagging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4 and ISO 13007 C2TES1.

a. Product: Subject to compliance with requirements, provide one of the following, or equal:

1) Custom Building Products; LFT.
2) Mapei Corporation; Ultraflex LFT.

3. Provide white mortar for glass tile installations.

C. Epoxy Based Tile Grout: ANSI A118.33, and ISO 13007 RG for floors, RG and RGT for walls including base tile.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Custom Building Products; “Ceg-Lite”.
b. Laticrete International Inc.; “Laticrete SpectraLOCK Pro”.
c. Mapei Corporation; MAPEI “Opticolor”.

2. Colors: As selected by Architect from manufacturer’s full range for each tile indicated.

2.7 ELASTOMERIC SEALANTS

A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements in Division 07 Section "Joint Sealants."

B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.

2.8 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-

based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.

1. Petroleum paraffin wax, fully refined and odorless, containing $\geq$ 0.5 % oil with a melting point of 120 to 140^{o} F per ASTM D 87.
2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.9 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.
2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
4. Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
5. Moisture testing for new concrete slabs on grade that contain integral waterproofing in accordance with Division 03 Section “Concrete Moisture Vapor Reduction Admixture.”

    a. Drilled sample cores of concrete slabs on grade will be tested for permeability and test results provided by the integral waterproofing manufacturer.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Start of

installation shall indicate approval of substrate.

3.2 PREPARATION

A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.

B. Provide concrete substrates for tile floors installed with thin-set mortar that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.

1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
2. Remove protrusions, bumps, and ridges by sanding or grinding.

C. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

D. Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, pre-coat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 INSTALLATION, GENERAL

A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.

B. TCNA Installation Guidelines: TCNA's "Handbook for Ceramic Tile Installation." Comply with TCNA installation methods indicated in ceramic tile installation schedules.

C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.

F. Lay out tile wainscots to next full tile beyond dimensions indicated.

G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control,

contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Locate joints in tile surfaces directly above joints in concrete substrates.
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

H. Grout tile to comply with requirements of the following tile installation standards:

1. For ceramic tile grouts (sand-portland cement; dry-set, commercial portland cement; and latex-portland cement grouts), comply with ANSI A108.10.

3.4 CRACK-SUPPRESSION MEMBRANE INSTALLATION

A. Install crack-suppression membrane to comply with ANSI A118.12 and manufacturer's written instructions to produce membrane of uniform thickness bonded securely to substrate.

B. Allow crack isolation membrane to cure before installing tile or setting materials over it.

3.5 TILE BACKING PANEL INSTALLATION

A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use latex-portland cement mortar for bonding material unless otherwise directed in manufacturer's written instructions.

3.6 FLOOR TILE INSTALLATION

A. General: Install floor tiles per TCNA installation methods and ANSI A108 Series of tile installation standards.

B. Substrates:

1. Wood-framed floor: Tile backing panel.

C. Joint Widths: Install tile on floors with the following joint widths:

1. Porcelain Tile: $^{1}/_{8}$ in.

D. Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile, unless otherwise indicated.

1. Set thresholds in latex-portland cement mortar for locations where mortar bed would otherwise be exposed above adjacent non-tile floor finish.

3.7 WALL TILE INSTALLATION

A. General: Install wall tiles per CT-3; TCNA W244C or TCNA W244F; thin-set mortar on moisture resistant base and installation methods and ANSI A108 Series of tile installation standards.

A. Substrates:

1. Wood-stud framed wall or partition: Moisture- and Mold-Resistant Base.

B. Joint Widths: Install wall tile with the following joint widths:

1. Ceramic Tile: 1/8 in.

3.8 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove epoxy and latex-portland cement grout residue from tile as soon as possible. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
2. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.

B. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

3.9 FLOOR TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Wood Subfloor:

1. Tile Installation: TCNA F144-03; interior floor installation on cementitious backer unit over existing plywood and board subfloor.

a. Tile Type: Porcelain tile.
b. Thin-Set Mortar: Latex-portland cement mortar.
c. Grout: Epoxy based grout.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section "Summary", Paragraph 1.01A, entitled "Related Documents".

1.2 SUMMARY

A. Section Includes:

1. Homogenous resilient sheet flooring.

B. Related Sections:

1. Division 01 Section "Alternates" for flooring which would be installed in lieu of that specified in this Section.
2. Division 02 Section "Selective Demolition" for removal of existing resilient sheet flooring in existing Kitchen, Shower and Toilet rooms on first floor.
3. Division 06 Section "Interior Finish Carpentry" for painted wood base.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color, texture, and pattern specified.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 WARRANTY

A. 5-year Commercial Limited Warranty from manufacturer.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for resilient sheet flooring installation and seaming method indicated.

1. Engage an installer who employs workers for this Project who are trained or certified by resilient sheet flooring manufacturer for installation techniques required.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient sheet flooring, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, ≥ 0.45 W/sq. cm.

2.2 VINYL SHEET FLOORING

A. Manufacturer: Armstrong Flooring, Inc. of Lancaster, PA.

1. Basis-of-Design Product: “ColorArt Accolade Plus Homogenous Sheet Flooring.”

B. Product Standard: ASTM F1303.

1. Type (Binder Content): Type I, binder content ≥ 90 percent
2. Wear-Layer Thickness: Grade 1.
3. Overall Thickness: 0.080 in.
4. Interlayer Material: None
5. Surface Coating: Commercial Polyurethane

C. Wearing Surface: Smooth

D. Sheet Width: 6 feet X 82 feet long.

E. Seamless-Installation Method: Heat welded

F. Colors and Patterns: Accolade Plus Collection, color to be selected by Architect during Submittals process.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient sheet flooring manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by flooring and adhesive manufacturers to suit resilient sheet flooring and substrate conditions indicated.

C. Seamless-Installation Accessories:

1. Heat-Welding Bead: Manufacturer's solid-strand product for heat welding seams.

a. Colors: As selected by Architect from manufacturer's full range to contrast with flooring.

D. Integral-Flash-Cove-Base Accessories:

1. Cove Strip: 1-inch radius provided or approved by resilient sheet flooring manufacturer.
2. Cap Strip: Square metal, vinyl, or rubber cap provided or approved by resilient sheet flooring manufacturer.

3. Corners: Metal inside and outside corners and end stops provided or approved by resilient sheet flooring manufacturer.

E. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient sheet flooring manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare substrates according to resilient sheet flooring manufacturer's written instructions to ensure adhesion of resilient sheet flooring.

B. Concrete Substrates: Prepare according to ASTM F710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by resilient sheet flooring manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by resilient sheet flooring manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but $\geq$ 5 or > 9 pH.
    a. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum percent relative humidity level measurement.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install resilient sheet flooring until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move flooring and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient sheet flooring.

3.2 RESILIENT SHEET FLOORING INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient sheet flooring.

B. Unroll resilient sheet flooring and allow it to stabilize before cutting and fitting.

C. Lay out resilient sheet flooring as follows:

1. Maintain uniformity of flooring direction.
2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in flooring substrates.
3. Match edges of flooring for color shading at seams.
4. Avoid cross seams.

D. Scribe and cut resilient sheet flooring to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend resilient sheet flooring into toe spaces, door reveals, closets, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on resilient sheet flooring as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install resilient sheet flooring on covers for telephone and electrical ducts and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of flooring installed on covers and adjoining flooring. Tightly adhere flooring edges to substrates that abut covers and to cover perimeters.

H. Adhere resilient sheet flooring to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

I. Seamless Installation:

1. Heat-Welded Seams: Comply with ASTM F1516. Rout joints and heat weld with welding bead to fuse sections permanently into a seamless flooring installation. Prepare, weld, and finish seams to produce surfaces flush with adjoining flooring surfaces.
2. Chemically Bonded Seams: Bond seams with chemical-bonding compound to fuse sections permanently into a seamless flooring installation. Prepare seams and apply compound to produce tightly fitted seams without gaps, overlays, or excess bonding compound on flooring surfaces.

J. Integral-Flash-Cove Base: Cove resilient sheet flooring 6 inches up vertical surfaces. Support flooring at horizontal and vertical junction with cove strip. Butt at top against cap strip.

1. Install metal corners at inside and outside corners.

K. Floor Polish: Remove soil, adhesive, and blemishes from flooring surfaces before applying liquid floor polish.

1. Apply two coat(s).

END OF SECTION

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PART 1 GENERAL

1.1 RELATED DOCUMENT

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section "Summary", Paragraph 1.1A, entitled "Related Documents."

1.2 SUMMARY OF WORK

A. Furnish all labor, supervision, materials, tools and equipment necessary for or reasonably incidental to completion of all cast-in-place concrete slab modifications as shown on the Contract Drawings and/or specified herein.

1. Polishing of existing concrete slabs on grade in Carriage House, after concrete patches and repairs have been placed and properly cured.
2. Terrazzo floor feature in Carriage House – Alternate No. 2.

1.3 RELATED WORK

A. Section 01 23 00 – "Alternates" for bidding requirements of this Section.

B. Section 02 41 19 – "Selective Demolition" for removal of damaged portions of concrete slab in Carriage House as indicated.

C. Section 03 30 04 – "Cast-In-Place Concrete" for placing underbed for terrazzo and patching of existing concrete slab in Carriage House as indicated.

1.4 SUBMITTALS

A. Product Data: For terrazzo materials including terrazzo mix and divider strips.

B. Shop Drawings: Show layout plan and large-scale details, attachment devices, and other components.

C. Samples for selection:

1. 2, 6 x 6 inch samples of each terrazzo color – Alternate No. 2.
2. NTMA (National Terrazzo and Mosaic Association) Info Guide color plate for selection of Terrazzo colors.
3. Terrazzo divider strip

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in the manufacturer's unopened containers marked with the brand name. Deliver, handle, and store materials in accordance with manufacturer's instructions in a manner that prevents deterioration and contamination.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Maintain areas to receive terrazzo at a temperature above $\geq 50^{o}$ F 24 hours prior to the time mixtures are placed and until completely cured.

1.5 WARRANTY

A. Provide manufacturer's standard performance guarantees or warranties that extend beyond a 1-year period.

PART 2 - PRODUCTS

2.1 PORTLAND CEMENT TERRAZZO FLOORING SYSTEM MATERIALS

A. Provide system that has a ≥ 40 percent fly ash. Provide data identifying percentage of recycled content for portland cement terrazzo flooring system. Do not use coral, dolomite, or limestone aggregates in setting bed.

2.2 PORTLAND CEMENT

A. Provide portland cement conforming to ASTM C150, Type I, of colors required to match NTMA Info Guide color plate which shall be submitted for color selection by Architect.

2.3 SAND

A. Provide sand conforming to ASTM C33 for fine aggregate

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2.4 MARBLE CHIPS

A. Provide marble chips of domestic origin of sizes and colors required to match NTMA Info Guide color plate. Marble chips shall have an abrasive hardness ≥ 10 when tested in accordance with ASTM C241/C241M; contain no deleterious or foreign matter; and ≤ 1 percent by weight dust content.

2.5 DIVIDER STRIPS

A. Provide divider strips in accordance with NTMA Info Guide and ½ inch deep x 1/8 inch thick heavy top zinc “L” strip. Heavy-top strips may be either one- or two-piece strips with a solid top section. Submit two 6 inch lengths of each type divider; curved and straight

2.6 REINFORCEMENT MATERIALS

A. Welded Wire Fabric Reinforcement: ASTM A185, 6x6, W1.4 x W1.4, galvanized.

2.7 COLORANTS

A. Provide alkali-resistant and nonfading colorants. Pigments must be of colors required to match NTMA Info Guide color plate indicated.

2.8 CURING MATERIAL

A. Curing material must be either liquid membrane-forming compound, wet sand, polyethylene sheeting, or water. Liquid membrane-forming compound must conform to ASTM C309, Type I.

2.9 TERRAZZO CLEANER

A. Use biodegradable, phosphate free terrazzo cleaner with a pH factor between 7 and 10 and of a type specially prepared for use on terrazzo. Submit maintenance instructions for bonded terrazzo.

2.10 SEALER

A. Sealer must have a pH factor between 7 and 10 and be a penetrating type specially prepared for use on terrazzo. The sealer must not discolor or amber the terrazzo and shall produce a slip resistant surface. Flash point of sealer shall be in accordance with NTMA Info Guide. Sealer products used on the interior of the building (defined as inside of the weatherproofing system) must meet VOC content requirements of SCAQMD Rule 1113.

2.11 SHEET MATERIALS

A. Sheet materials used for curing the terrazzo must conform to ASTM C171.

PART 3 EXECUTION

3.1 TERRAZZO PROPORTIONS

A. Underbed: Use underbed composed of 1-part portland cement to [parts sand. Add water to provide workability at as low a slump as possible. Spread to a level ½ inch below the finished floor, to a thickness of approximately 1-½ inches.

B. Terrazzo Topping: Topping must be composed of one 94-pound bag of portland cement per 200 pounds of marble chips and approximately 5 gallons of water. Add color pigment as needed, but ≤ 2 pounds per bag of cement. Add water in sufficient quantity to provide workability at as low a slump as possible.

3.2 INSTALLATION

A. Submit drawings indicating the type, size, and layout of divider strips and control joint strips and color of floor areas.

B. Underbed Placement: Clean and saturate concrete surfaces with water in accordance with NTMA Info Guide. Do not treat concrete substrate to receive bonded terrazzo with curing agent or additives which would preclude bonding. Remove excess water from the subfloor before slushing and brooming with neat cement paste. Place the underbed on the concrete subfloor and screed to an elevation ½ inch below the finished floor. Install divider strips in the semiplastic underbed. Firmly trowel the underbed along the edges to insure positive anchorage of the divider strips. Install control joint strips over subfloor expansion joints and extend the full depth of the underbed.

C. Setting Divider Strips: Set in accordance with layout indicated while underbed is still plastic. Set strips to straight lines and to the proper level to ensure that tops of strips will show uniformly after completing grinding and finishing operations. Fit joints and intersections tight. Where divisions in field work are not shown, divide field work into squares or rectangles of uniform size and ≤ 6 feet on a side. Divide borders by strips to coincide with the layout of division strips in the

field of floors. Place edging strips at doorways between terrazzo and other types of flooring and along the edges of terrazzo borders adjoining other types of floor finishes or floor coverings. Place expansion strips over control joints, construction joints, and expansion joints.

D. Placing Terrazzo Topping: Slush and broom the underbed in accordance with NTMA Info Guide with neat cement paste of the same color as required for the topping. Place the topping in panels formed by divider strips and trowel level with the top of the strips. Seed the troweled surface with chips in the same color proportions as contained in the terrazzo mix, trowel and roll with heavy rollers until excess water has been extracted. Trowel the terrazzo to a uniform surface disclosing the lines of the divider strips.

E. Curing: Cure the terrazzo until the topping develops sufficient strength to prevent lifting or pulling of terrazzo chips during grinding. Keep the completed terrazzo continuously moist and free of traffic during the curing period. Cure by covering with a liquid membrane-forming compound, sheet materials, wet sand, or sprinkling with water.

F. Finishing: Finish in accordance with NTMA Info Guide. After curing the grout coat for ≥ 72 hours, grind the floor using a No. 80 or finer grit stone. In the latter stages of grinding, use grit stones or other abrasive in the grinding machine of a grain or fineness that will give the surface a honed finish. Grind and rub by hand small areas, inaccessible portions, and corners that cannot be reached by the grinding machine. The honed surface of finished terrazzo must show ≥ 70 percent of the area as exposed aggregate evenly distributed and conform in appearance to the approved samples. Finished thickness of terrazzo topping shall be ≥ ½ inch.

1. Rough Grinding: After topping has cured, machine grinding the terrazzo using the wet method, to a true even surface using No. 24 or finer grit followed by No. 80 grit or finer grit stone. Finish floor surface must not vary > ¼ inch in 10 feet.

2. Grouting: After rough grinding, cleanse and rinse the floor with clean water. After removing excess rinse water, grout the floor using identical portland cement, color and pigments as used in the topping taking care to fill voids. After the grout has attained its initial set, cure the surface for ≥ 72 hours.

3 Fine Grinding: After grout has cured, grinding the surface with fine grit stones until all grout is removed from the surface. Upon completion of grinding, the terrazzo flooring shall show ≥ 70 percent of marble chips.

3.3 CLEANING AND SEALING

A. Wash the terrazzo with a neutral cleaner and, where required, clean with a fine abrasive to remove stains or cement smears. Rinse the cleaned surface. When dry, apply a terrazzo sealer in accordance with the manufacturer's directions.

3.4 PROTECTION

A. over and protect the terrazzo work from damage until completion of the work of all other trades.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Modular carpet tile.

1.2 PRE-INSTALLATION MEETINGS

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

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For carpet tile installation, plans showing the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Carpet tile type, color, and dye lot.
3. Type of subfloor.
4. Type of installation.
5. Pattern of installation.
6. Pattern type, location, and direction.
7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

C. Samples: For each exposed product and for each color and texture required.

1.4 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

1.7 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 15 year Commercial Limited Warranty from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. Manufacturer, Basis-of-Design: Subject to compliance with requirements, provide products by the following:

1. Shaw Floors, Dalton, GA 30722, “Correspond” line of carpet tile, or similar carpet tile of same type and quality by another manufacturer as determined by the Architect.

B. Collection: In Sync.

C. Style No.: 5T353

D. Color: To be selected at the time of submittal by the Architect from the selected product line.

E. Loop: Multi-Level Patterned Loop.

F. Fiber Content: 100 percent nylon 6, 6.

G. Fiber Type: “Ecosolution Q Nylon.”.

H. Pile Characteristic: Level-loop pile.

I. Average Density: 6,385 oz/yd^2.

J. Finished Thickness: 0.079 inches for finished carpet tile according to ASTM D6859.

K. Stitches: 10.0/inch.

L. Dye Method: 100% Solution Dyed.

M. Gage: 1/10 inch.

N. Tufted Pile Weight: 15 oz/yd^2.

O. Total Thickness: 0.238 inch.

P. Primary Backing System: Synthetic.

Q. Secondary Backing: Strataworx Tile

R. Size: 24 x 24 inches.

S. Applied Treatments:

1. Soil-Resistance Treatment: ‘SSP Shaw Soil Protection.’
2. Antimicrobial Treatment: Manufacturer's standard treatment that protects carpet tiles as follows:

   a. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.

T. Performance Characteristics:

1. Pill Test: Pass.
2. Radiant Panel: Class I
3. Smoke Density: ASTM E 662 less than 450.
4. Flammability: ASTM E 648 Class 1 (Glue Down)
5. Emissions: Provide carpet that complies with testing and product requirements of CRI’s “Green Label Plus program, GLP2671.
6. Electrostatic Propensity: Less than **3.5** kV according to AATCC 134.
7. ADA Compliance: >06, meets the recommended static coefficient of friction for walking surfaces and accessible routes.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, non-staining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Wood Subfloors: Verify that underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.

B. Painted Subfloors: Perform bond test recommended in writing by adhesive manufacturer.

3.2 PREPARATION

A. General: Comply with the Carpet and Rug Institute's CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions $\geq$ $^{1}/_{8}$-inch, and protrusions > $^{1}/_{32}$-inch unless more stringent requirements are required in manufacturer's written instructions.

C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with the Carpet and Rug Institute's CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.

B. Installation Method: As recommended in writing by carpet tile manufacturer.

C. Maintain dye-lot integrity. Do not mix dye lots in same area.

D. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.

E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, etc. Bind or seal cut edges as recommended by carpet tile manufacturer.

F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use non-permanent, non-staining marking device.

H. Install pattern parallel to south and north walls and borders in upper floor Social Hall and adjoining lobbies.

I. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS – TRADE SUB-BID REQUIRED

A. Work of this Section requires Trade Sub-Bids and is governed by the provisions of the Massachusetts General Laws (MGL), Public Bidding Law Chapter 149, Sections 44A to 44J inclusive; and applicable Section of the MGL, Public Contract Law Chapter 30 as amended.

1.2 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section "Summary", Paragraph 1.01A, entitled "Related Documents."

1.3 SUMMARY

A. This Section includes surface preparation and the application of paint systems on the following substrates:

1. Exterior finish carpentry.
2. Repair work at Mansion including repaired wood windows.
3. Repair work at Cottage exterior.
4. Interior architectural woodwork.
5. Hollow metal doors and frames.
6. Exterior of wood windows at Cottage.
7. Wood doors and frames, interior and exterior.
8. Wood fence and HVAC equipment enclosure.
9. Veneer plaster at Cottage.

B. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.

1. Painting includes field painting of exposed bare and covered pipes and ducts, hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.

C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

1. Prefinished items include the following factory-finished components:

   a. Door hardware
   b. Finished mechanical and electrical equipment.
   c. Light fixtures and wiring devices.
   d. HVAC wall-mounted equiupment.
   e. Electrical panel boards.

2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:

   a. Foundation spaces.
   b. Furred areas.
   c. Ceiling plenums.

d. Pipe spaces.
e. Duct shafts.

3. Finished metal surfaces include the following:

a. Anodized or coated aluminum.
b. Stainless steel.
c. Chromium plate.
d. Copper and copper alloys.
e. Bronze and brass.

4. Operating parts include moving parts of operating equipment and the following:

a. Valve and damper operators.
b. Linkages.
c. Sensing devices.
d. Motor and fan shafts.

5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

D. Related Sections include the following:

1. Division 05 Section "Metal Fabrications" for shop priming ferrous metal.
2. Division 05 Section “Metal Fabrications” for field finish painting.
3. Division 06 Section “Interior Architectural Woodwork” for items indicated to be field finished by this Section.
4. Division 06 Section “Exterior Finish Carpentry” for wood trim to be field finished by this Section.
5. Division 08 Section "Hollow Metal Doors and Frames" for factory priming steel doors and frames.
6. Division 08 Section “Wood Doors” for finish painting factory-prime painted interior wood doors and frames.
7. Division 09 Section "Gypsum Veneer Plastering” for surface preparation of gypsum board.

1.4 DEFINITIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

1. Flat refers to a lusterless or matte finish with a gloss range < 15 when measured at an 85^{o} meter.
2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60^{o} meter.
3. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60^{o} meter.
4. Full gloss refers to high-sheen finish with a gloss range > 70 when measured at a 60^{o} meter.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by

manufacturer's catalog number and general classification.
2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.
3. Certification by the manufacturer that products supplied comply with Commonwealth of Massachusetts Ozone Transportation Commission (OTC) regulations controlling use of volatile organic compounds (VOCs).

B. Qualification Data: For firms and persons specified in the “Quality Assurance” Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Architects and Owners, and other information specified.

C. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. VOC content.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

1. Quantity: Furnish an additional 1 gallon of each material and color applied.

1.7 QUALITY ASSURANCE

A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

a. Wall Surfaces: Provide samples $\geq$ 100 ft^2.

2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
3. Final approval of color selections will be based on benchmark samples.

a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 WARRANTY

A. Work shall be left complete and perfect and hereby warranted that it will not discolor, fade, craze, or peel-off with a period of 2 years after acceptance.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at $\geq$ 45° F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.10 PROJECT CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95° F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity > 85 %; at temperatures < 5° F above dew point; or to damp or wet surfaces.

C. Do not apply paints when relative humidity > 85 %; at temperatures < 5° F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Specified paints and coatings are products of Benjamin Moore & Co. Comparable product by one of the following shall be acceptable:

1. PPG Architectural Finishes, Inc.; Pittsburgh Paints.
2. Sherwin-Williams Co.

2.2 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. VOC Content for Interior Paints and Coatings:

1. All interior paints and coatings shall comply with the VOC content regulations of the Ozone Transportation Commission (OTC) effective in the Commonwealth of Massachusetts. For interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

a. Flat Coatings: 100 g/L.
b. Nonflat Coatings: 150 g/L.

c. Nonflat-High Gloss Coatings: 250 g/L.
d. Primers, sealers and undercoaters: 200 g/L.
e. Anti-corrosive and Anti-rust Paints Applied to Ferrous Metals: 250 g/L.
f. Industrial Maintenance Coatings: 340 g/L.
g. Floor Coatings: 250 g/L.

C. Colors: As selected by Architect from manufacturer's full range.

2.3 CONCRETE AND CONCRETE UNIT MASONRY BLOCK FILLERS

A. Concrete Unit Masonry Block Filler: Factory-formulated high-performance latex block fillers (50 g/L).

1. Benjamin Moore; "Super Spec Masonry Hi-Build Block Filler K206" (45 g/L), MPI # 4, LEED, CHPS.

2.4 EXTERIOR PRIMERS

A. Exterior Metal Primer: Factory-formulated galvanized metal primer for exterior application.

1. Benjamin Moore "Corotech Acrylic Metal Primer V110" (199 g/L), LEED Credit.

B. Exterior Wood Trim Primer: Factory-formulated latex primer for exterior application.

1. Benjamin Moore "Fresh Start High-Hiding All Purpose Primer K046": (44 g/L), MPI # 6, 17, X-Green 17, 39, 50, X-Green 50, 137, X-Green 137, LEED Credit, CHPS Certified.

2.5 INTERIOR PRIMERS

A. General: Provide tinted primers as required for dark colors.

B. Interior Gypsum Board Primer: Factory-formulated latex-based primer for interior application.

1. Benjamin Moore "Ultra Spec 500 Interior Latex Primer K534" (0 g/L), MPI # 50, X-Green 50, 149, X-Green 149, LEED 2009, LEED V4, CHPS Certified.

C. Interior Gypsum Board Primer for Epoxy Finish Coat: Factory-formulated waterborne acrylic epoxy for interior application.

1. Benjamin Moore "Ultra Spec 500 Interior Latex Primer K534" (0 g/L), MPI # 50, X-Green 50, 149, X-Green 149, LEED 2009, LEED V4, CHPS Certified.

D. Interior Wood Primer: Factory-formulated latex-based primer for interior application.

1. Benjamin Moore "Fresh Start Multi-Purpose Primer K/F023" (44 g/L), MPI # 6, 17, X-Green 17, 39, 137, X-Green 137, LEED Credit, CHPS Certified.

E. Interior Metal Primer: Factory-formulated metal primer.

1. Benjamin Moore "Corotech Acrylic Metal Primer V110" (199 g/L), LEED Credit.

2.6 EXTERIOR PAINTS

A. Exterior Full-Gloss Acrylic Enamel: Factory-formulated full-gloss waterborne acrylic-latex enamel for exterior metal application.

1. Benjamin Moore “Ultra Spec HP D.T.M. Acrylic Gloss Enamel” (45 g/L), MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED.

B. Exterior Satin Acrylic Paint: Factory-formulated satin acrylic-emulsion latex paint for exterior application.

1. Coronado “Cryli Cote 100% Acrylic Satin House & Trim Paint 410”.

C Exterior Wood Preservative: Pre-primer water repellant with fungicide.

1. Rustoleum Wolman “Woodlife Classic Clear Wood Preservative”

2.7 INTERIOR PAINTS

A. Interior Flat Acrylic Paint: Factory-formulated flat acrylic-emulsion latex paint for interior application ceilings and soffits.

1. Benjamin Moore “Ultra Spec 500 Interior Low Sheen K537” (0 g/L), MPI # 44, X-Green 44, 144, X-Green 144, LEED 2009, LEED V4, CHPS Certified.

B. Interior Low-Luster Acrylic Enamel: Factory-formulated eggshell acrylic-latex interior enamel for walls.

1. Benjamin Moore “Ultra Spec 500 Interior Latex Semi-Gloss K539” (0 g/L), MPI # 43, X-Green 43, 146, X-Green 146, 140, X-Green 140, LEED 2009, LEED V4, CHPS Certified.

C. Interior Full-Gloss Acrylic Enamel for Metal Surfaces: Factory-formulated full-gloss acrylic interior enamel.

1. Benjamin Moore “Corotech Acrylic DTM Enamel Gloss V330” (199 g/L), MPI # 154, 164, LEED 2009, LEED V4.

2.8 EPOXY COATING SYSTEMS

A. Epoxy Gloss Semi-Gloss Coating for Gypsum Veneer Plaster Surfaces.

1. Benjamin Moore “Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341” (71 g/L), LEED 2009.

2.9 CLEAR FINISH ON WOOD

A. Clear finish for floors and stair treads:

1. Minwax “Universal Floor Finish - Low Lustre” No. C 435” (waterbase), VOC maximum = 275 g/L.

2.10 CLEAR SEALER ON WOOD

A. Clear finish for interior woodwork:

1. Olympic “Water Guard” Waterproofing Clear Sealer, mildew resistant, Model No. 715195526012.

2.11 INTERIOR CONCRETE SEALER AND FINISHES

A. Interior Clear Acrylic Sealer: Water-based clear sealer for use on horizontal unpainted concrete.

1. Sherwin-Williams; “Armorseal 1K Waterbased Urethane Floor Enamel B65C775”: Applied at a dry film thickness of not less than 1.0 mil.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 3-5%. Allow new concrete to cure $\geq$ 28 days.
2. Exterior Wood: 17%.
3. Interior Wood: 15%.
4. Masonry (CMU): 12%.
5. Gypsum Board: 12%.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.

E. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

D. Wood Substrates:

1. Scrape and clean knots and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

E. Wood Doors: Seal door tops and bottoms prior to finishing if not done at factory.

F. Existing hardwood floors on the 1st and 2nd floors of the Cottage, and stair treads to remain shall be sanded and refinished as specified in the Interior Painting Schedule.

G. Stair treads installed at the renovated Cottage stair shall be prepped for clear finish.

H. Wood Door Trim in Cottage and Wood Doors to remain shall be stripped down to bare wood and sanded prior to painting.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.

2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:

1. Mechanical Work:

a. Uninsulated metal piping.
b. Uninsulated plastic piping.
c. Pipe hangers and supports.
d. Mechanical equipment that is indicated to have a factory-primed finish for field painting.

2. Electrical Work:

a. Switchgear.

b. Panelboards.
c. Electrical equipment that is indicated to have a factory-primed finish for field painting.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

A. Metal: Provide the following finish systems over exterior metal surfaces:

1. Full-Gloss Acrylic-Enamel Finish: Two finish coats over galvanized metal primer.

a. Primer: Metal primer, including factory primed surfaces.
b. Finish Coats: Exterior full-gloss acrylic enamel.

B. Zinc-Coated Metal: Provide the following finish systems over exterior zinc-coated metal surfaces:

1. Full-Gloss Acrylic-Enamel Finish: Two finish coats over galvanized metal primer.

a. Primer: Metal primer, including factory primed surfaces.
b. Finish Coats: Exterior full-gloss acrylic enamel.

C. Exterior Finish Carpentry: Provide the following finish systems over exterior wood items:

1. Semi-Gloss Latex Finish:

a. Pre-Primer: Wood preservative.
b. Primer: Exterior wood trim primer.
c. Finish Coats: Exterior full-gloss acrylic latex.

3.6 INTERIOR PAINTING SCHEDULE

A. Concrete Unit Masonry, CMU base in Carriage House: Provide the following finish systems over interior concrete masonry, and concrete where indicated:

1. Low-Luster Acrylic-Enamel Finish: Two finish coats over a filled surface.

a. Block Filler: Concrete unit masonry block filler.
b. Finish Coats: Interior low-luster acrylic enamel.

2. Low-Luster Epoxy Finish: Two finish coats over a primer for new concrete masonry units.

a. Primer: Interior acrylic primer for epoxy finish.
b. Finish Coats: Interior low-luster waterborne epoxy.

B. Gypsum Veneer Plaster: Provide the following finish systems over interior gypsum plaster surfaces:

1. Flat Acrylic Finish (ceilings): Two finish coats over a primer.

a. Primer: Interior gypsum board primer.
b. Finish Coats: Interior flat acrylic paint.

2. Low-Luster Acrylic-Enamel Finish (Walls): Two finish coats over a primer.

a. Primer: Interior gypsum board primer.
b. Finish Coats: Interior low-luster acrylic enamel.

3. Gloss Epoxy Finish (Toilet Room Walls): Two finish coats over a primer.

a. Primer: Interior acrylic primer for epoxy finish.
b. Finish Coats: Interior gloss waterborne epoxy.

C. Wood: Provide the following paint finish systems over new interior wood trim surfaces:

1. Semi-Gloss Acrylic-Enamel Finish: Two finish coats over a wood primer.

a. Primer: Interior wood primer for acrylic-enamel finishes.
b. Finish Coats: Interior acrylic enamel for wood surfaces.

D. Wood Floor and Stair Treads in Cottage:

1. Clear Satin Finish:

a. Finish Coats: 3 coats Universal Floor Finish.

E. Wood Basement Stair and Railings, and Plywood Landing at Cottage:

1. Clear Finish:

a. Finish Coat: Wood preservative.

F. Wood Wall and Ceiling Paneling, and Board Cheeks and Beam Covers in Carriage House:

1. Clear Finish:

a. Finish Coat: Clear Sealer on Wood.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. This Section includes the following:

1. Panel signs.
2. Plaques, interior and exterior.

B. Related Sections include the following:

1. Division 01 Section "Temporary Facilities and Controls" for temporary Project identification signs and for temporary information and directional signs.
2. Division 03 Section “Cast-In-Place Concrete” for setting exterior sign post.
3. Division 05 Section “Metal Fabrications” for galvanized steel pipe parking sign post.
4. Division 23 Mechanical Sections for labels, tags, and nameplates for mechanical equipment.
5. Division 26 Electrical Sections for labels, tags, and nameplates for electrical equipment.
6. Division 26 Section for illuminated exit signs.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication and installation details for signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
3. Provide message list, typestyles, graphic elements, including tactile characters and Braille, and layout for each sign.
4. Provide vector images or other digital media that may be required to enlarge small format logos, images, symbols, etc. furnished by Architect for application on all sign types including project identification and temporary signs included in Division 01 Section “Temporary Facilities and Controls.”

C. Samples for Initial Selection: For each type of sign material indicated that involves color selection.

1. Include representative Samples of available typestyles and graphic symbols.

D. Samples for Verification: For each of the following products and for the full range of color, texture, and sign material indicated, of sizes indicated:

1. Panel Signs: $\geq$ 12 in^2.
2. Plaque: 6 in^2 including border.
3. Dimensional Characters: Full-size Samples of each type of dimensional character

(letter, number, and graphic element).

E. Sign Schedule: Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Warranty: Special warranty specified in this Section.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative of signage manufacturer.

B. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

C. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.

D. Accessibility Guidelines: Comply with the accessibility requirements of 521 CMR- MAAB and ADA Standards.

1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation of signs in exterior locations to be performed according to manufacturers' written instructions and warranty requirements.

1.8 COORDINATION

A. Coordinate placement of anchorage devices with templates for installing signs.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 1 year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Thermal Movements: For exterior signs, allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120° F, ambient; 180° F, material surfaces.

2.2 PANEL SIGNS

A. Basis-of-Design Product: Subject to compliance with requirements, provide “InTouch” by ASI Sign Systems**,** or a comparable product by 1 of the following:

1. Advance Corporation; Braille-Tac Division, Cottage Grove, MI 55016.
2. Best Sign Systems, Inc., Montrose, CO 81401.
3. Mohawk Sign Systems, Inc., Amsterdam, NY 12010
4. Southwell Co. (The), Corpus Christie, TX 78401

B. Interior Panel Signs: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus $^{1}/_{16}$ in. measured diagonally from corner to corner, complying with the following requirements:

1. Provide manufacturer’s standard one-piece construction:

   a. Phenolic-Backed Photopolymer Sheet: Provide light-sensitive, water-wash photopolymer face layer bonded to a phenolic base layer to produce a composite sheet with overall, face-layer, and base-layer thickness of 1/8-inch; and a Type D Shore durometer hardness of 80.

2. Edge Condition: Square cut.
3. Corner Condition: Square.
4. Mounting: Unframed.

   a. Wall mounted with mechanical fasteners or two-face tape required by substrate.

5. Color: As selected by Architect from manufacturer's full range.
6. Font: As selected by Architect from manufacturer’s full range.
7. Character proportion: Width to height ratio between 3:5 and 1:1, and a stroke-width-to- height ratio between 1:5 and 1:10.
8. Size of characters and symbols:

   a. Room numbers: 1¼ in.
   b. Room letters: $\geq$ $^{5}/_{8}$ in.

9. Finish and Contrast: Characters, symbols and background to be matte or other non-glare finish. Characters and symbols to be in contrasting color to the background; either light characters on a dark background or dark characters on a light background.
10. Tactile Characters: Characters and Grade 2 Braille raised $^{1}/_{32}$ in. above surface with contrasting colors. Glue-on characters or etched backgrounds are not permitted.

    a. Manufacturer's standard process for producing text and symbols complying with applicable provisions in ADA Standards and 521 CMR Regulations of the Massachusetts Architectural Access Board. Produce precisely formed characters with square- cut edges free from burrs and cut marks; Braille dots with domed or rounded shape.
    b. Braille to be separated from corresponding raised characters or symbols by ½ in.

C. Changeable Message Inserts: Fabricate signs to allow insertion of changeable messages in the form of transparent covers with paper inserts printed by Owner.

1. Required at “Office” signs only.

D. Exterior Accessible Parking Sign: Referred to on drawings as “Accessible Parking Sign”, 12 x 18 in aluminum sign with white lettering and ISOA (international symbol of accessibility) (wheelchair) on blue background, per 521 CMR, Massachusetts Access Board Regulations. Post shall be 1½ in. galvanized steel provided under Section 05 50 00 – Metal Fabrications. Sign shall be manufactured by 1 of following:

1. ADA Sign Depot, Inc., San Diego, CA 92127.
2. Grimco, Inc., Billerica, MA 01821.
3. My Parking.com, Brooklyn, NY 11201.

2.3 ACCESSORIES

A. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors.

2.4 FABRICATION

A. General: Provide manufacturer's standard signs of configurations indicated.

B. Signs with Changeable Message Capability: Fabricate signs to allow insertion of changeable messages as follows:

1. For slide-in changeable inserts, fabricate slot without burrs or constrictions that inhibit function. Furnish initial changeable insert. Furnish two blank inserts for each sign for Owner's use.

2.5 FINISHES, GENERAL

A. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 ALUMINUM FINISHES

A. Color Anodic Finish: Manufacturer's standard Class 1 integrally colored or electrolytically deposited color anodic coating, $\geq$ 0.018 mm, in color as selected applied over a satin (directionally textured) mechanical finish, complying with AAMA 611.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.

B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.

C. Verify that anchor inserts are correctly sized and located to accommodate signs.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
3. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable.
   Where not indicated or possible, such as double doors, install signs on nearest adjacent walls.

   a. Locate top of sign at height indicated on Drawings, with tactile characters $\geq$ 48 in. above finish floor. Locate to allow approach $\leq$ 3 inches of sign without encountering protruding objects or standing within swing of door.

B. Wall-Mounted Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply.

1. Mechanical Fasteners: Employ non-removable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.

C. Room Identification Signs: For each type of the following rooms, wall mounted on corridor wall at latch side of door, 5’-0” above finish floor to centerline of sign. Where there is no wall space on latch side of door, sign shall be placed on the nearest adjacent wall:

Room Name	# Req.	Sign Wording
Men’s Toilet	1	“Men”
Women’s Toilet	1	“Women”
Office 01	1	“Office No. 1”
Office 02	1	“Office No. 2”
Coat Closet	1	“Coats”
Office 03	1	“Office No. 3”
Office 04	1	“Office No. 4”
Office 05	1	“Office No. 5”
Storage Closet	1	“Closet”

3.3 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.2 SUMMARY

A. This Section includes the following:

1. Washroom accessories.in Cottage.

B. Related Sections include the following:

1. Division 06 Section “Miscellaneous Rough Carpentry” for wood blocking.
2. Division 22 Section “Plumbing – Design-Build Summary of Work” for plumbing fixtures.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:

1. Construction details and dimensions.
2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Material and finish descriptions.
4. Features that will be included for Project.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated on Drawings.
2. Identify products using designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For toilet room accessories to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same articles in Part 2, provide products of same manufacturer unless otherwise approved by Architect.

B. Accessibility: Comply with applicable provisions in ADA Standards and 521 CMR Regulations of the Massachusetts Architectural Access Board.

1.7 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.8 WARRANTY

A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, nominal thickness $\geq$ 0.0312 in., unless otherwise indicated.

B. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), nominal thickness $\geq$ 0.0359 in.

C. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

D. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.2 TOILET ROOM ACCESSORIES

A. Basis-of-Design Product: Subject to compliance with requirements, provide products indicated by Bobrick Washroom Equipment, Inc**.** or a comparable product by 1 of the following:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bradley Corporation.

B. Toilet Tissue (Roll) Dispenser:

1. Basis-of-Design Product: Bobrick, B-2888
2. Description: Double-roll dispenser.
3. Mounting: Surface mounted.
4. Operation: Noncontrol delivery with theft-resistant spindle. Tissue rolls are loaded and locked into dispensing mechanism. Extra roll automatically drops in place when bottom roll is depleted. Depleted rolls can only be removed after unlocking door.
5. Capacity: Designed for $\leq$ 5-$^1/_4$ in. diameter, standard core tissue rolls.
6. Material and Finish: Stainless steel, No. 4 satin finish with heavy-duty 1 piece ABS plastic spindles.

a. Cabinet: 22 gauge stainless steel, all-welded construction.

b. Door: 22 gauge stainless steel with 18 gauge stainless steel door frame. Front of door is drawn, 1 piece seamless construction, secured to cabinet with two rivets.
c. Dispensing mechanism: 18 gauge stainless steel.
d. Spindles: Heavy duty, theft-resistant, 1 piece molded ABS. Spindles shall be retained in dispensing unit when door is locked.

7. Lockset: Tumbler type.

C. Paper Towel (Folded) Dispenser:

1. Basis-of-Design Product: Bobrick; B-262.
2. Mounting: Surface mounted.
3. Minimum Capacity: 400 C-fold or 525 multifold towels.
4. Material and Finish: Stainless steel, No. 4 finish (satin).

a. Cabinet: 22 gauge stainless steel, all-welded construction. Provide towel tray with hemmed opening to dispense towels without tearing.
b. Door: 22 gauge stainless steel, secured to cabinet with a full-length stainless steel piano-hinge.

5. Lockset: Tumbler type.
6. Refill Indicators: Pierced slots at sides or front.

D. Liquid Soap Dispenser:

1. Basis-of-Design Product: Bobrick; B-.155:
2. Description: Designed for dispensing all commercially marketed all-purpose soap in liquid form.
3. Mounting: Surface mounted.
4. Capacity: 24 fl oz.
5. Material and Finish: Translucent, shatter-resistant polyethylene on bright polished-chrome plated ABS bracket.

E. Sanitary Napkin Disposal:

1. Basis-of-Design Product: Bobrick; B-.270:
2. Description: Surface-mounted sanitary napkin disposal with hinged cover.
3. Container and Cover Material: Stainless steel, 22 gauge, 18-8, type-304.
4. Construction: All-welded.

F. Grab Bar:

1. Basis-of-Design Product: Bobrick; B-6806.99 Series.
2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, 18 gauge.

a. Finish: Smooth, No. 4, satin finish on ends and slip-resistant texture in grip area.

4. Outside Diameter: 1-1/2 inches.
5. Configuration and Length: Provide in straight lengths, in sizes indicated.

G. Mirror with Stainless Steel Angle Frame:

1. Basis-of-Design Product: Bobrick; B-290 Series.

2. Frame: Stainless-steel angle, 0.05 in. thick, 3/4 in. x 3/4 in. angle with vertical-grain satin finish, 1 piece roll-formed construction.

    a. Corners: Welded and ground smooth.
    b. Backing: Galvanized steel fastened to frame with concealed screws and equipped with integral horizontal hanging brackets near the top and bottom of the mirror.

3. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.

    a. Wall bracket of 20 gauge galvanized steel, equipped with concealed locking devices requiring a special tool to remove.

4. Mirror: No. 1 quality, 1/4 inch select float glass, with all edges protected by plastic filler strips. Provide protective backing of full-size, shock absorbing, water resistant, nonabrasive, 3/16 inch thick polyethylene padding.
5. Size: Model B-290 2436, 24 x 36 in.

H. Robe Hook:

1. Basis-of-Design Product: Bobrick; B-6707.
2. Mounting: Surface mounted.
3. Material and Finish: Stainless steel, No. 4 satin finish

    a. Flange and Support Arm: 22 gauge stainless steel with concealed 16 gauge stainless steel mounting bracket, all-welded construction. Secure to wall plate with stainless steel setscrew.
    b. Concealed Wall Plate: 16 gauge stainless steel.
    c. Cap: 10 gauge stainless steel, welded to support arm.

2.3 BABY CHANGING TABLE

A. Basis-of-Design Product: Subject to compliance with requirements, provide products indicated by Koala Kare Products or a comparable product by 1 of the following:

1. Rubbermaid Commercial Products, Inc.
2. American Specialties, Inc.

B. Koala Kare Baby Changing Table:

1. Basis-of-Design Product: Model No. KB200-00.
2. Description: Polypropylene horizontal fold-away bed type.
3. Bed Surface: Polypropylene with antimicrobial finish.
4. Chassis: Steel.
5. Capacity: 200 lb. with minimal deflection.
6. Articulation: Steel-on-steel hinge with gas spring mechanism.
7. Mounting: 11-gauge steel.
8. Finish: Cream.
9. Features: Nylon safety straps, and 3 bag hooks.
10. Accessibility: ADA Compliant.

2.4 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors

and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load $\geq$ 250 lb/ft, when tested according to method in ASTM F 446.

C. Provide the following items:

1. In each toilet room:
   a. Robe Hook
   b. Toilet Tissue Dispenser
   c. Paper Towel Dispenser
   d. Liquid Soap Dispenser
   e. Mirror
   f. Grab Bars
   g. Baby Changing Table

2. In Women’s Toilet only:
   a. Sanitary Napkin Disposal

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION

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PART 1 - GENERAL

1.1 GENERAL PROVISIONS – TRADE SUB-BID REQUIRED

A. Work of this Section requires Trade Sub-Bids and is governed by the provisions of the Massachusetts General Laws (MGL), Public Bidding Law Chapter 149, Sections 44A to 44J inclusive; and applicable Section of the MGL, Public Contract Law Chapter 30 as amended.

1.2 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section "Summary", Paragraph 1.01A, entitled "Related Documents."

1.3 REQUIREMENTS FOR FILING SUB-BIDS

A. Time, Manner and Requirements for Submitting Sub-Bids:

1. Sub-bids for work under this Section shall be for the complete work and shall be filed in a sealed envelope with the Public Agency at a time and place as stipulated in the "Instructions to Bidders."
2. Each sub-bid submitted for work under this Section shall be on forms furnished by the Awarding Authority as required by Section 44F of Chapter 149 of the General Laws, as amended.
3. Sub-bids filed with the Awarding Authority shall be accompanied by Bid Bond, Cash, Certified Check, Treasurer's Check, or Cashier's Check issued by a responsible bank or trust company payable to the Town of Templeton in the amount of 5% of the sub-bid. A sub-bid accompanied by any other form of bid deposit than those specified will be rejected.

B. Sub Sub-Bid Requirements: None required under this Section.

1.4 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including the following Specification Sections:

1. Division 22 Section "Plumbing – Design-Build Summary of Work".

B. The Work of this Section is shown on the following Drawings:

A-208	COTTAGE- BASEMENT & FIRST FLOOR DEMOLITION PLANS
A-209	COTTAGE- SECOND & ATTIC FLOOR DEMOLITION PLANS
A-210	COTTAGE- BASEMENT & FIRST FLOOR PLANS
A-211	COTTAGE- SECOND & ATTIC FLOOR PLANS
A-213	COTTAGE- FIRST FLOOR INTERIOR ELEVATIONS

The Trade Contractor shall also examine all other Drawings and all other Sections of the Specifications for requirements therein affecting the Work of this Section, not just those pertaining to this Sub-trade.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 – GENERAL

1.1 GENERAL PROVISIONS – TRADE SUB-BID REQUIRED

A. Work of this Section requires Trade Sub-Bids and is governed by the provisions of the Massachusetts General Laws (MGL), Public Bidding Law Chapter 149, Sections 44A to 44J inclusive; and applicable Section of the MGL, Public Contract Law Chapter 30 as amended.

1.2 SUMMARY

A. Design-Build Method: The plumbing systems in the building shall be modified as indicated on the Cottage Architectural drawings. The design and installation shall be completed by the "Design-Build" method by the licensed plumbing Sub-Contractor and shall conform to 248 CMR - Massachusetts Plumbing and Fuel Gas Code, and any regulations of the Town of Arlington, Massachusetts as they apply to the installation.

B. Summary: Briefly and without force and effect on contract documents, plumbing work can be generally summarized as (but is not necessarily limited to) the following to the work described in this Section and other Division 22 Sections.

C. General Work: General work associated with plumbing systems and equipment, and to be performed as plumbing work, includes earthwork (excavating, backfill and compaction of sub-grade) for piping, materials, pipe sleeves, pipe supports, anchors, meters, gages, electrical disconnects, motor starters, vibration isolation, sound isolation, drip pans, access panels, identification, coordination drawings, record drawings, installation permits, tests, inspection, cutting-and-patching work, start-up of systems, training of Owner's operating personnel, operating and maintenance manuals, operating permits, final cleaning of plumbing work, continued operation of certain equipment for specified periods after Owner's acceptance or occupancy, and similar work. All work must be in conformance with all state and local codes.

D. Related Section 018115, "Sustainable Design Requirements":

1. Low Emitting Materials, Adhesives and Sealants.
2. Low Emitting Material, Paints and Coatings.

1.3 PLUMBING

A. Perform work as indicated on Plans and in the Specifications, and in conformance to all applicable codes. Any waste materials must be removed and disposed of legally. Furnish and install components to make a fully functional system.

B. Provide the Domestic water system. Make any additions including pipe, valves, backflow preventers, pressure gauges; and pressure reducing valve when necessary.

C. Provide the sanitary drainage system constructed of NSF approved materials. Building traps are to be included where they are required.

B. Condensate piping for air conditioners, including insulation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.5 ACCESSIBILITY

A. Install equipment and materials to provide required access for servicing and maintenance. Coordinate the final location of concealed equipment and devices requiring access with final location of required access panels and doors. Allow ample space for removal of all parts that require replacement or servicing.

1.6 ROUGH-IN

A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be installed.

1.7 COORDINATION

A. The Contractor shall acquaint himself with space requirements of other trades and call to the Architect's attention any conflicts noted prior to performing any work. If work is started without notice to the Architect, Contractor assumes responsibility for any work that has to be done over.

B. Contractor shall have materials on the job and erected in conformance with building work schedule and in full coordination with other trades. Coordination with the electrical contractor to assure proper power supply to each component is the responsibility of the plumbing contractor. Provide plumbing to mechanical equipment in requiring water or drainage.

C. Coordinate installation of plumbing equipment and materials with all other building components.

D. Verify all dimensions by field measurements.

E. Arrange for chases, slots, and openings in other building components to allow for plumbing installations.

F. Coordinate the cutting and patching of building components to accommodate the installation of plumbing equipment and materials.

G. Where mounting heights are not detailed or dimensioned, install plumbing services and overhead equipment to provide the maximum headroom possible consistent with being serviceable. In spaces above accessible ceilings mount equipment no lower than 12 inches, to the bottom of the equipment or piping, above the ceiling and no higher than 24 inches to the bottom of equipment or piping, above the ceiling

H. Install plumbing equipment to facilitate maintenance and repair or replacement of equipment components. Connect equipment for ease of disconnecting, with minimum of interference with other installations.

I. Coordinate the installation of plumbing materials and equipment above ceiling with suspension system, light fixtures, and other installations.

J. Coordinate connections of plumbing systems with exterior underground and overhead utilities and services. Provide required connection for each service.

1.8 CONTRACT DRAWINGS

A. Contract drawings are in part diagrammatic, intended to convey the scope of work and indicated general arrangements of equipment, piping, and approximate sizes and locations of equipment and outlets. Contractor shall familiarize himself with all conditions affecting his work and shall verify spaces in which his work will be installed.

B. Where job conditions require reasonable changes in indicated locations and arrangement, make such changes without extra cost to Owner.

C. The Contractor shall carefully study and compare all contract drawings, specifications, and other instructions and shall at once report to the Architect any error, inconsistency, deviation from actual conditions, or omission which he may discover.

1.9 CUTTING AND PATCHING

A. Perform cutting, fitting, and patching of plumbing equipment and materials required to:

1. Uncover Work to provide for installation of ill-timed Work;
2. Remove and replace defective Work;
3. Remove and replace Work not conforming to requirements of the Contract Documents.
4. Install equipment and materials in existing structures;
5. Upon written instructions from the Architect, uncover and restore work to provide for Architect observation of concealed Work.

B. Do not endanger or damage installed Work through procedures and processes of cutting and patching.

C. Arrange for repairs required to restore other Work, because of damage caused as a result of plumbing installations.

D. No additional compensation will be authorized for cutting and patching Work that is necessitated by ill-timed, defective, or non-conforming installations.

E. Cut, remove and legally dispose of any indicated plumbing equipment, components, and materials as required.

F. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.

1.10 SEQUENCING AND SCHEDULING

A. Construct work in sequence under the provisions of Division 01 Sections.

B. All concealed piping conveying sanitary waste, condensate, vent, and domestic water shall be fully charged and leak-tested prior to completion of the wall or ceiling enclosures. The cost of repairing damages to other Work during charging and leak testing shall be the responsibility of the Plumbing Contractor. If permanent site water is not available at this time, temporary water shall be used to complete this testing.

1.11 NAMEPLATE DATA

A. Provide a permanent nameplate on each item of power operated plumbing equipment, indicating manufacturer, product name, model number, serial number, capacity,

operating and power characteristics, labels of tested compliance's, and similar essential data. Locate nameplates in an accessible location.

1.12 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for district identifications; adequately packaged and protected to prevent damage during shipment, storage and handling.

B. Store and protect products in accordance with Division 01 Sections.

1.13 RECORD DOCUMENTS

A. Maintain record documents in accordance with requirements. Record documents shall be available for inspections and reference at any time during construction.

B. Mark a set of drawings to indicate any revisions to piping, size and location both exterior and interior; including locations of control devices, filters, and similar units requiring periodic maintenance of repair; actual equipment locations, dimensioned for column lines; actual inverts and locations of underground piping; concealed equipment, dimensioned to column lines; mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, tanks, etc.); and Change Orders.

PART 2 - PRODUCTS

2.1 Piping as required by 248 CMR 2.00 Massachusetts Plumbing Code, 248 CMR 3.00 - 8.00 Massachusetts Fuel Gas Code. Vertical mains shall be cast iron to minimize noise.

2.2 Fixtures shall be white vitreous china, ASME A112.19.2 compliant. Fittings, exposed valves and piping shall be polished chrome-plated.

2.3 Pipe Insulation: Hot water piping, and both hot and cold water piping in exterior wall construction shall receive ½ inch thick pipe insulation. Insulation in exterior chase shall be such that it will protect pipe from freezing at prolonged 0^{o} F exterior temperature for a period of 4 days.

2.4 Plumbing Fixture Schedule:

. A. Toilet: American Standard Model No. 3195A.101 "Champion Pro Right Height Elongated Toilet", Model No. 4225A.104 , tank, vitreous china, 1.28 gallons per flush, ADA Compliant, with "Champion Elongated Closed Front Toilet Seat" Model 5321A.65CT.020.

B. Lavatory Sink: American Standard Model No. 9024.001EC CHO "Decorum Wall-Hung Lavatory with Everclean", center hole only, vitreous china, ADA Compliant, with Jay R. Smith carrier Model No. 0801.

C. Lavatory Faucet: American Standard Model No. 7075.104, "Colony Pro Single Control Lavatory Faucet", one-hole, single metal lever handle, polished chrome, 1.2 gallons per minute flow rate with PCA aerator, ADA Compliant.

D. Undersink Pipe Protection: IPS Corporation "LavGuard 2", molded antimicrobial vinyl with built-in concealed fasteners, ADA Compliant.

E. Coffee Counter Sink: Elkay Model BPSR15 “Celebrity Stainless Steel 15 in. x 15 in. x 6-1/8 Single Bowl Drop-In Bar Sink” 12 in. x 9-¼ in. x 6 in. bowl, 3-hole, ADA Compliant.

F. Coffee Counter Faucet: American Standard Model No. 7075.054, “Colony Pro Single Control Lavatory Faucet”, 3-hole, single metal lever handle, polished chrome, 0.5 gallons per minute flow rate with PCA aerator, ADA Compliant.

G. Water Heater: Ruud “Commercial Condensing Tankless Water Heater” Model No. RUTGH-C95DVL (P), 100° F– 120° F temperature range,120 VAC/60 Hz, wall-hung, direct ignition, natural gas unit.

PART 3 – EXECUTION

3.1 PIPING INSTALLATION

A. Piping shall be installed as closely as possible to walls, ceilings, beams, columns, etc., consistent with proper space allowance.

B. The Plumbing Subcontractor shall note the invert elevations of existing sanitary drain and shall run his piping to this invert as evenly as possible. Branches on sanitary lines shall have pitch $\geq$ 1/8 inch/foot wherever possible.

C. Piping shall be run in rectilinear fashion and to avoid conflicts, rigidly supported and evenly spaced, aligned and/or graded and arranged without sags, pockets or low spots. Low ends of water lines shall be fitted with drain leg tees fitted with screwed plugs.

D. Valves, special traps and accessories shall be installed so as to allow for proper operation and maintenance.

E Except where otherwise noted, all piping shall be concealed in walls, ceiling construction, access spaces and chases provided.

3.2 PLUMBING SYSTEM TESTS

A. All plumbing systems shall be tested by the Plumbing Subcontractor in the presence of the Architect or his representative and the Plumbing Inspector after completion of “Roughing-In” and before concealing any section from view.

B. No piping shall be insulated until it has been pressure tested and proven tight.

C. All water piping shall be tested to a hydrostatic pressure of 125 lb/in^2 and proven tight at this pressure for $\geq$ 8 hours, or as long thereafter as is required to make the complete test.

D. Gas System: After assembly and before piping is concealed, the system shall be tested to a pressure of 5 lb/in^2 gage for 30 minutes or as long as required to prove the system tight without a drop in pressure.

3.3 CLEANING AND ADJUSTING

A. At the completion of work, all fixtures, equipment and apparatus and exposed trim for same included in this Section shall be cleaned and, where required, polished ready for use. Drains and traps shall be thoroughly cleaned.

3.4 STERILIZATION

A. The entire potable hot- and cold-water distribution system shall be thoroughly sterilized with a solution containing ≥ 50 parts per million of available chlorine**.** The sterilizing solution shall be allowed to remain in the system for ≥ 8 hours, during which time all valves and faucets shall be opened and closed several times. After sterilization, the solution shall be flushed from the system with clean water until the residual chlorine content is ≤ 0.2 parts per million,

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS – TRADE SUB-BID REQUIRED

A. Work of this Section requires Trade Sub-Bids and is governed by the provisions of the Massachusetts General Laws (MGL), Public Bidding Law Chapter 149, Sections 44A to 44J inclusive; and applicable Section of the MGL, Public Contract Law Chapter 30 as amended.

1.2 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section "Summary", Paragraph 1.01A, entitled "Related Documents."

1.3 REQUIREMENTS FOR FILING SUB-BIDS

A. Time, Manner and Requirements for Submitting Sub-Bids:

1. Sub-bids for work under this Section shall be for the complete work and shall be filed in a sealed envelope with the Public Agency at a time and place as stipulated in the "Instructions to Bidders."
2. Each sub-bid submitted for work under this Section shall be on forms furnished by the Awarding Authority as required by Section 44F of Chapter 149 of the General Laws, as amended.
3. Sub-bids filed with the Awarding Authority shall be accompanied by Bid Bond, Cash, Certified Check, Treasurer's Check, or Cashier's Check issued by a responsible bank or trust company payable to the Town of Templeton in the amount of 5% of the sub-bid. A sub-bid accompanied by any other form of bid deposit than those specified will be rejected.

B. Sub Sub-Bid Requirements: None required under this Section.

1.4 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including the following Specification Sections:

1. Division 23 Section "HVAC - Design-Build Summary of Work".

B. The Work of this Section is shown on the following Drawings:

A-202	COTTAGE - EXTERIOR - SOUTH ELEVATION
A-208	COTTAGE- BASEMENT & FIRST FLOOR DEMOLITION PLANS
A-209	COTTAGE- SECOND & ATTIC FLOOR DEMOLITION PLANS
A-210	COTTAGE- BASEMENT & FIRST FLOOR PLANS
A-211	COTTAGE- SECOND & ATTIC FLOOR PLANS
A-213	COTTAGE- FIRST FLOOR INTERIOR ELEVATIONS
A-214	COTTAGE- SECOND FLOOR INTERIOR ELEVATIONS
A-216	COTTAGE- HVAC EQUIPMENT SCHEDULE

The Trade Contractor shall also examine all other Drawings and all other Sections of the Specifications for requirements therein affecting the Work of this Section, not just those pertaining to this Sub-trade.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS – TRADE SUB-BID REQUIRED

A. Work of this Section requires Trade Sub-Bids and is governed by the provisions of the Massachusetts General Laws (MGL), Public Bidding Law Chapter 149, Sections 44A to 44J inclusive; and applicable Section of the MGL, Public Contract Law Chapter 30 as amended.

1.2 SUMMARY

A. Design-Build Method: The HVAC systems in the building shall be modified as indicated on the Cottage Architectural drawings. The design and installation shall be completed by the "Design-Build" method by the licensed HVAC Sub-Contractor, and shall conform to the 2015 International Mechanical Code and any regulations of the Town of Arlington, Massachusetts as they apply to the installation.

B. Summary: Briefly and without force and effect on contract documents, HVAC work can be generally summarized as (but is not necessarily limited to) the following to the work described in this Section and other Division 23 Sections.

C. General Work: General work associated with HVAC systems and equipment, and to be performed as HVAC work, electrical disconnects, motor starters, vibration isolation, sound isolation, drip pans, access panels, identification, coordination drawings, record drawings, installation permits, tests, inspection, cutting-and-patching work, start-up of systems, training of Owner's operating personnel, operating and maintenance manuals, operating permits, final cleaning of HVAC work, continued operation of certain equipment for specified periods after Owner's acceptance or occupancy, and similar work. All work must be in conformance with all state and local codes.

D. Related Section 018115, "Sustainable Design Requirements":

1. Low Emitting Materials, Adhesives and Sealants.
2. Low Emitting Material, Paints and Coatings.

1.2 HVAC

A. Section includes Multi-Zone Inverter Heat-Pump System with following components:

1 Slim Wall-Mounted Indoor HVAC Units.
2. Mid-Static Horizontal-Ducted Indoor Unit.
3. Slim "Suitcase" Outdoor HVAC Condenser Units.
4. Custom Insulated Sheetmetal Plenums.
5. Flexible Metal Ductwork.
6. Flush Floor-Mounted Diffusers and Return-Air Grille.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings:

1. Include plans, elevations, sections, and details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include details of anchorages and attachments to structure and to supported equipment.
4. Include equipment schedules to indicate rated capacities, operating characteristics, furnished specialties, and accessories.
5. Wiring Diagrams: Power, signal, and control wiring.

C. Samples: For each exposed product and for each color and texture specified.

1.2 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 HVAC INDOOR WALL AND OUTDOOR UNITS

A. HVAC Indoor Wall and Outdoor Unit Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Mitsubishi Electric U.S. Corporation, Cypress, CA 90630, basis of design.
2. Fujitsu General.
3. Trane, Inc.

B Assembly including chassis, electric heating coil, fan, motor, and controls. Comply with UL 2021.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 REGISTERS AND GRILLES

A. Fixed Face Registers and Grilles:

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:
   a. Hart & Cooley Inc.
   b. Krueger.
   c. Nailor Industries Inc.
   d. Price Industries.
   e. Titus.
   f. Tuttle & Bailey.
   g. Or Approved Equal.
2. Material: Steel.
3. Finish: Baked enamel, color selected by Architect.
4. Face Arrangement: 1/2-by-1/2-by-1/2-inch grid core.

5. Core Construction: Removable.
6. Frame: 1-¼ inches wide, top flush with floor ADA compliant.
7. Mounting: Countersunk screw.
8. Damper Type: Adjustable opposed blade.
9. Accessory: Filter.

2.3 FLEXIBLE METAL DUCTWORK

A. Flexible metal ductwork shall conform to following:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work.
2. Aluminum inner core construction, ASTM C 518, UL 181, Class 0 air duct conforming to NFPA 90A and 90B.
3. Fabricated from heavy gauge corrugated aluminum, with one end crimped and other end plain, 6 inch diameter x 8 feet long lengths.
4. End treatment: Universal male/female fittings.
5. Velocity: ≤ 5,000 ft/minute.
6. Surface Burning Characteristics: Flame Spread 0, Smoke Developed.

2.4 SHEETMETAL PLENUM

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G60.

2.5 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Two-Part Tape Sealing System:

1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
2. Tape Width: 4 inches.
3. Sealant: Modified styrene acrylic.
4. Water resistant.
5. Mold and mildew resistant.
6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature Range: - 40°F to 200 °F.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
10. For indoor applications, use sealant that has a VOC content ≤ 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.6 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

D. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

2.7 CONTROLS

A. Controls: Portable remote-control electronic unit with wall-mounting bracket for each unit.

B. Electrical Connection: Factory wire motors and controls for a single field connection with disconnect switch.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install HVAC operating equipment in accordance with manufacturer’s printed installation instructions.

B. Install wall and ceiling unit heaters to comply with NFPA 90A.

C. Install wall and ceiling-mounted unit heaters level and plumb.

D. Install wall-mounted thermostats and switch controls in electrical outlet boxes at heights to match lighting controls. Verify location of thermostats and other exposed control sensors with Drawings and room details before installation.

E. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

F. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.2 DUCT AND SHEETMETAL PLENUM INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install round ducts in maximum practical lengths.

D. Install ducts with fewest possible joints.

END OF SECTION

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PART 1 - GENERAL

1.1 GENERAL PROVISIONS – TRADE SUB-BID REQUIRED

A. Work of this Section requires Trade Sub-Bids and is governed by the provisions of the Massachusetts General Laws (MGL), Public Bidding Law Chapter 149, Sections 44A to 44J inclusive; and applicable Section of the MGL, Public Contract Law Chapter 30 as amended.

1.2 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section “Summary”, Paragraph 1.01A, entitled “Related Documents.”

1.3 REQUIREMENTS FOR FILING SUB-BIDS

A. Time, Manner and Requirements for Submitting Sub-Bids:

1. Sub-bids for work under this Section shall be for the complete work and shall be filed in a sealed envelope with the Public Agency at a time and place as stipulated in the “Instructions to Bidders.”
2. Each sub-bid submitted for work under this Section shall be on forms furnished by the Awarding Authority as required by Section 44F of Chapter 149 of the General Laws, as amended.
3. Sub-bids filed with the Awarding Authority shall be accompanied by Bid Bond, Cash, Certified Check, Treasurer’s Check, or Cashier’s Check issued by a responsible bank or trust company payable to the Town of Arlington in the amount of 5% of the sub-bid. A sub-bid accompanied by any other form of bid deposit than those specified will be rejected.

1.4 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including the following Specification Sections:

1. Division 26 Section “Electrical”.

B. The Work of this Section is shown on the following Drawings:

ED.1	COTTAGE – DEMOLITION BASEMENT AND FIRST FLOOR PLANS - ELECTRICAL
ED.2	COTTAGE DEMOLITION SECOND & ATTIC FLOOR PLANS - ELECTRICAL
E1.1	COTTAGE – BASEMENT & FIRST FLOOR PLANS LIGHTING
E1.2	COTTAGE – BASEMENT & FIRST FLOOR PLANS POWER
E2.1	PLANS LIGHTING
E2.2	COTTAGE – SECOND & ATTIC FLOOR PLANS POWER
E3.1	CARRIAGE HOUSE – FIRST & SECOND FLOOR PLANS LIGHTING/POWER
E4.1	LEGEND, SCHEDULES, AND DETAILS
FA.1	COTTAGE – BASEMENT & FIRST FLOOR FIRE ALARM
FA.2	COTTAGE – SECOND & ATTIC FLOOR FIRE ALARM
FA.3	CARRIAGE HOUSE – FIRST FLOOR & ATTIC FLOOR PLANS FIRE ALARM

The Trade Contractor shall also examine all other Drawings and all other Sections of the Specifications for requirements therein affecting the Work of this Section, not just those

pertaining to this Sub-trade.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL PROVISIONS – TRADE SUB-BID REQUIRED

A. Work of this Section requires Trade Sub-Bids and is governed by the provisions of the Massachusetts General Laws (MGL), Public Bidding Law Chapter 149, Sections 44A to 44J inclusive; and applicable Section of the MGL, Public Contract Law Chapter 30 as amended.

1.2 SCOPE

A. Labor, supervision, materials, tools, scaffolding, equipment, supplies, transportation and services for a complete and operational electrical system as specified shall be provided.

B. Materials and equipment shall be installed in accordance with standards of the National Electrical Code, local codes, safety codes and ordinances.

C. Work under this Section shall include, but not be limited to:

PART I - GENERAL
1.1 GENERAL REQUIREMENTS
1.2 SCOPE
1.3 EXAMINATION OF SITE
1.4 DRAWINGS AND SPECIFICATIONS
1.5 INSURANCE
1.6 CHANGES AND REVISIONS
1.7 WORKMANSHIP
1.8 MANUFACTURERS' NAMES AND TRADE NAMES
1.9 MATERIAL STORAGE AND OFFICE SPACE
1.10 GUARANTEE
1.11 RELATED WORK
1.12 CUTTING AND PATCHING
1.13 OPERATING INSTRUCTIONS
1.14 PERMITS
1.15 RECORD DRAWINGS
1.16 TEMPORARY LIGHT AND POWER
1.17 DEFINITIONS
1.18 PRODUCT DELIVERY, STORAGE AND HANDLING
1.19 WORK CONDITIONS/SEQUENCE

PART 2 - PRODUCTS
2.1 RACEWAYS AND FITTINGS
2.2 FIRE PROOFING AND CONDUIT SEAL
2.3 WIRING SYSTEM
2.4 WIRE
2.5 GROUNDING
2.6 OUTLET BOXES
2.7 PULL AND JUNCTION BOXES
2.8 SLEEVES
2.9 WIRING DEVICES
2.10 SYSTEM OF LIGHT AND POWER
2.11 POWER WIRING

2.12 SAFETY DISCONNECT SWITCHES
2.13 CIRCUIT BREAKERS
2.14 PANELS
2.15 LIGHTING SYSTEMS
2.16 OCCUPANCY LIGHTING SENSORS
2.17 FIRE ALARM SYSTEM

PART 3 – EXECUTION
3.1 INSPECTION AND COORDINATION
3.2 INSTALLATION
3.3 RACEWAYS AND FITTINGS
3.4 WIRING
3.5 WIRE
3.6 OUTLET BOXES
3.7 SAFETY TYPE DISCONNECT SWITCHES
3.8 PULL AND JUNCTION BOXES
3.9 WIRING DEVICES
3.10 LOCATION OF OUTLETS
3.11 POWER WIRING AND CONTROLS
3.12 HANGERS AND SUPPORTS
3.13 EXIT LIGHTS
3.14 FIRE ALARM SYSTEM – SILENT KNIGHT 5820XL SERIES
3.15 INSTRUCTIONS TO OWNER
3.16 CLEANUP
3.17 FIRESTOPPING

D. PROJECT SCOPE

1. All necessary disconnect and removal of the existing electrical systems as shown in the basement, first floor and partial second floor areas. The existing main distribution board is to remain within the basement area.
2. Power wiring
3. Grounding system
4. Panels and circuit breakers
5. Wiring devices and related branch circuit power.
6. Lighting fixtures – refer to the light fixture schedule as noted on the Contract Documents.
7. Power requirements for the mechanical, plumbing, elevator and related trade systems as noted on the Contract Documents.
8. Fire Alarm System
9. Empty raceway systems for the telephone and data consisting of a backbox and blank cover, empty raceway with pull string and plastic grommet to look into the nearest accessible ceiling.
10. Any other system hereinafter called for or shown on the drawings.

1.3 EXAMINATION OF SITE

A. Before submitting a Bid, this Contractor must visit the job site to determine the conditions under which the work is to be done.

1.4 DRAWINGS AND SPECIFICATIONS

A. Drawings and specifications are complementary to each other. Any labor and material which is called for by either, whether or not by both, or which is necessary for the

successful operation of all systems, shall be furnished and installed. Discrepancies should be brought immediately to the attention of the Architect.

B. Plans and specifications for this project should be examined to determine the scope and character of the work, the building design and function, and the required coordination with the General Contractor and other Trades before and during construction.

C. Any questions regarding the plans and specifications shall be addressed in writing to the Architect five (5) days before Bids close; otherwise, after the closing of the Bids, the Architect's interpretation of the meaning and intent of the plans and specifications shall be final.

D. Shop drawings and submissions of materials shall be made within thirty (30) days after the signing of the Contract; refer to the architect’s specification for submission requirements.

E. This Contractor shall prepare an electrical set of coordination drawings to overlay with all other Trades. Drawings shall be prepared on translucent drawings to properly coordinate all of the other equipment to be installed. Prior to any installations, the Electrical Contractor must receive approval of drawings from the Architect.

1.5 INSURANCE

A. Insurance is to conform to the provisions and requirements as set forth in Division 1.

1.6 CHANGES AND REVISIONS

A. Costs for changes and/or revisions shall be submitted to the General Contractor with material and labor breakdown of charges and credits clearly itemized.

B. Work shall not be executed until approval has been received in writing from the Architect.

1.7 WORKMANSHIP

A. Materials shall be new and shall conform to the standards of UL, Inc., in every case where such a standard has been established for the particular type of material in question. Work shall be executed in a workmanlike manner and a competent Foreman shall be provided for the entire project.

B. After wires are pulled in and fixtures and equipment are installed, this Contractor shall make tests for performance, grounds, etc., and shall immediately remedy any defects. Equipment for tests shall be provided by this Contractor.

C. Work under this Contract must be so performed that the progress of the entire project, including work of all Trades, shall not cause delays or interference. Materials and apparatus shall be installed as fast as the condition of the building will permit.

D. It will be the responsibility of the Electrical Foreman to instruct the Owner in the function, operation and maintenance of electrical systems and equipment. This is to be done upon completion of the installation, before leaving the job site and to the satisfaction of the Owner, and Architect.

1.8 MANUFACTURERS' NAMES AND TRADE NAMES

A. Throughout the specification types of materials may be specified by manufacturer's name and catalogue number in order to establish standards of performance and quality, and not to limit competition.

1.9 MATERIAL STORAGE AND OFFICE SPACE

A. This Contractor shall maintain at his own expense, where directed on the premises, neat covered storage for material and equipment, and office space where drawings and specifications shall be kept for records.

B. Equipment or material damaged during the construction period shall be replaced at this Contractor's expense.

1.10 GUARANTEE

A. Materials and labor incorporated in the work are to be guaranteed against defects for a period of one (1) year from date of substantial completion. This Contractor shall correct such defects that occur within the guarantee period and to the satisfaction of the Architect without cost to the Owner, within a twenty-four (24) hour period.

B. This Contractor shall not be responsible for failures through normal usage, nor for those caused by neglect or abuse on the part of the Owner or his employees.

1.11 RELATED WORK

A. Following related work is not included in this Section and will be performed under designated Sections.

1. Motorized equipment will be furnished complete with motors under other Sections. Control wiring for these motors shall be the responsibilities of others. See HVAC, Plumbing, Fire Protection and Irrigation Sections.

2. Major cutting and patching.

3. Starters and controls are furnished under Plumbing Section and HVAC Section. The Electrical Contractor shall be responsible to install and wire all starters.

4. Except as shown on the drawings, Automatic Temperature Control wiring for HVAC equipment and heater burner power wiring beyond supply point and indicated on drawings and heating burner control wiring: See HVAC Section.

5. Filling of space around conduits which penetrate floor slab: to be firestopped by Electrical Sub-Contractor.

1.12 CUTTING AND PATCHING

A. This Contractor as part of his work, and without extra charge, shall do fitting and minor cutting required for conduit four (4) inches and under. Cutting over four (4) inches and patching will be by the General Contractor. Costs for openings required due to lack of coordination shall be the responsibility of this Contractor.

1.13 OPERATING INSTRUCTIONS

A. This Contractor shall furnish four (4) Operating and Maintenance Manuals outlining in

detail the operational features of the following systems:

1. Circuit breakers, panels and disconnect switches.
2. Metal raceway and PVC system.
3. Light fixtures.
4. Cable and junction boxes.
5. Fire alarm system.
6. Devices and cover plates.

1.14 PERMITS

A. This Contractor shall obtain and pay for permits for the fire alarm and electrical systems on this project.

1.15 RECORD DRAWINGS

A. Refer to the architectural specification for submission requirements.

1.16 TEMPORARY LIGHT AND POWER

A. This Contractor shall furnish, install, maintain and remove at completion of work all necessary temporary electrical distribution wiring.

B. Temporary service shall feed to the existing branch circuit panels currently supporting the facility.

C. Temporary light shall be based on 100W lamp for rooms up to 500 sq. ft. and two (2) 200W or LED equivalent lamps for every 1000 sq. ft. or fraction thereof. All lamps shall be furnished and replaced by this Contractor.

D. Panelboards, switches, receptacles, and related accessories required for temporary light and power installation shall be provided.

E. Outlets shall be located at convenient points so that extension cords of not over fifty (50) feet will reach work requiring temporary light and power.

F. The General Contractor and Subcontractors, individually, shall furnish cords, sockets, motors and accessories for their work.

G. Temporary wiring, service equipment and accessories thereto installed, shall be removed at the expense of this Contractor after they have served their purpose.

H. The Owner is required to pay the cost of electricity consumed by himself and by his Subcontractors. This Contractor shall pay for replacement of lamps broken and/or removed from the premises during the construction period and until date of substantial completion as determined by Architect.

I. Temporary work shall be furnished and installed in conformance with OSHA, local codes and ordinances.

J. The Electrical Contractor shall install and maintain in each wing of the building sufficient power for the requirements of the entire wing.

1.17 DEFINITIONS

A. The terms "This Contractor", "Electrical Contractor", "Electrical Subcontractor", or "This Section" all refer to the work of this Section 26.00.00.

1.18 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. The General Contractor shall provide and pay for all dumpster services during the entire construction period. Suppliers and Sub-Contractors to bring all rubbish and debris to the dumpster location daily. No costs are to be assessed to the suppliers or Sub-Contractors by the General Contractor for this service.

B. The General Contractor, Sub-Contractors and suppliers, individually, shall furnish their own staging, scaffolding, and hoisting equipment to get workers, material and equipment from the point of delivery at the project site to the point of use or installation within the building and project site. All crane and rigging services required are the responsibility of each individual trade.

1.19 WORK CONDITIONS/SEQUENCE

A. If Sub-Contractors find that conditions are not appropriate for them to begin the work of their trade of if they are directed to perform their work out of sequence by the General Contractor, or if the General Contractor directs Sub-Contractors to start and continue regardless of job conditions, the Sub-Contractor shall notify the Architect in writing by certified mail immediately.

PART 2 – PRODUCTS - BASIC MATERIALS AND METHODS

2.1 RACEWAYS AND FITTINGS

A. Rigid conduit shall be heavy wall hot dipped, galvanized: Midland-Ross, Wheatland or Republic.

B. Minimum size of conduit used shall be 3/4" with no more than 9-#12 conductors. All circuits shall have separate neutrals and grounds.

C. Electrical Metallic Tubing (EMT) shall be mild steel, electrically welded, galvanized, Midland-Ross, Wheatland or Republic. All exposed conduits within finished areas will utilize two hole clips.

D. Conduit installed underground or under concrete slabs shall be rigid galvanized or Type PVC40 plastic conduit. Raceways rising up from floor slabs shall be rigid galvanized conduit.

E. Conduit shall be kept at least six (6) inches away from adjacent copper piping or other copper work on the project.

F. During construction, ends of conduit shall be kept tightly plugged to exclude plaster, dirt, dust, moisture and debris.

G. Motor connections shall be Type UA Sealtite with equipment ground wire, a minimum of 1/2 inch in size.

2.2 FIRE PROOFING AND CONDUIT SEAL

A. The Electrical Contractor is responsible for all fireproofing of raceways through floors

and walls which pertain to the electrical systems.

B. The material to be used for firestopping shall be 3M moldable fire rated putty or 3M #CP25WB caulk to firestop penetrations in fire rated areas of walls and floors.

2.3 WIRING SYSTEM

A. Wiring shall be installed concealed in the construction. Wiring underground or in concrete slabs shall be installed in heavy wall, rigid.

B. Joints in wiring shall be made with approved type solderless connectors of the self-insulating type with an insulation equal to that of the conductors being joined. They shall be Minnesota Mining & Manufacturing Co., Type "Y", "R" or "B" Scotchlok, T&B Twist-on-Piggy or TUB one-piece, pressure type, self-insulating wire joint.

C. All branch circuits shall have separate grounds and neutrals.

2.4 WIRE

A. Unless otherwise specified, conductors installed in conduit shall be Type THW or THHN, 600V, 90 degree C. – Rome Cable. Conductors shall be copper.

B. MC shall be Type THHN #12 or #14 copper conductors or as noted on the drawings. Romex type NM cable may NOT be used.

C. Covering of wires and cables designed to meet the above specifications shall have distinctive markings as required by the latest standards of UL, Inc., making them readily identifiable in the field.

2.5 GROUNDING

A. The entire system shall be grounded in accordance with the National Board of Fire Underwriters', State and Local requirements.

B. Framework of control centers, motor apparatus, panels, heating equipment, portable equipment, etc., shall be grounded to a ground loop or buss to receive a building ground conductor.

C. This Contractor shall furnish and install an equipment ground wire in feeder runs to meet requirements of the National Electrical Code.

D. All branch circuits shall have separate neutrals and grounds.

2.6 OUTLET BOXES

A. Outlet boxes shall be Steel City, Appleton, or Raco, galvanized of a type best adaptable to their respective use and in general four (4) square or octagon. Boxes in plaster areas shall be equipped with plaster rings or trim. Studs of suitable size for proper support shall be provided in boxes from which fixtures are to be hung.

B. Boxes installed in tile, block or similar finished walls shall be solid flush type, square cornered, without ears, 1-2-3 and 4-gang as required - Raco, Steel City or Appleton.

C. Outlet boxes shall be provided with only the holes necessary to accommodate conduit connected. Boxes shall be furnished with lugs, ears, covers and/or outlet devices for

attachment.

D. Plastic boxes are not acceptable.

E. Boxes shall have barrier seals on all exterior walls. For noise and air penetrations.

2.7 PULL AND JUNCTION BOXES

A. Pull and junction boxes shall conform to requirements of the National Electrical Code. They shall be galvanized code gauge steel construction with removable cover plate secured by 1/4" brass machine screws. Junction boxes shall be supported to the building structure.

2.8 SLEEVES

A. It shall be the responsibility of this Contractor to furnish and install sleeves through floors, walls, rated assemblies, etc., where necessary.

B. Sleeves shall be sealed with UL, Inc., approved fire rated material after wires have been installed. Refer to FIRESTOPPING Section.

2.9 WIRING DEVICES

A. Switches shall be Hubbell Co. #DS120-color single pole, DS320-color three way, DS420-color four way Leviton, General Electric or Cooper. All device covers and devices are to be selected by the Architect.

B. Switch and pilot units shall be Hubbell #1297-color or equal manufacturer as listed above.

C. Ground fault receptacles shall be Hubbell GF5352-color or equal.

D. Grounded type duplex receptacles shall be used. Provide ground path either by continuous metal conduit or separate conductor. Flush mounted receptacles shall have ground connection from terminal screw of the receptacle to the outlet box.

E. Plates in general shall be phenolic plastic – color selection by the architect.

F. LED dimmers where shown shall be Cooper Co. or equal #WBSD-010SLD-COLOR to operate with the dimming drivers. Prior to purchasing the dimming controls, coordinate with the lighting manufacturer to ensure that the dimming drivers are capable of operating with the specified dimmer controls as well as the day light dimming sensors

G. LED 0-10 volt dimmer switch with passive infrared vacancy control motion sensor. Leviton Co, or equal OSD10-IOW.

H. Mounting height from center to finish floor, unless otherwise noted, shall be as follows for wiring devices:

Switches, in general .....48"
Receptacles, in general .....18"
Receptacles with X - See Architectural details for mounting height above counter.

I. All device plates for all switch controls, receptacles, etc., shall be labeled on the

outside of the device plate indicating the panel designation, circuit number and voltage using a Brady style adhesive lettering tool. Hand-written designations on the front face will not be acceptable.

2.10 SYSTEM OF LIGHT AND POWER

A. Secondary distribution system is 120/208V, 3 phase, 4 wire, 60 HZ AC.

B. Motors 1/2HP and larger, unless otherwise noted, shall be 208V, 3 phase, motors under 1/2HP shall be 120V, single phase. Coordinate with the mechanical plans to determine their voltage and phase requirements.

2.11 POWER WIRING

A. Motors shall be supplied by the HVAC Contractor. Electrical Contractor shall provide power wiring.

B. This Contractor shall wire and install safety disconnect switches and local controls unless otherwise noted in the HVAC Specification.

C. Interlock wiring shall be furnished by the HVAC Contractor and final connections shall be by the HVAC Contractor.

D. Location and sizes of motors shall be reviewed with HVAC Contractor before wiring.

E. Starters for self-contained roof top units shall be furnished by the HVAC Contractor. Any starter that is not part of the equipment shall be furnished by the HVAC Contractor and mounted and wired by Electrical Contractor.

2.12 SAFETY DISCONNECT SWITCHES

A. Safety type disconnect switches shall be fused heavy duty EATON Co., Siemens Co., Square D or General Electric. Boxes exposed to rain or wet conditions shall be rain-tight.

B. Switches shall be rated for the voltage as required by the voltage of the circuit on which they are utilized and shall be rated in horsepower; each shall be capable of interrupting the locked rotor current of the motor for which it is to be used, which current shall be assumed as six (6) times the full rated load current. There are two speed two winding starters for many of the motors, as noted on the drawings. All starters are to be furnished by the HVAC Contractor and wired by the Electrical Contractor.

C. Switches shall be fused, quick-make, quick-break type and parts shall be mounted on insulating boxes to permit replacement of any part from the front of the switch. Current-carrying parts shall be high conductivity copper designed to carry the rated load without excessive heating. Switch contacts shall be silver tungsten type or plated to prevent corrosion, pitting and oxidation and to assure suitable conductivity.

2.13 CIRCUIT BREAKERS

A. Circuit breakers for lighting and small power loads shall be bolt-on thermal magnetic, quick-make, quick-break, trip free and sized as designated on panel schedules.

B. Circuit breakers for distribution and power panels shall be bolt-on quick-make, quick-break, trip free, molded case type and sized as shown on panel schedules.

C. Circuit breakers shall be manufactured by EATON Co., Siemens Co., Square D, General Electric or equal.

2.14 PANELS

A. Panels shall be circuit breaker type, sized as indicated on Drawings.

B. Commercial panels shall be mounted in code gauge steel cabinets having not less than six (6) inch gutters, equipped with hinged doors, flush catch lock and keys, having surface or flush trims as designed on schedules and Drawings.

C. Provide engraved bakelite nameplate on trim of panels, indicating number and voltage.

D. Panels shall have equipment ground buss isolated from the system ground buss to receive the fifth wire, which is the equipment ground wire.

E. Strip cabinets used for low tension system shall be furnished by the panel manufacturer. Cabinets shall have the entire door hinged, with lock and key to match panels, 3/4" plywood backing, terminal strips as required and engraved nameplates on face of cabinet indicating purpose.

F. Panels shall have typewritten legends.

G. Panels shall be EATON Co., Siemens Co., General Electric, Square D, or equal.

H. All panels shall have a door on door with locking devices.

2.15 LIGHTING SYSTEM

A. Provide and install the complete lighting system from the lighting outlets including wire, conduit, feeders, flexible wiring system, outlet boxes, junction boxes, wiring devices, remote control relays, dimming switches, and lighting fixtures.

B. Include labor and fittings necessary for the complete installation of fixtures. Steel rod, support wire, or chain hangers and mechanical suspension channel shall be furnished and installed. Light fixtures are to be hung to the building structure and not to the metal roof or floor decking.

C. Where recessed lighting fixtures are to be installed in plaster ceiling, plaster rings and frames shall be installed under this Section of the specification.

D. Recessed LED lighting fixtures shall be supported by wire or chain hangers by this Contractor and shall not depend on the ceiling hangers to support the weight of the fixtures

E. Unless otherwise detailed on the electrical Drawings, a framed opening shall be provided under another section of the specification for recessed lighting fixtures to be installed in the ceiling.

F. Flexible wiring system is approved method of wiring, subject to approved method of product wiring.

G. Drivers shall meet applicable ANSI Standards for harmonic distortion surge protection. Drivers shall not be affected by lamp failure and shall be rated at 90% high power factor or higher.

H. Drivers shall meet applicable ANSI Standards for harmonic distortion surge protection. Ballasts shall not be affected by lamp failure and shall be rated at 90% high power factor or higher.

I. All drivers shall be of one manufacturer.

J. The LED drivers shall comply with National Grid Co. rebate requirement.

K. Provide 0-10 volt control wiring (gray and Violet) for all light fixtures controlled via dimming control switches

2.16 OCCUPANCY LIGHTING SENSORS

A. Occupancy motion sensors installed in the ceiling grid shall be EATON Greengate model number VAC-DT-2000-R series.

B. Occupancy motion sensors installed on the walls shall be EATON Greengate model number VNW-D-1001-MV-COLOR series

C. Unit shall be ceiling mounted and require no special hardware to complete installation on either a suspended or inaccessible ceiling.

D. Unit shall have a light-emitting diode (LED) means for walk testing.

E. Manufacturer will have a minimum of five (5) years' experience in the manufacture and application of occupancy sensors and extend a full five (5) year warranty to its product.

2.17 FIRE ALARM SYSTEM

A Summary

1. This Section covers fire alarm systems, including initiating devices, notification appliances, controls, and supervisory devices.
2. Work covered by this section includes the furnishing of labor, equipment, and materials for installation of the fire alarm system as indicated on the drawings and specifications.
3. The Fire Alarm System shall consist of all necessary hardware equipment and software programming to perform the following functions:

    a. Fire alarm and detection operations
    b. Control and monitoring of elevators, smoke control equipment, fire suppression systems, emergency power systems, and other equipment as indicated in the drawings and specifications.

B Acceptable Manufacturer

1. Manufacturer: The equipment and service described in this specification are those supplied and supported by Notifier NFS320 series. Acceptable manufacturers are Edwards, Fire-Lite, Silent Knight.

C. Related Documents

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.
2. The work covered by this section is to be coordinated with related work as specified elsewhere in the specifications. Requirements of the following sections apply:

    - Division 16: “Basic Electrical Materials and Methods.”
    - Division 16: “Wiring Methods.”
    - Division 13: “Fire Suppression”
    - Division 15: “Fire Protection”
    - Division 15: “HVAC Systems”

3. The system and all associated operations shall be in accordance with the following Guidelines of the following Building Code:

    - Massachusetts Building Code (8th edition)
    - NFPA 72, National Fire Alarm Code
    - NFPA 70, National Electrical Code (2010 edition)
    - NFPA 101, Life Safety Code (2010 edition)
    - NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems
    - Local Jurisdictional Adopted Codes and Standards
    - ADA Accessibility Guidelines

D. System Description

1. General: Provide a complete, non-coded, addressable, microprocessor-based fire alarm system with initiating devices, notification appliances, and monitoring and control devices as indicated on the drawings and as specified herein.
2. Software: The fire alarm system shall allow for loading and editing instructions and operating sequences as necessary. The system shall be capable of storing, and downloading while the system is in operation, a second set of operating software resident in the control panels as backup in case primary operating software is corrupted. In addition, the system shall be capable of on-site programming to accommodate system expansion and facilitate changes in operation. All software operations shall be stored in a non-volatile programmable memory within the fire alarm control unit. Loss of primary and secondary power shall not erase the instructions stored in memory.
3. History Logs: The system shall provide a means to recall alarms and trouble conditions in chronological order for the purpose of recreating an event history. A separate alarm and trouble log shall be provided.
4. Recording of Events: Record all alarm, supervisory, and trouble events by means of system printer. The printout shall include the type of signal (alarm, supervisory, or trouble) the device identification, date and time of the occurrence. The printout differentiates alarm signals from all other printed indications.

E. Wiring/Signal Transmission:

1. Transmission shall be addressable signal transmission, dedicated to fire alarm service only.

2. System connections for initiating (signaling) circuits and notification appliance circuits shall be Class A.
3. Circuit Supervision: Circuit faults shall be indicated by a trouble signal at the FACP. Provide a distinctive indicating audible tone and alphanumeric annunciation.

F. Remote Access:

1. FACP shall have the capability to provide Remote Access through a Dial-Up Service Modem using the public switched telephone system of a private switched telephone system.

2. A personal computer or technician's laptop, configured with terminal emulation software shall have the ability to access the FACP for diagnostics, maintenance reporting and information gathering.

3. FACP shall have the capability to provide third party access through a serial interface connection and be agency listed for specific interfaces and for the purpose.

G. Required Functions: The following are required system functions and operating features:

1. Priority of Signals: Fire alarm events have highest priority. Subsequent alarm events are queued in the order received and do not affect existing alarm conditions. Priority Two, Supervisory and Trouble events have second-, third- and fourth-level priority respectively. Signals of a higher-level priority take precedence over signals of lower priority even though the lower-priority condition occurred first. Annunciate all events regardless of priority or order received.
2. Noninterfering: The activation of an addressable device does not prevent the receipt of signals from subsequent addressable device activations.
3. Transmission to Remote Central Station: Automatically route alarm, supervisory, and trouble signals to a remote central station service transmitter provided under another contract.
4. Annunciation: Operation of alarm and supervisory initiating devices shall be annunciated at the FACP and the remote annunciator Silent Knight series located in the Front Vestibule 100. He annunciator shall come complete with all functions as the main fire alarm control panel.

5. General Alarm: A system general alarm shall include:

    a. Indication of alarm condition at the FACP.
    b. Identification of the device that is the source of the alarm at the FACP.
    c. Operation of audible and visible notification devices throughout the building until silenced at FACP.
    d. Closing doors normally held open by magnetic door holders.
    e. Unlocking designated Access Controlled doors.
    f. Shutting down supply and return fans serving zone where alarm is initiated.
    g. Closing smoke dampers on system serving zone where alarm is initiated.
    h. Initiation of smoke control sequence through the building temperature control system.
    i. Notifying the local fire department through a leased line connection. Coordinate with the fire department to receive the required relays to

interface with the Town of Walpole monitoring system controls.

j. Initiation of elevator recall in accordance with ASME/ANSI A17.1, when specified sensors are activated.

6. Supervisory Operations: Upon activation of a supervisory device such as fire pump power failure, low air pressure switch, and tamper switch, the system shall operate as follows:

   a. Activate the system supervisory service audible signal and illuminate the LED at the control unit and the graphic annunciator.
   b. Pressing the Supervisory Acknowledge Key will silence the supervisory audible signal while maintaining the Supervisory LED "on" indicating off-normal condition.
   c. Record the event in the FACP historical log.
   d. Transmission of supervisory signal to remote central monitoring station.

7. Restoring the condition shall cause the Supervisory LED restore system to normal.

8. Alarm Silencing: If the “Alarm Silence” button is pressed, all audible alarm signals shall cease operation.

9. System Reset

   a. The “System Reset” button shall be used to return the system to its normal state. Display messages shall provide operator assurance of the sequential steps (“IN PROGRESS”, “RESET COMPLETED”) as they occur. The system shall verify all circuits or devices are restored prior to resetting the system to avoid the potential for re-alarming the system. The display message shall indicate “ALARM PRESENT, SYSTEM RESET ABORTED.”
   b. Should an alarm condition continue, the system will remain in an alarmed state.

10. Drill: A manual evacuation (drill) switch shall be provided to operate the notification appliances without causing other control circuits to be activated.

11. WALKTEST: The system shall have the capacity of 8 programmable passcode protected one person testing groups, such that only a portion of the system need be disabled during testing. The actuation of the “enable one person test” program at the control unit shall activate the “One Person Testing” mode of the system as follows:

    a. The city circuit connection [and suppression release circuits] shall be bypassed for the testing group.
    b. Control relay functions associated to one of the 8 testing groups shall be bypassed.
    c. The control unit shall indicate a trouble condition.
    d. The alarm activation of any initiation device in the testing group shall cause the audible notification appliances assigned only to that group to sound a code to identify the device.
    e. The unit shall automatically reset itself after signaling is complete.
    f. Any opening of an initiating or notification appliance circuit wiring shall cause the audible signals to sound for 4 seconds indicating the trouble condition.

H. Analog Smoke Sensors:

1. Monitoring: FACP shall individually monitor sensors for calibration, sensitivity, and alarm condition, and shall individually adjust for sensitivity. The control unit shall determine the condition of each sensor by comparing the sensor value to the stored values.
2. Photo-electric addressable duct detector shall be come complete with detector, housing, sending tube with remote test switch with reset station key.
3. Environmental Compensation: The FACP shall maintain a moving average of the sensor's smoke chamber value to automatically compensate for dust, dirt, and other conditions that could affect detection operations.
4. Programmable Sensitivity: Photoelectric Smoke Sensors shall have 7 selectable sensitivity levels ranging from 0.2% to 3.7%, programmed and monitored from the FACP.
5. Sensitivity Testing Reports: The FACP shall provide sensor reports that meet NFPA 72 calibrated test method requirements. The reports shall be viewed on a CRT Display or printed for annual recording and logging of the calibration maintenance schedule.
6. The FACP shall automatically indicate when an individual sensor needs cleaning. The system shall provide a means to automatically indicate when a sensor requires cleaning. When a sensor's average value reaches a predetermined value, (3) progressive levels of reporting are provided. The first level shall indicate if a sensor is close to a trouble reporting condition and will be indicated on the FACP as "ALMOST DIRTY." This condition provides a means to alert maintenance staff of a sensor approaching dirty without creating a trouble in the system. If this indicator is ignored and the second level is reached, a "DIRTY SENSOR" condition shall be indicated at the FACP and subsequently a system trouble is reported [to the Central Monitoring Station]. The sensor base LED shall glow steady giving a visible indication at the sensor location. The "DIRTY SENSOR" condition shall not affect the sensitivity level required to alarm the sensor. If a "DIRTY SENSOR" is left unattended, and its average value increases to a third predetermined value, an "EXCESSIVELY DIRTY SENSOR" trouble condition shall be indicated at the control unit.
7. The FACP shall continuously perform an automatic self-test on each sensor which will check sensor electronics and ensure the accuracy of the values being transmitted. Any sensor that fails this test shall indicate a "SELF TEST ABNORMAL" trouble condition.
8. Magnet test activation of smoke sensors shall be indicated as an alarm, but distinguished by its label and history log entry as being activated by a magnet.

I. Audible Alarm Notification: By horns in areas as indicated on drawings.

J. Power Requirements

1. The control unit shall receive 120 VAC power via a dedicated fused disconnect circuit.
2. The system shall be provided with sufficient battery capacity to operate the entire system upon loss of normal 120 VAC power in a normal supervisory mode for a period of [60] hours with [10] minutes of alarm operation at the end of this period. The system shall automatically transfer to battery standby upon power failure. All battery charging and recharging operations shall be automatic.
3. All circuits requiring system-operating power shall be 24 VDC and shall be individually fused at the control unit.
4. The incoming power to the system shall be supervised so that any power failure

will be indicated at the control unit. A green "power on" LED shall be displayed continuously at the user interface while incoming power is present.

5. The system batteries shall be supervised so that a low battery or a depleted battery condition, or disconnection of the battery shall be indicated at the control unit and displayed for the specific fault type.
6. The system shall support NAC Lockout feature to prevent subsequent activation of Notification Appliance Circuits after a Depleted Battery condition occurs in order to make use of battery reserve for front panel annunciation and control.
7. The system shall support 100% of addressable devices in alarm or operated at the same time, under both primary (AC) and secondary (battery) power conditions.
8. Loss of primary power shall sound a trouble signal at the FACP. FACP shall indicate when the system is operating on an alternate power supply.

K. Submittals

1. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

    a. Product data sheets for system components highlighted to indicate the specific products, features, or functions required to meet this specification. Alternate or as-equal products submitted under this contract must provide a detailed line-by-line comparison of how the submitted product meets, exceeds, or does not comply with this specification.
    b. Provide a complete point-to-point wiring diagrams from manufacturer.
    c. Shop drawings showing system details including location of FACP, all devices and circuiting.
    d. System Power and battery charts with performance graphs and voltage drop calculations to assure that the system will operate per the prescribed backup time periods and under all voltage conditions per UL and NFPA standards.
    e. System operation description including method of operation and supervision of each type of circuit and sequence of operations for all manually and automatically initiated system inputs and outputs. A list of all input and output points in the system shall be provided with a label indicating location or use of IDC, NAC, relay, [Sensor,] and auxiliary control circuits.
    f. Operating instructions for FACP.
    g. Operation and maintenance data for inclusion in Operating and Maintenance Manual. Include data for each type product, including all features and operating sequences, both automatic and manual. Provide the names, addresses, and telephone numbers of service organizations.
    h. Product certification signed by the manufacturer of the fire alarm system components certifying that their products comply with indicated requirements.
    i. Record of field tests of system.

2. Submission to Authority Having Jurisdiction: In addition to routine submission of the above material, make an identical submission to the authority having jurisdiction. Include copies of shop drawings as required to depict component locations to facilitate review. Upon receipt of comments from the Authority, make resubmissions if required to make clarifications or revisions to obtain approval.
3. Coordinate with the City of Worcester Fire Department to obtain the application to furnish and install the fire fighters' flush mounted key box.

L. Quality Assurance

1. Installer Qualifications: A factory authorized installer is to perform the work of this section.
2. Each and all items of the Fire Alarm System shall be listed as a product of a single fire alarm system manufacturer under the appropriate category by Underwriters Laboratories, Inc. (UL), and shall bear the "UL" label.

M. Extra Materials

1. General: Furnish extra materials, packaged with protective covering for storage, and identified with labels clearly describing contents as follows:

    a. Manual Stations: Furnish quantity equal to 15 percent of the number of manual stations installed.
    b. Audio Visual Units: Furnish quantity equal to 10 percent of the number of units installed, but not less than one.
    c. Smoke and Heat Sensors: Furnish quantity equal to 10 percent of the number of units of each type installed but not less than one of each type.
    d. Sensor Bases: Furnish quantity equal to 2 percent of the number of units of each type installed but not less than one of each type.

N. Fire Alarm Control Panel (FACP) Notifier NFS320 series.

1. General: Furnish and install a Notifier Fire Alarm Audio Control Panel. All initiating and notification circuits shall be wired in a class “A” configuration. Construction shall be modular with solid state, microprocessor based electronics.

2. The FACP shall be equipped with the minimum:

    a. 80 character LCD display to indicate alarm, supervisory, and component status messages and a keypad for use in entering and executing control commands.
    b. Battery voltage and ammeter readouts from the LCD Display.
    c. Required quantity of Signaling Line Circuits (SLC) to monitor/control the system devices plus 25% spare capacity.
    d. Required quantity of Class A (Style Z) Notification Appliance Circuits (NAC; rated 3A@24VDC, resistive) to operate the audio visual units plus 25% spare capacity.
    e. Form “C” Auxiliary Relay Circuits (Form C contacts rated 2A @ 24VDC, resistive) as required. Operation shall be programmable for trouble, alarm, supervisory of other fire response functions.
    f. Capability to support *five (5)* RS-232-C ports and one service port.
    g. Capability to support addressable notification devices.
    h. Remote Unit Interface: supervised serial communication channel for control and monitoring of remotely located annunciators and I/O panels.
    i. Common Event DACT.
    j. UL listed Internet Interface to allow users to access the fire alarm system information from a personal computer, laptop, personal digital assistant, or pager. In the event of an alarm or trouble condition, the system shall automatically send an email to designated staff informing them of the situation. Service Port Modem for dial in passcode access to all fire control panel information.

3. Cabinet: Lockable steel enclosure. Arrange unit so all operations required for testing or for normal care and maintenance of the system are performed from the front of the enclosure. If more than a single unit is required to form a complete control unit, provide exactly matching modular unit enclosures.

O. Remote Transponder Panels

1. General: Where shown on the plans provide remote transponder panels. These panels shall be beige in color, communicate with the main fire alarm panel in a Style 7 format and operate in standard master/slave or local mode. In local mode operation a local mode controller will indicate status and can be enabled using a keyswitch to perform local alarm silence or reset.
2. Each panel shall be equipped with following:

    a. Required quantity of Signaling Line Circuits (SLC) to monitor/control the system devices plus 25% spare capacity.
    b. Required quantity of Class A (Style Z) Notification Appliance Circuits (NAC; rated 3A@24VDC, resistive) to operate the audio visual units plus 25% spare capacity.
    c. Form “C” Auxiliary Relay Circuits (Form C contacts rated 2A @ 24VDC, resistive) as required. Operation shall be programmable for trouble, alarm, supervisory of other fire response functions.
    d. Capability to support *five (5)* RS-232-C ports and one service port.
    e. Capability to support addressable notification devices.
    f. Remote Unit Interface: supervised serial communication channel for control and monitoring of remotely located annunciator and I/O panels.

P. Addressable Manual Pull Stations

1. Description: Addressable Single-action type, red LEXAN or metal, and finished in red with molded, raised-letter operating instructions of contrasting color. Station will mechanically latch upon operation and remain so until manually reset by opening with a key common with the control units.

Q. Smoke Sensors

1. General: Comply with UL 268, "Smoke Detectors for Fire Protective Signaling Systems." Include the following features:

    a. Factory Nameplate: Serial number and type identification.
    b. Operating Voltage: 24 VDC, nominal.
    c. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore normal operation.
    d. Plug-In Arrangement: Sensor and associated electronic components are mounted in a module that connects to a fixed base with a twist-locking plug connection. Base shall provide break-off plastic tab that can be removed to engage the head/base locking mechanism. No special tools shall be required to remove head once it has been locked. Removal of the detector head shall interrupt the supervisory circuit of the fire alarm detection loop and cause a trouble signal at the control unit.
    e. Each sensor base shall contain an LED that will flash each time it is scanned by the Control Unit (once every 4 seconds). In an alarm condition the LED shall remain on steady.
    f. Each sensor base shall contain a magnetically actuated test switch to provide for easy alarm testing at the sensor location.

g. Each sensor shall be scanned by the Control Unit for its type identification to prevent inadvertent substitution of another sensor type. Upon detection of a “wrong device”, the control unit shall operate with the installed device at the default alarm settings for that sensor; 2.5% obscuration for photoelectric sensor, 135-deg F and 15-deg F rate-of-rise for the heat sensor, but shall indicate a “Wrong Device” trouble condition.
h. The sensor's electronics shall be immune from false alarms caused by EMI and RFI.
i. Addressability: Sensors include a communication transmitter and receiver in the mounting base having a unique identification and capability for status reporting to the FACP. Sensor address shall be located in base to eliminate false addressing when replacing sensors.
j. Removal of the sensor head for cleaning shall not require the setting of addresses.

2. Type: Smoke sensors shall be of the photoelectric type.

R. Heat Sensors

1. Thermal Sensor: Combination fixed-temperature and rate-of-rise unit with plug-in base and alarm indication lamp; 135-deg F fixed-temperature setting except as indicated.
2. Thermal sensor shall be of the epoxy encapsulated electronic design. It shall be thermistor-based, rate-compensated, self-restoring and shall not be affected by thermal lag.
3. Sensor fixed temperature sensing shall be independent of rate-of-rise sensing and programmable to operate at 135-deg F or 155-deg F. Sensor rate-of-rise temperature detection shall be selectable at the FACP for either 15-deg F or 20-deg F per minute.
4. Sensor shall have the capability to be programmed as a utility monitoring device to monitor for temperature extremes in the range from 32-deg F to 155-deg F.

S. Carbon Monoxide Detectors

1. Carbon Monoxide Detectors: addressable, intelligent detector with integral communication to provide a point location for alarm communication and selective maintenance.

T. Alarm-Notification Appliances

1. Horn: Piezoelectric type horn shall be listed to UL 464. The horn shall have a minimum sound pressure level of 85 dBA @ 24VDC. The horn shall mount directly to a standard single gang, double gang or 4" square electrical box, without the use of special adapter or trim rings.
2. Visible/Only: Strobe shall be listed to UL 1971. The V/O shall consist of a xenon flash tube and associated lens/reflector system. The V/O enclosure shall mount directly to standard single gang, double gang or 4” square electrical box, without the use of special adapters or trim rings. V/O appliances shall be provided with different minimum flash intensities of 15cd, 75cd,110cd and 177cd. Provide a label inside the strobe lens to indicate the listed candela rating of the specific Visible/Only appliance.
3. Audible/Visible: Combination Audible/Visible (A/V) Notification Appliances shall be listed to UL 1971 and UL 464. The strobe light shall consist of a xenon flash

tube and associated lens/reflector system. Provide a label inside the strobe lens to indicate the listed candela rating of the specific strobe. The horn shall have a minimum sound pressure level of 85 dBA @ 24VDC. The audible/visible enclosure shall mount directly to standard single gang, double gang or 4" square electrical box, without the use of special adapters or trim rings.

4. Notification Appliance Circuit provides synchronization of strobes at a rate of 1Hz and operates horns with a Temporal Code Pattern. The circuit shall provide the capability to silence the audible signals, while the strobes continue to flash, over a single pair of wires. The capability to synchronize multiple notification appliance circuits shall be provided.

U. Addressable Circuit Interface Modules

1. Addressable Circuit Interface Modules: Arrange to monitor one or more system components that are not otherwise equipped for addressable communication. Modules shall be used for monitoring of waterflow, valve tamper, non-addressable devices, and for control of evacuation indicating appliances and AHU systems.
2. Addressable Circuit Interface Modules will be capable of mounting in a standard electric outlet box. Modules will include cover plates to allow surface or flush mounting. Modules will receive their operating power from the signaling line or a separate two wire pair running from an appropriate power supply as required.
3. There shall be two types of modules:

   a. Type 1: Monitor Circuit Interface Module:

      1). For conventional 4-wire smoke detector with Class A wiring supervision. The module will provide detector reset capability and over-current power protection for the 4-wire detector. This module will communicate status (normal, alarm, trouble) to the FACP.

   b. Type 2: Line Powered Monitor Circuit Interface Module

      1). This type of module is an individually addressable module that has both its power and its communications supplied by the two wire multiplexing signaling line circuit. It provides location specific addressability to an initiating device by monitoring normally open dry contacts. This module shall communicate four zone status conditions (normal, alarm, current limited, trouble) to the FACP.

4. All Circuit Interface Module shall be supervised and uniquely identified by the control unit. Module identification shall be transmitted to the control unit for processing according to the program instructions. Modules shall have an on-board LED to provide an indication that the module is powered and communicating with the FACP. The LEDs shall provide a troubleshooting aid since the LED blinks on poll whenever the peripheral is powered and communicating.

V. Exterior Weatherproof Strobe

1 Provide a 24v dc red exterior strobe on each building to signal when a device in that area is triggered into alarm. It shall be UL 1638 listed and provide 60 double flashes per minute at 7.5 joules. Prior to installing the beacons onto the

two buildings, coordinate with the architect and Town of Walpole fire department to determine the exact location and mounting height.

W. Emergency Power Supply

1. General: Components include battery charger.
2. Battery: Sealed lead-acid or nickel cadmium type. Provide sufficient capacity to operate the complete alarm system in normal or supervisory (non-alarm) mode for a period of 60 hours. Following this period of operation on battery power, the battery shall have sufficient capacity to operate all components of the system, including all alarm indicating devices in alarm or supervisory mode for a period of 10 minutes.

X. Installation, General

1. Install system components and all associated devices in accordance with applicable NFPA Standards and manufacturer's recommendations.
2. Installation personnel shall be supervised by persons who are qualified and experienced in the installation, inspection, and testing of fire alarm systems. Examples of qualified personnel shall include, but not be limited to, the following:

    a. Factory trained and certified personnel.
    b. National Institute of Certification in Engineering Technologies (NICET) fire alarm level II certified personnel.
    c. Personnel licensed or certified by state or local authority.

Y. Equipment Installation

1. Furnish and install a complete Fire Alarm System as described herein and as shown on the plans. Include sufficient control unit(s), manual stations, automatic fire detectors, smoke detectors, audible and visible notification appliances, wiring, terminations, electrical boxes, and all other necessary material for a complete operating system.
2. Water-Flow and Valve Supervisory Switches: Connect for each sprinkler valve required to be supervised.
3. Device Location-Indicating Lights: Locate in the public space immediately adjacent to the device they monitor.

Z. Wiring Installation

1. System Wiring: Wire and cable shall be a type listed for its intended use by an approval agency acceptable to the Authority Having Jurisdiction (AH and shall be installed in accordance with the appropriate articles from the current approved edition of NFPA 70: National Electric Code (NEC).
2. Contractor shall obtain from the Fire Alarm System Manufacturer written instruction regarding the appropriate wire/cable to be used for this installation. No deviation from the written instruction shall be made by the Contractor without the prior written approval of the Fire Alarm System Manufacturer.
3. Color Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm initiating device circuits wiring and a different color code for supervisory circuits. Color-code notification appliance circuits differently from alarm-initiating circuits. Paint fire alarm system junction boxes and covers red.

AA. Field Quality Control

1. Manufacturer's Field Services: Provide services of a factory-authorized service representative to supervise the field assembly and connection of components and the pretesting, testing, and adjustment of the system.
2. Service personnel shall be qualified and experienced in the inspection, testing, and maintenance of fire alarm systems. Examples of qualified personnel shall be permitted to include, but shall not be limited to, individuals with the following qualifications:
    a. Factory trained and certified.
    b. National Institute for Certification in Engineering Technologies (NICET) fire alarm certified.
    c. International Municipal Signal Association (IMSA) fire alarm certified.
    d. Certified by a state or local authority.
    e. Trained and qualified personnel employed by an organization listed by a national testing laboratory for the servicing of fire alarm systems.
3. Pre-testing: Determine, through prê-testing, the conformance of the system to the requirements of the Drawings and Specifications. Correct deficiencies observed in pre-testing. Replace malfunctioning or damaged items with new and retest until satisfactory performance and conditions are achieved.
4. Final Test Notice: Provide a 10-day minimum notice in writing when the system is ready for final acceptance testing.
5. Minimum System Tests: Test the system according to the procedures outlined in NFPA 72.
6. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets the Specifications and complies with applicable standards.
7. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log.
8. Final Test, Certificate of Completion, and Certificate of Occupancy:
    a. Test the system as required by the Authority Having Jurisdiction in order to obtain a certificate of occupancy.

BB. Cleaning and Adjusting

1. Cleaning: Remove paint splatters and other spots, dirt, and debris. Clean unit internally using methods and materials recommended by manufacturer.
2. Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels and adjusting controls and sensitivities to suit actual occupied conditions. Provide up to three visits to the site for this purpose.

CC. Monitoring Requirements

1. Furnish and install two dedicated Category 6 plenum rated phone lines from the main telephone service entrance to the fire alarm control panel for final connections by the UL Approved Central Monitoring Company.
2. Radio master box shall be purchased from AES Corporation model number 7788F series 8 zone radio alarm box. Inclusive of antenna and all related components in accordance with the City of Worcester Fire Department requirements. Coordinate with the City of Worcester Fire Department to

determine the required programming and testing procedures. Prior to installing the approved radio master box, coordinate with the fire department to determine the best location of the equipment and related antenna

3. Furnish and install a recessed fire fighters key box.

PART 3 - EXECUTION

3.1 INSPECTION AND COORDINATION

A. This Contractor shall inspect surfaces and areas that will receive his material and the job conditions as they exist and report any conditions that may adversely affect his work. Notify Architect or General Contractor of unsuitable conditions.

B. Coordinate work with construction schedule and job progress.

C. This Contractor shall confer with the General Contractor and other Trades to coordinate his work and to properly locate systems to avoid conflict and interference.

D. Any interference with the work of other Trades or with architectural or structural details shall be brought to the attention of the Architect for decision before installation. Contractor's failure to so coordinate his work will not relieve him of the responsibility to correct work to suit building conditions.

3.2 INSTALLATION

A. Installation shall be by skilled workmen using proper equipment. Commencement of work shall be deemed as acceptance of existing conditions by installer.

B. Entire application shall be in strict accordance with manufacturer's recommendations and the standards of the National Electrical Code, local codes and ordinances, OSHA safety codes and regulations.

C. After wires are pulled in and all fixtures are installed, this Contractor shall make tests for performance, grounds, etc., and shall immediately remedy defects. Equipment for tests shall be borne by this Contractor.

D. Work under this Contract must be so performed that the progress of the entire project, including work of all Trades shall not cause delays or interference. Material and apparatus shall be installed as fast as condition of the building will permit.

3.3 RACEWAYS AND FITTINGS

A. Conduit and wiring shall be installed concealed in the construction where possible. Conduit shall be installed in a neat, workmanlike manner and run parallel to building walls. Conduit size shall be minimum 3/4".

B. During building construction ends of conduit shall be tightly plugged to exclude plaster, dirt, dust and moisture.

C. Ends of conduit entering boxes shall be equipped with galvanized locknuts and bushings. Cut ends of conduit shall be reamed free of burrs and sharp edges.

D. Electrical metallic tubing couplings and terminations in outlet boxes, junction boxes, panelboard cabinets, etc., shall be secured thereto for grounding by means of raintight

and concrete-tight fittings of the interlocking compression ring or stainless steel, multiple joint locking type. Set screws or indentations will be acceptable as a method of attachment of fittings to conduit or EMT. Two hole clips will be required for all exposed conduit in finished areas.

3.4 WIRING

A. Joints in wiring shall be made with approved type solderless connectors.

B. All branch circuits shall have separate neutrals and grounds.

3.5 WIRE

A. Wire #8 and larger shall be stranded and no wire less than #12 shall be used, unless otherwise noted.

B. This Contractor may use MC cable with THHN conductors where allowed by code. No wiring less than #12 AWG shall be used.

3.6 OUTLET BOXES

A. Ceiling boxes shall be supported to carry the weight of fixtures which are to be hung.

B. Boxes in poured concrete slab ceilings shall be four (4) inch concrete type as required by slab thickness with complete back plate and support.

C. Outlet boxes shall be provided with only the holes necessary to accommodate the conduits being connected. Boxes shall be furnished with lugs or ears for attachment of covers and/or outlet devices.

3.7 SAFETY TYPE DISCONNECT SWITCHES

A. Disconnect switches shall be installed as indicated on drawings. Fuse sizing shall be reviewed with the HVAC Contractor before installation.

3.8 PULL AND JUNCTION BOXES

A. Pull and junction boxes shall be supported to the building structure or floor slab by suitable hangers to meet National Electrical Code.

3.9 WIRING DEVICES

A. Grounded type duplex receptacles shall be used. Provide ground path either by continuous metal conduit or separate conductor.

B. Receptacles with X typical for above counter or special mounting height. Refer to the Architectural Drawings for these locations and details before installation.

3.10 LOCATION OF OUTLETS

A. Outlets shall line up with items above and be centered on wall. Add supports as required for this purpose. Do not mount on nearest studs.

B. Architect or Engineer has the right to move outlets a reasonable distance.

C. This Contractor shall check any questionable outlet before installation.

D. This Contractor shall review drawings for exact location of receptacles mounted above counter or for special purpose. Dimensions shall be taken from Architectural drawings not from Electrical.

3.11 POWER WIRING AND CONTROLS

A. This Contractor shall install wiring and disconnect switches relating to the elevator. The wiring to the elevator shall be extended to the elevator control panel.

B. This Contractor shall install power wiring related to the HVAC and Plumbing as specified herein and as shown on the Drawings.

C. Motors for this project shall be installed by the HVAC and Plumbing Contractors.

3.12 HANGERS AND SUPPORTS

A. Lighting fixtures shall be hung independent of the ceiling system.

B. Recessed fixtures shall be supported from two (2) one-quarter (1/4") inch steel rod supports or chain or wire hangers having the same strength designed for the purpose.

C. Surface fixtures shall be supported from 1/4" rods.

D. Wiring above the ceiling shall be supported to conform to code.

3.13 EXIT LIGHTS

A. The exit lights are 120 volt. Wiring shall conform to code. Foot candle requirements shall meet code requirements of five (5) foot candles of light on face of exit. Lamps shall be LED.

3.14 FIRE ALARM SYSTEM

A. Provide and install the system in accordance with the plans and specifications, all applicable codes and the manufacturer's recommendations. All wiring shall be installed in strict accordance with all the provisions of the NEC-Article 760A and C, Power-Limited Fire Protective Signaling Circuits or, if required, may be reclassified as non-power limited and wired in accordance with NEC Article 760A and B. Upon completion, This Contractor shall so certify in writing to the Owner and General Contractor.

B. All junction boxes shall be painted red and labeled "Fire Alarm". Wiring color code shall be maintained throughout the installation.

C. Installation of equipment and devices that pertain to other work in the Contract shall be closely coordinated with the appropriate Contractor.

D. This Contractor shall clean all dirt and debris from the inside and outside of the fire alarm equipment after completion of the installation.

E. The manufacturer's authorized representative shall provide on site supervision of installation.

F. The completed fire alarm system shall be fully tested in accordance with NFPA-72H by this Contractor in the presence of the Owner's Representative, Engineer and the Local Fire Marshall. Upon completion of a successful test, this Contractor shall so certify in writing to the Owner and General Contractor.

G. This Contractor shall warrant the completed fire alarm system wiring and equipment to be free from inherent mechanical and electrical defects for a period of one (1) year from the date of the completed and certified test or from the date of first beneficial use.

H. The equipment manufacturer shall make available to the Owner a maintenance contract proposal to provide a minimum of two (2) inspections and tests per year, in compliance with NFPA-72H guidelines.

3.15 INSTRUCTIONS TO OWNER

A. It shall be the responsibility of the Electrical Foreman to instruct the Owner in the function, operation and maintenance of electrical systems and equipment.

3.16 CLEANUP

A. Stains and/or damage to the finish of the building caused by faulty workmanship and/or improper handling of material in regard to installation shall be cleaned or removed and replaced at no cost to the Owner.

B. Panels and like shall be cleaned and left in a neat manner and where required shall be painted if any finish material has been removed.

C. Temporary wiring shall be removed.

D. Lighting fixtures shall be left clean. Lenses shall not be installed until areas are completed and free from dust and dirt. Fixtures with plastic covers shall remain wrapped until areas are free from dust and dirt.

3.17 FIRESTOPPING

A. The Electrical Contractor shall be responsible to fire stop all the raceways and the interior and exterior of all sleeves through which wires penetrate walls, floors or any other penetrations requiring firestopping material under this Section.

END OF SECTION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section "Summary", Paragraph 1.01A, entitled "Related Documents."

1.02 SUMMARY

A. This Section includes the following:

1. The contractor shall furnish all labor, materials, and equipment and shall replace the bituminous concrete pavements as indicated on the drawings and as specified herein.

B. Related Sections include the following:

1. Division 32 Section "Brick Unit Paving".
2. Division 32 Section "Pavement Markings".

1.03 SYSTEM DESCRIPTIONS

A. Areas shall be paved with permanent trench base and/or binder pavement (and concrete slab, if require

1.04 REFERENCES

A. The following standards form a part of these specifications and indicate the minimum standards required:

1. American Society for Testing and Materials (ASTM)

ASTM D1557	Test for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 Pound Rammer and 18-Inch Drop.

2. Commonwealth of Massachusetts Highway Department (MHD) Standard Specifications for Highways and Bridges as last revised.

MHD 405	Gravel Base Course
MHD 420	Class I Bituminous Concrete Base Course (Type I-1)
MHD 460	Class I Bituminous Concrete Pavement
MHD 476	Cement Concrete Pavement
MHD 860	Reflectorized Pavement Markings

1.05 SUBMITTALS

A. Six sets of complete job mix formula shall be submitted to the owner and/or owner's representative at $\geq$ 2 weeks prior to any of the work of this section is to commence.

PART 2 PRODUCTS

2.01 GRAVEL SUBBASE:

A. Gravel subbase shall consist of inert material that is hard durable stone and coarse sand, free from loam and clay, surface coatings and any other deleterious material.

B. Gradation requirements for gravel subbase shall be as specified in Section 31 20 00 - Earthmoving for Gravel Borrow.

2.02 BITUMINOUS CONCRETE PAVEMENT:

A. Bituminous concrete pavement shall consist of Class I Bituminous Concrete, Type I-1.

B. Bituminous concrete mixtures shall be within the composition limits of base courses, binder courses, top courses and surface treatment, in accordance with MHD m3.11.03, with constituents that conform to Table A, below.

TABLE A
PERCENT BY WEIGHT PASSING SIEVE DESIGNATION

Standard Sieves	Base Course	Binder Course	Top Course	Surface Treatment
2 in.	100			
1 in.	55 - 80	100		
¾ in.		80 - 100		
5/8 in.			100	
½ in.	40 - 65	55 - 75	95 - 100	
3/8 in.			80 - 100	100
No. 4	20 - 45	28 - 50	50 - 76	80 - 100
No. 8	15-33	20-38	37 - 54	64 - 85
No. 16			26 - 40	46 - 68
No. 30	8 - 17	8 - 22	17 - 29	26 - 50
No. 50	4 - 12	5 - 15	10 - 21	13 – 31
No. 100*			5 - 16	7 - 17
No. 200*	0 - 4	0 - 5	2 - 7	3 - 8
Bitumen	4 - 5	4.5 – 5.5	5.5 – 7.0	7 – 8

*Percentages shown for aggregate sizes are stated as proportional percentages of total aggregate for the mix
Unless otherwise authorized by the owner and/or owner's representative, no job mix formula will be approved which specifies:
Less than 4% passing No. 200 for Top Course
Less than 6% bitumen for top course

C. The tack coat shall be a hot poured rubberized emulsified asphalt sealant meeting the requirements of Federal Specifications SS-1401 or SS-S-164.

2.03 SEAL COAT:

A. Seal coats shall be within the composition limits for protective seal coat emulsion in accordance with MHD M3.0.3.

B. Silica sand when blended with seal coat emulsion shall be No. 30 silica sand.

PART 3 EXECUTION

3.01 GENERAL

A. The existing bituminous pavement shall be removed in the area indicated on drawing No. L-101 and carted off-site to be recycled. Upon removal of the bituminous concrete, the Paving Subcontractor shall contact the Architect to arrange for a site meeting with the Owner to examine the existing subbase to determine if it is adequate, may be made adequate or is inadequate or non-existent.

B. Pavement thicknesses specified are measured in compacted inches. If a pavement course thickness exceeds 2-½ compacted inches, the course shall be installed in multiple lifts with each lift not exceeding 2-½ compacted inches in thickness.

1.02 GRAVEL SUBBASE:

A. If required, the gravel subbase to be placed under the pavement shall consist of 15 inches of gravel evenly spread and thoroughly compacted.

B. The gravel shall be spread in layers $\leq$ 4 in. in thickness, compacted measure. All layers shall be compacted to $\geq$ 95% of the maximum dry density of the material as determined by ASTM D1557 Method C at optimum moisture content.

1.03 PERMANENT BITUMINOUS PAVEMENT:

A. The bituminous paving mixture, equipment, methods of mixing and placing, and the precautions to be observed as to weather, condition of subbase, etc., shall be in accordance with MHD 460.

B. Base Course and Binder Course Pavement:

1. Immediately prior to installing the base and/or binder course, the trimmed edges shall be made stable and unyielding, free of loose or broken pieces and all edges shall be thoroughly broomed clean. Contact surfaces of trench sides, curbings, manholes, catch basins, or other appurtenant structures in the pavement shall be painted thoroughly with a uniform coating of hot poured rubberized asphalt sealant meeting the requirements of Federal Specification SS-S-1401 or SS-S-164, just before any mixture is placed against them.

2. The binder course shall be repaired as necessary to maintain the surface of the pavement until placement of the permanent overlay. If required, the contractor shall place a leveling course before placing the permanent overlay.

3. The top course shall not be installed until the binder course has been in place for a minimum of 6 months and must be installed $\leq$ 12 months of binder course installation.

1.04 PAVEMENT PLACEMENT:

A. Unless otherwise permitted by the owner and/or owner's representative for particular conditions, only machine methods of placing the pavement shall be used. The equipment for spreading and finishing shall be mechanical, self-powered pavers, capable of spreading and finishing the mixture true to line, grade, width, and crown. The mixtures shall be placed and compacted only at such times as to permit proper inspection and checking by the owner and/or owner's representative.

B. After the paving mixtures have been properly spread, initial and intermediate compaction shall be obtained by the use of steel wheel rollers having a weight of ≥ 240 lb/in. width of tread.

C. Final rolling of the top course or surface treatment pavement shall be performed by a steel wheel roller weighing ≥ 285 lb/in. width of tread at a mix temperature and time sufficient to allow for final smoothing of the surface and thorough compaction.

D. Immediately after placement of top course or surface treatment pavement, all joints between the existing and new top course or surface treatment pavements shall be sealed with hot poured rubberized asphalt sealant meeting the requirements of Federal Specification SS-S-1401 or SS-S-164.

E. Where there is no backing for the edges of the curb-to-curb pavement, the contractor shall provide a gravel transition. The gravel transition shall be installed immediately after the pavement is placed, shall be feathered and extend ≥ 18 in., and shall be compacted using the same equipment as for pavement compaction. The gravel shall be uniformly graded material with a size of ≥ 3/8 to ½ in.

F. When directed by the owner and/or owner's representative, the contractor shall furnish and install additional paving to provide satisfactory transition for driveways and walkways impacted by a new curb-to-curb pavement installation. The transition installation will be considered incidental to the curb-to-curb pavement installation.

G. The owner reserves the right to eliminate the top course item from this project.

1.05 ADDITIONAL PAVING:

A. If the owner and/or owner's representative determines that the existing bituminous concrete pavement on local streets is thicker than the permanent pavement specified herein, the contractor may be required to install additional Type I-1 bituminous concrete to obtain the depth of the existing pavement.

B. If for the installation of full width paving, the owner and/or the owner's representative determines that the existing road surface requires additional leveling pavement, then the contractor shall install additional Type I-1 bituminous concrete to bring the section to proper line and cross-section. Additional paving required to restore the proper line and cross-section of binder course installed by the contractor, which has become rough and uneven shall be furnished and installed at the expense of the contractor.

1.06 PARKING LOTS AND DRIVEWAYS:

A. Parking lot and driveway pavement shall consist of a 1-½ in. binder course and a 1-½ in. top course on a compacted 12 in. gravel subbase. All thicknesses are compacted thicknesses.

B. Adjacent concrete work, slate work, sidewalks, structures, etc., shall be protected from stain and damage during the entire operation. Damaged or stained areas shall be replaced or repaired to equal their original condition.

C. All joints between binder and top course shall be staggered ≥ 6-inches.

D. After final rolling, no vehicular traffic of any kind shall be permitted on the pavement until it has cooled and hardened sufficiently to prevent distortion and loss of fines, and in no case in < 6-hrs.

E. Smoothness of all areas of the finished surface shall not vary more than ¼-inch when tested with a 16 foot straightedge, applied both parallel to and at right angles to the centerline of the paved area. At building entrances, curbs, and other locations where an essentially flush transition is required, pavement elevation tolerance shall be < $^{1}/_{8}$ in. Irregularities exceeding these amounts, or which retain water on the surface, shall be corrected by removing the defective work and replacing or repairing it to the satisfaction of the owner and/or the owner's representative.

1.07 PAVEMENT REPAIR:

A. If required in the contract or if permanent pavement becomes rough or uneven, permanent pavement patches and trenches shall be repaired and brought to grade utilizing "infrared" paving methods following completion of the construction.

B. The contractor performing the work shall use care to avoid overheating the pavement being repaired.

C. Pavement repair shall extend to $\geq$ 6 in. beyond all edges of the pavement patch to assure adequate bonding at the pavement joints.

END OF SECTION

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section "Summary", Paragraph 1.1A, entitled "Related Documents."

1.2 SUMMARY

A. Section Includes:

1. Brick pavers set in mortar on a rigid base.
2. Existing brick pavers to be re-set after filling and leveling of sand bed at low areas.

B. Related Sections include the following:

1. Division 02 Section "Selective Demolition" for salvaging bricks at low areas to be re-set.
2. Division 03 Section "Cast-In-Place Concrete" for base slab for mortar bed.
3. Division 32 Section "Asphalt Paving" which directly abuts brick pavers.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. ASTM International (ASTM):

1. C144-11 - Aggregate for Masonry Mortar.
2. C150/C150M-16 - Portland Cement.
3. C207-06(2011) - Hydrated Lime for Masonry Purposes.
4. C270-14a- Mortar for Unit Masonry.
5. C902-15 - Pedestrian and Light Traffic Paving Brick.

1.4 SUBMITTALS

A. Manufacturer's Literature and Data:

1. Description of each product.

B. Drawings:

1. Indicate brick paving layout and patterns.
2. Indicate special brick shapes.

C. Samples:

1. Brick: Full size of each type and color.
   a. Submit $\geq$ 5 individual samples to show full color and texture ranges.
2. Mortar: Samples of brick with mortar joints of each color.

1.5 QUALITY ASSURANCE

A. Mockup: To confirm paving materials and pattern and to establish workmanship quality, prior to constructing the walk the Contractor shall construct a 3'-2" x 5'-0" mockup as indicated on drawing No. L-106. If this work is deemed acceptable to the Architect, it may become part of the work and construction may proceed on the walk.

1.6 DELIVERY

A. Deliver products in manufacturer's original sealed packaging.

B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, color, production run number, and manufacture date.

C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.7 STORAGE AND HANDLING

A. Store masonry materials under waterproof covers on planking clear of ground.

B. Protect products from damage during handling and construction operations.

1.8 FIELD CONDITIONS

A. Environment:

1. Product Temperature: $\geq$ 40° F for $\geq$ 48 hours before installation.

1.9 WARRANTY

A. Construction Warranty: 1 year "Warranty of Construction" including labor and materials.

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

A. Design brick complying with specified performance:

1. Slip Resistance: ASTM C902.

2.2 PRODUCTS - GENERAL

A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.

B. Provide each paving system component from one manufacturer and from one production run.

2.3 BRICK

A. Paving Brick: "Artisan Flashed", ASTM C902; Class SX, Type I, manufactured by Stiles + Hart Brick Co., Bridgewater, MA 02324.

2.4 MORTAR

A. ASTM C270, Type S, cement-lime proportion specification mix. Admixtures and Type N lime are not acceptable.

B. Hydrated Lime: ASTM C207 Type S.

C. Sand: ASTM C144.

D. Portland Cement: ASTM C150/C150M.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine and verify substrate suitability for product installation.

1. Verify substrate depth accommodates brick paving installation thickness.

B. Protect existing construction and completed work from damage.

1. Prevent damage from contact with mortar.

C. Clean substrates. Remove contaminants capable of affecting subsequently installed product's performance.

3.2 INSTALLATION - GENERAL

A. Install products according to manufacturer's printed instructions and approved submittal drawings.

3.3 BRICK INSTALLATION – MORTAR BASE

A. Do not use bricks with chips, cracks, discoloration, or other visible defects.

B. Layout brick paving according to pattern indicated on drawings.

C. Installation with Portland Cement Mortar:

1. Install brick in full bed joint. Remove excess mortar. Strike joints flush with top surface of brick and tool slightly concave.
2. Cure mortar by maintaining damp condition for 7 days.

D. Installation Tolerances:

1. Finished surface true to plane within $^{1}/_{8}$ in.: 10 feet, non-cumulative.
2. Joint width deviation $\leq$ 25 % of dimension indicated.

3.4 BRICK INSTALLATION – SAND BASE

A. Clean with water and soft-bristle brush stockpiled bricks removed from depressed areas in walkway.

B. Fill-in depressed areas with gravel and sand as required to meet adjacent setting bed grade.

C. Re-set bricks to neatly mesh with the adjacent walkway bricks so the patch area will be imperceptible in the completed work.

D. Sweep clean the brick walking surface of any excess sand and remove from area, and bank back and compress the adjacent soil against the brick perimeter.

3.5 CLEANING

A. Remove excess mortar before fully set.

B. Clean exposed brick and mortar surfaces. Remove contaminants and stains.

3.6 PROTECTION

A. Protect brick paving from traffic and construction operations.

B. Cover brick paving with reinforced kraft paper, and plywood or hardboard.

C. Remove protective materials immediately before acceptance.

D. Repair damage.

END OF SECTION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section "Summary", Paragraph 1.01A, entitled "Related Documents."

1.02 SUMMARY

A. This Section includes the following:

1. The contractor shall furnish all labor, materials, and equipment necessary to install all pavement markings as indicated on the drawings and as specified herein. The contractor shall replace all pavement markings removed or covered over in carrying out the work, and as directed by the owner and/or owner's representative, $\geq$ 48 hours after completion of permanent paving. The markings shall be 4 in. wide, white or yellow, single or double lines as required.

B. Related Sections include the following:

1. Division 32 "Asphalt Paving".

1.03 PROJECT CONDITIONS

A, Weather conditions must be conducive to installation of pavement markings as specified by manufacturers' recommendations. Maintain access for vehicular and pedestrian traffic as required. Utilize flagmen, barricades, warning signs and warning lights as required.

PART 2 PRODUCTS

2.01 MATERIALS:

A. The paint shall be a non-bleeding, quick-drying, alkyd petroleum base paint suitable for traffic-bearing surface and shall meet FS TTP-85E and mixed in accordance with manufacturer's instructions prior to application.

B. Pavement markings shall conform to the requirements of MHD 860, consisting of the following:

1. Line delineation of parking spaces.
2. Diagonally-striped Van-accessible access aisle.
3, International Symbol of Accessibility at the accessible parking space.

C. The mixture of the marking material shall be within the composition limits for reflectorized pavement markings as described in the MHD Specifications as follows:

1. Thermoplastic reflectorized pavement markings M7.01.03/04.

2. High heat rapid drying traffic marking material M7.01.08/09.

3. Fast drying traffic paint – M7.01.10/11.

D. Application of the glass beads to be used as reflector material on the striping shall conform to Sections 860.62 and M7.03.07 of the MHD Specifications.

PART 3 EXECUTION

3.01 PREPARATION:

A. Thoroughly sweep and clean surface to receive pavement markings to eliminate loose material and dust.

3.02 APPLICATION

A. Apply 2 coats of paint at manufacturer's recommended rate without the addition of thinner, with $\leq$ 100 ft^2/gal. Apply with mechanical equipment to produce uniform straight edges. At sidewalk curbs and crosswalks, use a straightedge to ensure a uniform, clean, and straight stripe.

END OF SECTION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section "Summary", Paragraph 1.01A, entitled "Related Documents."

1.02 SUMMARY

A. This Section includes the following:

1. This section of the specifications covers all labor, materials, and equipment necessary to do all loaming, seeding, and related work as indicated on the drawings and as herein specified. All lawns disturbed by the Contractor's operations shall be repaired as herein specified.

B. Related Sections include the following:

1.Section 32 92 20 - Surface Restoration

1.03 QUALITY ASSURANCE

A. For a particular source of loam, the owner or owner's representative may require the contractor to send an approximately 10 pound sample of material to an approved testing laboratory and have the following tests conducted:

1. Organic concentration
2. Ph
3. Nitrogen concentration
4. Phosphorous concentration
5. Potash concentration

B. These tests shall be conducted at the contractor's expense. Test results, along with soil conditioning and fertilizing recommendations, shall be forwarded to the owner and/or owner's representative.

1.04 SUBMITTALS:

A. Six sets of information detailing the seed mixes, fertilizers, mulch material, and origin of loam shall be submitted for review.

B. Three sets of test results shall be submitted to owner and/or owner's representative for review.

PART 2 PRODUCTS

2.01 MATERIALS

A. LOAM

1. Loam shall be a natural, fertile, friable soil, typical of productive soils in the vicinity, obtained from naturally well-drained areas, neither excessively acid nor alkaline, and containing no substances harmful to grass growth. Loam shall not be delivered to the site in frozen or muddy condition and shall be reasonably free of stumps, roots, heavy or stiff clay, stones larger than one inch in diameter, lumps, coarse sand, noxious weeds, sticks, brush or other litter.

2. The loam shall contain $\geq$ 4% nor $\leq$ 20% organic matter as determined by the loss of weight by ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 230^{o} F.

B. LIME

1. Lime shall be standard commercial ground limestone containing $\geq$ 50% total oxides (calcium oxide and magnesium oxide), and 50% of the material must pass through a No. 100 mesh sieve with 98% passing a No. 2 mesh sieve.

C. FERTILIZER

1. Fertilizer shall be commercial fertilizer, 10-10-10 fertilizer mixture containing $\geq$ 40% organic nitrogen. It shall be delivered to the site in the original sealed containers, each showing the manufacturer's guaranteed analysis. Fertilizer shall be stored so that when used it will be dry and free flowing. No fertilizer shall be used which has not been marketed in accordance with provisions of the General Laws, Chapter 94, as amended, relating to fertilizers.

D. MULCH

1. Materials to be used in mulching shall conform to the following requirements:

2. Hay Mulch - Hay mulch shall consist of mowed and properly cured grass, clover or other acceptable plants. No salt hay shall be used.

3. Straw Mulch - Straw mulch shall consist of stalks or stems of grain after threshing.

4. Wood Fiber Mulch - Wood fiber mulch shall consist of wood fiber produced from clean, whole, uncooked wood, formed into resilient bundles having a high degree of internal friction and shall be dry when delivered to the project.

E. SEED

1. Seed shall be of an approved mixture, the previous year's crop, clean, high in germinating value, a perennial variety, and low in weed seed. Seed shall be obtained from a reliable seed company and shall be accompanied by certificates relative to mixture purity and germinating value.

2. Grass seed for lawn areas shall conform to the following requirements:

	Proportion by Weight	Germination Minimum	Purity Minimum
Chewing's Fescue	30%	70%	97%
Kentucky 31 Fescue	30%	90%	98%

Kentucky Blue Grass	20%	80%	85%
Domestic Rye Grass	20%	90%	98%

Grass seed for cross-country areas, slopes, and other areas not normally mowed shall conform to the following requirements:

	Proportion by Weight	Germination Minimum	Purity Minimum
Creeping Red Fescue	50%	85%	95%
Kentucky 31 Fescue	30%	85%	95%
Domestic Rye Grass	10%	90%	98%
Red Top	5%	85%	92%
Ladino Clover	5%	85%	96%

F. TEMPORARY COVER CROP

1. Temporary cover crop shall conform to the following requirements:

	% Weight	Germination Minimum
Winter Rye	80%	85%
Red Fescue (creeping)	4%	8%
Perennial Rye Grass	3%	90%
Red Clover	3%	90%
Other Crop Grass	0.5%	
Noxious Weed Seed	0.5%	
Inert Matter	1.0%	

PART 3 EXECUTION

3.01 SURFACE PREPARATION

A. After approval of rough grading, loam shall be placed on areas affected by the Contractor's operations. Loam shall be placed at least four (4) inches compacted thickness.

B. Lime shall be applied to bring the pH to 6.5 or, without a soil test, at the rate of 2.5 tons per acre.

C. Fertilizer shall be applied according to the soil test, or without a soil test, at the rate of 0.5 tons per acre.

D. Loam shall be worked $\geq$ 2 in. deep, thoroughly incorporating the lime and fertilizer into the soil. The loam shall then be raked until the surface is finely pulverized and smooth and compacted with rollers, weighing $\leq$ 100 lb/linear ft. of tread, to an even surface conforming to the prescribed lines and grades. Depth shall be $\geq$ 4 in. after completion.

3.02 SEEDING

A. Seeding shall be done when weather conditions are approved as suitable by the owner and/or owner's representative.

B. If there is a delay in seeding, during which weeds grow or soil is washed out, the contractor shall remove the weeds and/or replace the soil before sowing the seed, without

any additional expense to the owner. Immediately before seeding, the soil shall be slightly scarified.

C. Seed shall be sown at the approved rate, on a calm day by machine.

D. One half the seed sown shall be sown in one direction and the other half at right angles. Seed shall be raked lightly into the soil to a depth of ¼ in. and rolled with a roller weighing ≤ 100 lb/linear ft. of tread.

E. The surface shall be kept moist by a fine spray until the grass shows uniform germination over the entire area. Wherever poor germination occurs in areas >3 ft^2, the Contractor shall reseed, roll, and water as necessary to obtain proper germination.

F. The contractor shall water, weed, cut, and otherwise maintain and protect seeded areas as necessary to produce a dense, healthy growth of perennial lawn grass.

G. If there is insufficient time in the planting season to complete the fertilizing and seeding, permanent seeding may be left until the following planting season, at the option of the contractor or on order by the Owner and/or Owner's representative. In that event, a temporary cover crop shall be sown. This cover crop shall be cut and watered as necessary until the beginning of the following planting season, at which time it shall be plowed or harrowed into the soil, the area shall be fertilized and the permanent seed crop shall be sown as specified.

3.03 SEEDING AND MULCHING BY SPRAY MACHINE

A. The application of lime, fertilizer, grass seed, and mulch may be accomplished in one operation by the use of an approved spraying machine. The materials shall be mixed with water in the machine and kept in an agitated state in order that the materials may be uniformly suspended in the water. The spraying equipment shall be so designed that when the solution is sprayed over an area, the resulting deposits of lime, fertilizer, grass seed, and mulch shall be equal to the specified quantities.

B. A certified statement shall be furnished, prior to start of work, to the owner and/or owner's representative by the contractor as to the number of pounds of limestone, fertilizer, grass seed and mulch per 100 gallons of water.

C. This statement should also specify the number of square yards of seeding that can be covered with the solution specified above. If the results of the spray operation are unsatisfactory, the contractor will be required to abandon this method and to apply the lime, fertilizer, grass seed, and mulch by other methods.

3.04 INSPECTION AND ACCEPTANCE

A. At the beginning of the planting season following that in which the permanent grass crop was sown, the seeded areas will be inspected. Any section not showing dense, vigorous growth at that time shall be promptly reseeded by the contractor at his own expense. The seeded areas shall be watered, weeded, cut, and otherwise maintained by the contractor until the end of the planting season, when they will be accepted if the sections show dense, vigorous growth.

END OF SECTION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section "Summary", Paragraph 1.01A, entitled "Related Documents."

1.02 SUMMARY

A. This Section includes the following:

1. This section of the specifications covers all labor, materials, and equipment necessary to restore cross country areas affected by contractor's operations.

B. Related Sections include the following:

1. Section 32 92 19 - Seeding

1.03 SYSTEM DESCRIPTION

A. All cross country areas shall be restored to their original condition as much as possible. Contractor shall attempt to establish a vegetative cover as soon as possible to prevent erosion into wetland resource areas and abutting properties.

PART 2 PRODUCTS

2.01 MATERIALS

A. Materials utilized in the restoration of cross country areas shall be the same as identified in Section 32 92 19 - Seeding.

PART 3 EXECUTION

3.01 SEPARATION OF SURFACE MATERIALS

A. Enough topsoil to repair damaged areas shall be carefully removed and separately stored to be utilized again.

3.02 SURFACE PREPARATION

A. After approval of rough grading, topsoil which was originally stockpiled shall be replaced on areas affected by the contractor's operations.

B. Any trees which are to be removed shall be removed completely off-site, stump and all, by the Contractor at no additional expense to the owner.

C. All concrete and/or brick unit paver sidewalks/walkways shall be repaired and/or replaced utilizing the identical construction method as they exist. By submitting his bid, the contractor fully agrees that he has made himself aware of the existing conditions of the project site.

3.03 SEEDING

A. Seeding shall be done when weather conditions are approved as suitable by the owner and/or owner's representative.

B. If there is a delay in seeding, during which weeds grow or soil is washed out, the contractor shall remove the weeds and/or replace the soil before sowing the seed, without any additional expense to the owner. Immediately before seeding, the soil shall be slightly scarified.

C. Seed shall be sown at the approved rate, on a calm day by machine.

D. One half the seed sown shall be sown in one direction and the other half at right angles. Seed shall be raked lightly into the soil to a depth of ¼ in. and rolled with a roller weighing not more than 100 lb/linear ft. of tread.

E. The surface shall be kept moist by a fine spray until the grass shows uniform germination over the entire area. Wherever poor germination occurs in areas > 3 ft^2, the Contractor shall reseed, roll, and water as necessary to obtain proper germination.

F. The Contractor shall water, weed, cut, and otherwise maintain and protect seeded areas as necessary to produce a dense, healthy growth of perennial lawn grass.

G. If there is insufficient time in the planting season to complete the fertilizing and seeding, permanent seeding may be left until the following planting season, at the option of the contractor or on order by the owner and/or owner's representative. In that event, a temporary cover crop shall be sown. This cover crop shall be cut and watered as necessary until the beginning of the following planting season, at which time it shall be plowed or harrowed into the soil, the area shall be fertilized and the permanent seed crop shall be sown as specified.

3.04 INSPECTION AND ACCEPTANCE

A. At the beginning of the planting season following that in which the permanent grass crop was sown, the seeded areas will be inspected. Any section not showing dense, vigorous growth at that time shall be promptly reseeded by the Contractor at his own expense. The seeded areas shall be watered, weeded, cut, and otherwise maintained by the Contractor until the end of the planting season, when they will be accepted if the sections show dense, vigorous growth.

END OF SECTION