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COUNTY OF OCEAN
101 HOOPER AVENUE
TOMS RIVER, NEW JERSEY 08754-2191

BOOK A

BID

SPECIFICATIONS

FOR

MARY ETTA COX HOUSE
Interior Renovations at the Mary Etta Cox House NO.IV

**Bid Category: Public Works, Park Equipment, and Construction
Services - 22**

November 2025

INTERIOR RENOVATIONS AT THE MARY ETTA COX HOUSE

Historic Building Architects, LLC
 312 West State Street
 Trenton, NJ 08618

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DRAFT AIA Document A104™ - 2017

Standard Abbreviated Form of Agreement Between Owner and Contractor

AGREEMENT made as of the « » day of « » in the year « 2025 »
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

« The County of Ocean »
« PO Box 2191 »
« 101 Hooper Avenue »
« Toms River, New Jersey, 08754 »
« »

and the Contractor:
(Name, legal status, address and other information)

« Name »
« Address »
« Address »
« Tel: »
« Fax: »

for the following Project:
(Name, location and detailed description)

« Interior Renovations at the Mary Etta Cox House »
« 353 North Main Street »
« Barnegat, NJ 08005 »

The Architect:
(Name, legal status, address and other information)

«Historic Building Architects, LLC.»
« 312 West State Street »
« Trenton, NJ 08618 »
«Tel: (609)393-3999 »
«Fax: (609)393-4333 »

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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ARTICLE 1 THE WORK OF THIS CONTRACT

The Contractor shall execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 2 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 2.1 The date of commencement of the Work shall be:

(Check one of the following boxes.)

[] Upon Partial or Full Approval of the Barnegat Building Permit.

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 2.2 The Contract Time shall be measured from the date of commencement.

§ 2.3 Substantial Completion

§ 2.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

(Check the appropriate box and complete the necessary information.)

Not later than () calendar days from Barnegat Building Permit Partial or Full Approval.

§ 2.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates: *No partial substantial completion applies.*

Portion of Work	Substantial Completion Date
N/A	N/A

§ 2.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 2.3, liquidated damages, if any, shall be assessed as set forth in Section 3.5.

ARTICLE 3 CONTRACT SUM

§ 3.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be one of the following:

(Check the appropriate box.)

Stipulated Sum, in accordance with Section 3.2 below

(Based on the selection above, complete Section 3.2 below.)

§ 3.2 The Stipulated Sum shall be (\$), subject to additions and deductions as provided in the Contract Documents. This includes all allowances listed in 3.2.3.

§ 3.2.1 The Stipulated Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

«See Bid Forms

§ 3.2.2 Unit prices, if any:

(Identify the item and state the unit price and the quantity limitations, if any, to which the unit price will be applicable.)

The following unit prices with Base Bid quantities were included in bid form submission and govern this contract:

«See Bid Forms

§ 3.2.3 Allowances, if any, included in the stipulated sum:

(Identify each allowance.)

«See Bid Forms

§ 3.5 Liquidated damages, if any:

(Insert terms and conditions for liquidated damages, if any.)

« \$500 Per Calendar Day, after date of contract completion. »

ARTICLE 4 PAYMENT

§ 4.1 Progress Payments

§ 4.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided.

§ 4.1.2 The period covered for each Application for Payment shall be as provided in the Project Manual. An Application for Payment must be approved by the Architect prior to the submission to the Owner. Once approved by the Architect, the Application for Payment shall be provided to the Owner by voucher.

§ 4.1.3 Vouchers shall be submitted to the Owner for payment as provided herein. Payment shall be made within seven (7) days of the next regularly scheduled meeting of the Owner provided vouchers are submitted at least fourteen (14) days prior thereto.

§ 4.1.4 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold retainage from the payment otherwise due as follows:

« 10% through Substantial Completion then reduce to 5% through Closeout »

This provision is a permissible exception to the requirements set forth in N.J.S.A. 2A:30A-2. All disputes regarding whether a party has failed to make payments pursuant to N.J.S.A. 2A:30A-1 et seq. may be submitted to a process of alternative dispute resolution.

§ 4.2 Final Payment

§ 4.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 18.2, and to satisfy other requirements, if any, which extend beyond final payment;
- .2 the Contractor has submitted a final accounting for the Cost of the Work, where payment is on the basis of the Cost of the Work with or without a Guaranteed Maximum Price; and
- .3 a final Certificate for Payment has been issued by the Architect in accordance with Section 15.7.1.

§ 4.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

« »

ARTICLE 5 DISPUTE RESOLUTION

§ 5.1 Binding Dispute Resolution

For any claim subject to, but not resolved by, mediation pursuant to Article 21, the method of binding dispute resolution shall be as follows:

(Check the appropriate box.)

The Contract shall be governed by the laws of the State of New Jersey. Any and all lawsuits or other actions, claims, disputes and the like are to be venued in the Superior Court of New Jersey, Law Division, Ocean County and no other Federal, State, or County Court, including the Chancery Division of the Superior Court, Ocean County.

ARTICLE 6 ENUMERATION OF CONTRACT DOCUMENTS

§ 6.1 The Contract Documents are defined in Article 7 and, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 6.1.1 The Agreement is this executed AIA Document A104™–2017, Standard Abbreviated Form of Agreement Between Owner and Contractor.

« »

§ 6.1.3 The Supplementary and other Conditions of the Contract:

§ 6.1.4 The Specifications:

(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

«See Bid Book A: Bid Specifications

§ 6.1.5 The Drawings:

(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

« See Bid Book B: Drawings and Construction Documents.

§ 6.1.6 The Addenda, if any:

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are enumerated in this Article 6.

§ 6.1.7 Additional documents, if any, forming part of the Contract Documents:

.1 Other Exhibits:

(Check all boxes that apply.)

[] Exhibit A, Determination of the Cost of the Work.

.2 Other documents, if any, listed below:

(List here any additional documents that are intended to form part of the Contract Documents.)

Ocean County Bid Instructions and General Requirements consisting of *(number)* pages, advertising date *(month day, year)*.

Ocean County Resolution to be listed post-bid award. *(include Resolution number)*

Contractor *Company Name* Bid Month Day,2025

ARTICLE 7 GENERAL PROVISIONS

§ 7.1 The Contract Documents

The Contract Documents are enumerated in Article 6 and consist of this Agreement (including, if applicable, Supplementary and other Conditions of the Contract), Drawings, Specifications, Addenda issued prior to the execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement. 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. 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 to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 7.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either

written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind between any persons or entities other than the Owner and the Contractor.

§ 7.3 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.

§ 7.4 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect’s consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 7.5 Ownership and use of Drawings, Specifications and Other Instruments of Service

§ 7.5.1 The Architect and the Architect’s consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect’s or Architect’s consultants’ reserved rights.

§ 7.5.2 The Contractor, Subcontractors, Sub-subcontractors and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to the protocols established pursuant to Sections 7.6 and 7.7, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect’s consultants.

§ 7.6 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form.

§ 7.7 Not Used

§ 7.8 Severability

The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties’ intentions and purposes in executing the Contract.

§ 7.9 Notice

§ 7.9.1 Except as otherwise provided in Section 7.9.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with AIA Document E203–2013, insert requirements for delivering Notice in electronic format such as name, title and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

<< >>

§ 7.9.2 Notice of Claims shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 7.10 Relationship of the Parties

Where the Contract is based on the Cost of the Work plus the Contractor's Fee, with or without a Guaranteed Maximum Price, the Contractor accepts the relationship of trust and confidence established by this Agreement and covenants with the Owner to cooperate with the Architect and exercise the Contractor's skill and judgment in furthering the interests of the Owner; to furnish efficient business administration and supervision; to furnish at all times an adequate supply of workers and materials; and to perform the Work in an expeditious and economical manner consistent with the Owner's interests. The Owner agrees to furnish and approve, in a timely manner, information required by the Contractor and to make payments to the Contractor in accordance with the requirements of the Contract Documents.

ARTICLE 8 OWNER

§ 8.1 Information and Services Required of the Owner

§ 8.1.1 Prior to commencement of the Work, at the written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 8.1.1, the Contract Time shall be extended appropriately.

§ 8.1.2 The Owner shall furnish all necessary surveys and a legal description of the site.

§ 8.1.3 The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 8.1.4 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 9.6.1, the Owner shall secure and pay for other necessary approvals, easements, assessments, and charges required for the construction, use, or occupancy of permanent structures or for permanent changes in existing facilities.

§ 8.2 Owner's Right to Stop the Work

If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents, or repeatedly fails to carry out the Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order is 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.

§ 8.3 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents, and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to any other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 15.4.3, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including the Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 21.

ARTICLE 9 CONTRACTOR

§ 9.1 Review of Contract Documents and Field Conditions by Contractor

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

§ 9.1.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 8.1.2, shall take field measurements of any existing conditions related to that portion of the Work and shall observe any conditions at the site affecting it. These

obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies, or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional unless otherwise specifically provided in the Contract Documents.

§ 9.1.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 9.2 Supervision and Construction Procedures

§ 9.2.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters.

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

§ 9.3 Labor and Materials

§ 9.3.1 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.

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

§ 9.3.3 The Contractor may make a substitution only with the consent of the Owner, after evaluation by the Architect and in accordance with a Modification.

§ 9.4 Warranty

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit, for a period of eighteen months following Substantial Completion. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation or normal wear and tear under normal usage. All other warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 15.6.3.

§ 9.5 Taxes

The Contractor shall pay sales, consumer, use, and other similar taxes that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 9.6 Permits, Fees, Notices, and Compliance with Laws

§ 9.6.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 9.6.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work. If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 9.7 Allowances

The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. The Owner shall select materials and equipment under allowances with reasonable promptness. Allowance amounts shall include the costs to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts. Contractor's costs for unloading and handling at the site, labor, installation, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowance.

§ 9.8 Contractor's Construction Schedules

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

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

§ 9.9 Submittals

§ 9.9.1 The Contractor shall review for compliance with the Contract Documents and submit to the Architect Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents in coordination with the Contractor's construction schedule and in such sequence as to allow the Architect reasonable time for review. By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them; (2) determined and verified materials, field measurements, and field construction criteria related thereto, or will do so; and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. The Work shall be in accordance with approved submittals.

§ 9.9.2 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents.

§ 9.9.3 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents or unless the Contractor needs to provide such services in order to carry out the Contractor's own responsibilities. If professional design services or certifications by a design professional are specifically required, the Owner and the Architect will specify the performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional. If no criteria are specified, the design shall comply with applicable codes and ordinances. Each Party shall be entitled to rely upon the information provided by the other Party. The Architect will review and approve or take other appropriate action on submittals for the limited purpose of checking for conformance with information provided and the design concept expressed in the Contract Documents. The Architect's review of Shop Drawings, Product Data, Samples, and similar submittals shall be for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. In performing such review, the Architect will approve, or take other appropriate action upon, the Contractor's Shop Drawings, Product Data, Samples, and similar submittals.

§ 9.10 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 9.11 Cutting and Patching

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

§ 9.12 Cleaning Up

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

§ 9.13 Access to Work

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

§ 9.14 Royalties, Patents and Copyrights

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

§ 9.15 Indemnification

§ 9.15.1 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 expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 9.15.1.

§ 9.15.2 In claims against any person or entity indemnified under this Section 9.15 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 9.15.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

§ 9.15.3 The bidder, if awarded a contract, agrees to protect, defend and save harmless the County against any damage for payment for the use of any patented material process, article or device that may enter into the manufacture, construction or form a part of the work covered by either order or contract, and the manufacture, construction or form a part of the work covered by either order or contract, and he further agrees to indemnify and save harmless the County from suits or actions of every nature and description brought against it, for, or on account of injuries or damages received or sustained by any party or parties by, or from any of the negligent acts of the contractor, his servants or agents.

ARTICLE 10 ARCHITECT

§ 10.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction, until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract.

§ 10.2 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.

§ 10.3 The Architect will visit the site at intervals appropriate to the stage of the construction to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general, if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site

inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the 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 rights and responsibilities under the Contract Documents.

§ 10.4 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

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

§ 10.6 The Architect has authority to reject Work that does not conform to the Contract Documents and to require inspection or testing of the Work.

§ 10.7 The Architect will review and approve or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 10.8 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 will make initial decisions on all claims, disputes, and other matters in question between the Owner and Contractor but will not be liable for results of any interpretations or decisions rendered in good faith.

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

ARTICLE 11 SUBCONTRACTORS

§ 11.1 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.

§ 11.2 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the Subcontractors or suppliers proposed for each of the principal portions of the Work. The Contractor shall not contract with any Subcontractor or supplier to whom the Owner or Architect has made reasonable written objection within ten days after receipt of the Contractor's list of Subcontractors and suppliers. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 11.3 Contracts between the Contractor and Subcontractors shall (1) require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by the Contract Documents, assumes toward the Owner and Architect, and (2) allow the Subcontractor the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Contract Documents, has against the Owner.

§ 11.4 During the course of contract performance:

- (1) the contractor shall not enter into a contract with a subcontractor unless the subcontractor first provides the contractor with a valid proof of business registration.
- (2) the contractor shall maintain an submit to the Contracting Agency a list of subcontractors and their addresses that may be updated from time to time.

- (3) the contractor and any subcontractor providing goods or performing services under the contract, and each of their affiliates, shall collect and remit to the Director of the Division of Taxation in in the Department of the Treasury, the use tax due pursuant to the Sales and Use Tax Act, (N.J.S.A. 54:3213-1 et seq.) on all sales of tangible personal property delivered into the State. Any questions in this regard can be directed to the division of Taxation at (609)292-6400. Form N. -REG can be filed online at <http://www.state.nj.us/treasury/revenue/busregcert.shtml>.

Before final payment is made under the contract, the contractor shall submit to the Contracting Agency a complete and accurate list of all subcontractors used and their addresses.

ARTICLE 12 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 12.1 The term “Separate Contractor(s)” shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner’s own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 12.2 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 activities with theirs as required by the Contract Documents.

§ 12.3 The Owner shall be reimbursed by the Contractor for costs incurred by the Owner which are payable to a Separate Contractor because of delays, improperly timed activities, or defective construction of the Contractor. The Owner shall be responsible to the Contractor for costs incurred by the Contractor because of delays, improperly timed activities, damage to the Work, or defective construction of a Separate Contractor.

ARTICLE 13 CHANGES IN THE WORK

§ 13.1 By appropriate Modification, changes in the Work may be accomplished after execution of the Contract. The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, with the Contract Sum and Contract Time being adjusted accordingly. Such changes in the Work shall be authorized by written Change Order signed by the Owner, Contractor, and Architect, or by written Construction Change Directive signed by the Owner and Architect. Upon issuance of the Change Order or Construction Change Directive, the Contractor shall proceed promptly with such changes in the Work, unless otherwise provided in the Change Order or Construction Change Directive.

§ 13.2 Adjustments in the Contract Sum and Contract Time resulting from a change in the Work shall be determined by mutual agreement of the parties or, in the case of a Construction Change Directive signed only by the Owner and Architect, by the Contractor’s cost of labor, material, equipment, and reasonable overhead and profit, unless the parties agree on another method for determining the cost or credit. Pending final determination of the total cost of a Construction Change Directive, the Contractor may request payment for Work completed pursuant to the Construction Change Directive. The Architect will make an interim determination of the amount of payment due for purposes of certifying the Contractor’s monthly Application for Payment. When the Owner and Contractor agree on adjustments to the Contract Sum and Contract Time arising from a Construction Change Directive, the Architect will prepare a Change Order.

§ 13.3 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. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work.

§ 13.4 If concealed or unknown physical conditions are encountered at the site that differ materially from those indicated in the Contract Documents or from those conditions ordinarily found to exist, the Contract Sum and Contract Time shall be equitably adjusted as mutually agreed between the Owner and Contractor; provided that the Contractor provides notice to the Owner and Architect promptly and before conditions are disturbed.

ARTICLE 14 TIME

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

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

§ 14.3 The term “day” as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 14.4 The date of Substantial Completion is the date certified by the Architect in accordance with Section 15.6.3.

§ 14.5 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) changes ordered in the Work; (2) by labor disputes, fire, unusual delay in deliveries, abnormal adverse weather conditions not reasonably anticipatable, unavoidable casualties, or any causes beyond the Contractor’s control; or (3) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine, subject to the provisions of Article 21.

ARTICLE 15 PAYMENTS AND COMPLETION

§ 15.1 Schedule of Values

§ 15.1.1 Where the Contract is based on a Stipulated Sum or the Cost of the Work with a Guaranteed Maximum Price pursuant to Section 3.2 or 3.4, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Stipulated Sum or Guaranteed Maximum Price to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy required by the Architect. This schedule of values shall be used as a basis for reviewing the Contractor’s Applications for Payment.

§ 15.1.2 The allocation of the Stipulated Sum or Guaranteed Maximum Price under this Section 15.1 shall not constitute a separate stipulated sum or guaranteed maximum price for each individual line item in the schedule of values.

§ 15.2 Control Estimate

§ 15.2.1 Where the Contract Sum is the Cost of the Work, plus the Contractor’s Fee without a Guaranteed Maximum Price pursuant to Section 3.3, the Contractor shall prepare and submit to the Owner a Control Estimate within 14 days of executing this Agreement. The Control Estimate shall include the estimated Cost of the Work plus the Contractor’s Fee.

§ 15.2.2 The Control Estimate shall include:

- .1 the documents enumerated in Article 6, including all Modifications thereto;
- .2 a list of the assumptions made by the Contractor in the preparation of the Control Estimate to supplement the information provided by the Owner and contained in the Contract Documents;
- .3 a statement of the estimated Cost of the Work organized by trade categories or systems and the Contractor’s Fee;
- .4 a project schedule upon which the Control Estimate is based, indicating proposed Subcontractors, activity sequences and durations, milestone dates for receipt and approval of pertinent information, schedule of shop drawings and samples, procurement and delivery of materials or equipment the Owner’s occupancy requirements, and the date of Substantial Completion; and
- .5 a list of any contingency amounts included in the Control Estimate for further development of design and construction.

§ 15.2.3 When the Control Estimate is acceptable to the Owner and Architect, the Owner shall acknowledge it in writing. The Owner’s acceptance of the Control Estimate does not imply that the Control Estimate constitutes a Guaranteed Maximum Price.

§ 15.2.4 The Contractor shall develop and implement a detailed system of cost control that will provide the Owner and Architect with timely information as to the anticipated total Cost of the Work. The cost control system shall compare the Control Estimate with the actual cost for activities in progress and estimates for uncompleted tasks and

proposed changes. This information shall be reported to the Owner, in writing, no later than the Contractor's first Application for Payment and shall be revised and submitted with each Application for Payment.

§ 15.2.5 The Owner shall authorize preparation of revisions to the Contract Documents that incorporate the agreed-upon assumptions contained in the Control Estimate. The Owner shall promptly furnish such revised Contract Documents to the Contractor. The Contractor shall notify the Owner and Architect of any inconsistencies between the Control Estimate and the revised Contract Documents.

§ 15.3 Applications for Payment

§ 15.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 15.1, for completed portions of the Work. The application shall be notarized, if required; be supported by all data substantiating the Contractor's right to payment that the Owner or Architect require; shall reflect retainage if provided for in the Contract Documents; and include any revised cost control information required by Section 15.2.4. Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 15.3.2 Payments will be made upon the approval of vouchers submitted by the successful bidders in accordance with the requirements of the Board of Commissioners and subject to the Board of Commissioners customary procedures. The County will not pay interest or late fees regardless of language provided.

§ 15.3.3 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 stored, and protected from damage, off the site at a location agreed upon in writing.

§ 15.3.4 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or other encumbrances adverse to the Owner's interests.

§ 15.4 Certificates for Payment

§ 15.4.1 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 of the Architect's reasons for withholding certification in whole or in part as provided in Section 15.4.3.

§ 15.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluations of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. 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 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.

§ 15.4.3 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 15.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 15.4.1. If the Contractor and the Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or,

because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 9.2.2, because of

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

§ 15.4.4 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 15.4.3, in whole or in part, that party may submit a Claim in accordance with Article 21.

§ 15.5 Progress Payments

§ 15.5.1 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to sub-subcontractors in a similar manner.

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

§ 15.5.3 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.

§ 15.5.4 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 15.6 Substantial Completion

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

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

§ 15.6.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. When the Architect determines that the Work or designated portion thereof is substantially complete, the Architect will issue a Certificate of Substantial Completion which shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof and shall extend for a period of eighteen (18) months unless otherwise provided in the Certificate of Substantial Completion.

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

§ 15.7 Final Completion and Final Payment

§ 15.7.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions stated in Section 15.7.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

.1 Close-Out Documentation - Commissioning Review

The general contractor shall schedule a meeting at the job site with his consultants, other prime contractors, the facility user, the County Director of Management and Budget, Parks Department, - the Architect and consultants. The purpose of this meeting will be a final review prior to the final certificate of occupancy and close-out of the project (100%). The meeting shall include, but not be limited to, review of all equipment and operation of same, lighting requirements, HVAC equipment, sprinkler systems, period maintenance schedule, manuals, schedules, warranties, etc. This process shall be part of the basic services under the base contract.

§ 15.7.2 Final payment shall not become due until the Contractor has delivered to the Owner a complete release of all liens arising out of this Contract or receipts in full covering all labor, materials and equipment for which a lien could be filed, or 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 costs and reasonable attorneys' fees.

§ 15.7.3 The making of final payment shall constitute a waiver of claims by the Owner except those arising from

- .1** liens, claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2** failure of the Work to comply with the requirements of the Contract Documents;
- .3** terms of special warranties required by the Contract Documents; or
- .4** audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 15.7.4 Acceptance of final payment by the Contractor, a Subcontractor or 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 the final Application for Payment.

ARTICLE 16 PROTECTION OF PERSONS AND PROPERTY

§ 16.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1** employees on the Work and other persons who may be affected thereby;
- .2** the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3** other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation, or replacement in the course of construction.

The Contractor shall comply with, and give notices required by, applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons and property and their protection from damage, injury, or loss. The Contractor shall promptly remedy damage and loss to property caused in whole or in part by the Contractor, a Subcontractor, a sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 16.1.2 and 16.1.3. The Contractor may make a claim for the cost to remedy the damage

or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 9.15.

§ 16.2 Hazardous Materials and Substances

§ 16.2.1 The Contractor is responsible for compliance with the requirements of the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents, and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 16.2.2 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area, if in fact, the material or substance presents the risk of bodily injury or death as described in Section 16.2.1 and has not been rendered harmless, 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), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 16.2.3 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

ARTICLE 17 INSURANCE AND BONDS

§ 17.1 Contractor's Insurance

§ 17.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in this Section 17.1 or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the insurance required by this Agreement from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 18.4, unless a different duration is stated below:

« »

§ 17.1.2 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than «One Million » (\$ «1,000,000.00 ») each occurrence, «Two Million » (\$ « 2,000,000.00 ») general aggregate, and « Two Million » (\$ «2,000,000.00 ») aggregate for products-completed operations hazard, providing coverage for claims including

- .1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- .2 personal and advertising injury;
- .3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
- .4 bodily injury or property damage arising out of completed operations; and
- .5 the Contractor's indemnity obligations under Section 9.15.

§ 17.1.3 Automobile Liability covering vehicles owned by the Contractor and non-owned vehicles used by the Contractor, with policy limits of not less than «One Million » (\$ «1,000,000.00 ») per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance, and use of those motor vehicles along with any other statutorily required automobile coverage.

§ 17.1.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such

primary and excess or umbrella insurance policies result in the same or greater coverage as those required under Section 17.1.2 and 17.1.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ 17.1.5 Workers' Compensation at statutory limits.

§ 17.1.6 Employers' Liability with policy limits not less than « One million » (\$ « 1,000,000.00 ») each accident, « One Million » (\$ « 1,000,000.00 ») each employee, and « One Million » (\$ « 1,000,000.00 ») policy limit.

§ 17.1.7 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than « » (\$ « ») per claim and « » (\$ « ») in the aggregate.

§ 17.1.8 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than «Two Million » (\$ « 2,000,000.00 ») per claim and «Two Million » (\$ «2,000,000.00 ») in the aggregate.

§ 17.1.9 Coverage under Sections 17.1.7 and 17.1.8 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than « » (\$ « ») per claim and « » (\$ « ») in the aggregate.

§ 17.1.10 The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Section 17.1 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the period required by Section 17.1.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy.

§ 17.1.11 The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ 17.1.12 To the fullest extent permitted by law, the Contractor shall cause the commercial liability coverage required by this Section 17.1 to include (1) the Owner, the Architect, and the Architect's Consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's Consultants, CG 20 32 07 04.

§ 17.1.13 Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by this Section 17.1, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 17.1.14 Other Insurance Provided by the Contractor

(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage

Limits

§ 17.2 Owner's Insurance

§ 17.2.1 Owner's Liability Insurance

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

§ 17.2.2 Property Insurance

§ 17.2.2.1 The Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed or materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section 17.2.2.2, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ 17.2.2.2 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section 17.2.2.1 or, if necessary, replace the insurance policy required under Section 17.2.2.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 18.4.

§ 17.2.2.3 If the insurance required by this Section 17.2.2 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ 17.2.2.4 If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 18.4, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ 17.2.2.5 Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Section 17.2.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by this Section 17.2.2. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ 17.2.2.6 Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any insurance required by this Section 17.2.2, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 17.2.2.7 Waiver of Subrogation

§ 17.2.2.7.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by this Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this Section 17.2.2.7 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a

duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 17.2.2.7.2 If during the Project construction period the Owner insures properties, real or personal or both, at 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, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 17.2.2.7.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

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

§ 17.2.3 Other Insurance Provided by the Owner

(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Per Ocean County Requirements.

§ 17.3 Performance Bond and Payment Bond

§ 17.3.1 The Owner shall require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in the Contract Documents.

§ 17.3.2 A Performance Bond in the form of a Certified Check (cash) or Bond, from a surety company authorized to transact business in the State of New Jersey, in the amount of 100% of total bid will be required from the successful bidder, to insure faithful performance of the contract. The Performance Bond and contract must be filed with the County of Ocean within twenty-one (21) days of the award resolution, or the contract will be subject to rescission.

§ 17.3.3 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 authorize a copy to be furnished.

ARTICLE 18 CORRECTION OF WORK

§ 18.1 The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed, or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense, unless compensable under Section A.1.7.3 in Exhibit A, Determination of the Cost of the Work.

§ 18.2 In addition to the Contractor's obligations under Section 9.4, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 15.6.3, 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 notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty.

§ 18.3 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Section 8.3.

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

§ 18.5 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Article 18.

ARTICLE 19 MISCELLANEOUS PROVISIONS

§ 19.1 Assignment of Contract

Neither party to the Contract shall assign the Contract without written consent of the other, except that the Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 19.2 Governing Law

The Contract shall be governed by the laws of the State of New Jersey.

§ 19.3 Tests and Inspections

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

§ 19.4 The Owner's representative:

(Name, address, email address and other information)

« Company Name »
« Contact Person »
« Address »
« Address »
« Tel: »
« Email: »

§ 19.5 The Contractor's representative:

(Name, address, email address and other information)

« Contact Person »
« Title »
« Address »
« Tel: »
« Fax: »
« Email: »

§ 19.6 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 19.7 Pursuant to N.J.S.A. 52:15C-14(d), if the total consideration of the project exceeds \$2,500,000 million dollars, relevant records of private vendors or other persons entering into contracts with the Owner are subject to audit or review by the New Jersey Office of the State Comptroller. Therefore, the Contractor shall maintain all documentation related to products, transactions or services under this contract for a period of five years from the date of final payment. Such records shall be made available to the New Jersey Office of the State Comptroller upon request.

§ 19.8 This project is funded in part by the Preserve New Jersey Historic Preservation Fund Grant (NJHT) and all work must be in accordance with The Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR Part 68, 1995)-Rehabilitation as 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.] The contractor and its subcontractors must demonstrate familiarity with these standards.

§ 19.9 Prevailing Wage & Labor Laws

The New Jersey Prevailing Wage Act (P.L. 1963, Chapter 150) and provisions of the State Labor Laws must be complied with by the successful bidder, if applicable. The current Prevailing Wage Rates can be found online at <https://lwdwebpt.dol.state.nj.us/archivewages/210152831-ocean-7-28-20.pdf>

§ 19.10 The County of Ocean is exempt from any State sales tax or Federal excise tax.

§ 19.11 American Goods and Products

All contractors must comply with the provisions of New Jersey Statute Title 40A:11-18, when applicable.

§ 19.12 Public Works Contractor Registration Act, N.J.S.A. 34:11-56.48 et seq

The bidder must comply with the provisions of "The Public Works Contractor Registration Act", if applicable.

- All named contractors must be registered with the Department of Labor and Workforce Development pursuant to the Public Works Contractor Registration Act at the time the proposal is received, or the proposal will be determined to be non-responsive.
- Any non-listed contractor must be registered with the Department of Labor and Workforce Development prior to physically starting work. It is the responsibility of the General Contractor to insure that all non-listed sub-contractors comply.
- Contractors are encouraged to submit their and all named sub-contractors' Public Works Contractor Registration Certificates with the bid.

ARTICLE 20 TERMINATION OF THE CONTRACT

§ 20.1 Termination by the Contractor

If the Architect fails to certify payment as provided in Section 15.4.1 for a period of 30 days through no fault of the Contractor, or if the Owner fails to make payment as provided in Section 4.1.3 for a period of 30 days, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 20.2 Termination by the Owner for Cause

§ 20.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 20.2.2 When any of the reasons described in Section 20.2.1 exists, the Owner, upon certification by the Architect that sufficient cause exists to justify such action, may, without prejudice to any other remedy the Owner may have and after giving the Contractor seven days' notice, terminate the Contract and take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever reasonable method the Owner may deem expedient. Upon request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 20.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 20.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

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

§ 20.3 Termination by the Owner for Convenience

The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause. The Owner shall pay the Contractor for Work executed; and costs incurred by reason of such termination, including costs attributable to termination of Subcontracts; and a termination fee, if any, as follows:

(Insert the amount of or method for determining the fee payable to the Contractor by the Owner following a termination for the Owner's convenience, if any.)

« »

ARTICLE 21 CLAIMS AND DISPUTES

§ 21.1. Claims, including those alleging an error or omission by the Construction Manager or Architect shall be referred initially to the Owner's Representative for decision. An initial decision by the Owner's Representative shall be required as a condition precedent to litigation of all Claims between the Contractor and Owner arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Owner's Representative with no decision having been rendered by the owner's representative .

§ 21.2. The Owner's Representative will approve or reject Claims by written decision, within 10 days, which shall state the reasons therefore and which shall notify the parties of any change in the Contract Sum or Contract Time or both. The approval or rejection of a Claim by the Owner's Representative shall not be binding on the parties. This non-binding process is intended to satisfy the requirements of N.J.S.A. 40A:11-50.

§21.3 The Statutory Limitation period shall be deemed to have accrued according to the laws of the State of New Jersey, but in no event, prior to the date of final acceptance by the Owner.

21.4 Pending resolution of a Claim, the Contractor, the Construction Manager, and the Architect shall proceed diligently with their obligations under the Contract Documents and the Owner shall continue to discharge his obligations, including payment, under the Contract Documents.

§ 21.10 Continuing Contract Performance

Pending final resolution of a Claim, except as 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.

§ 21.11 Waiver of Claims for Consequential Damages

The Contractor and Owner waive claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 20. Nothing contained in this Section 21.11 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

This Agreement entered into as of the day and year first written above.

OWNER *(Signature)*

« Name »« Title »
(Printed name and title)

CONTRACTOR *(Signature)*

« Name »« Title »
(Printed name and title)



INTERIOR RENOVATIONS AT THE MARY ETTA COX HOUSE NO. III
Ocean County Parks and Recreation
353 North Main Street, Barnegat, NJ 08005
CLARIFICATION

- ITEM 1. A002 –
A. The numbers in circles on the site plan 1/A002 correspond with notes on the right side of the sheet below the architect name.
B. Site Set Up Note #6 is to read as follows:
“All staging & set up areas are to be fully restored at project completion, including all landscaping and paved areas including drive.”
- ITEM 2. A010 –
A. Ceiling in 002 to be removed by contractor.
B. Detail call out 4-6/A010 at D001-1 to be changed to read “3-5/A010”.
- ITEM 3. A011 –
A. Ceilings in 101, 102, & 109 have been removed. All first floor ceilings have been removed, omit all Demolition Finish Schedule for ceilings at first floor.
B. South bookshelves around fireplace in 104 to remain.
C. Delete the Key Note #7 in room 107 at the center of the room.
- ITEM 4. A012 –
A. All ceilings on the second floor have been removed, except ceiling in closet 206A, which is to remain and be repainted.
B. Closets 202A & 203B were previously removed by owner.
- ITEM 5. A101 –
A. Coordinate Key Note #1 with Appendix A in the Specifications.
B. Key reference for Room 106 is incorrectly shown as A207 and should be A205.
- ITEM 6. A102 –
A. Delete Key Notes #4 & #12 in Room 205.
B. The plaster & lath on the room side of Closet 205A has been previously removed. Install (N) GWB wall with veneer plaster finish around closet & chimney, similar to Wall Type A (A/A520).
C. Closets 202A & 203B were previously removed by owner.
- ITEM 7. A111–
A. Ceilings in 101, 102, & 109 to be (N) veneer plaster with insulation above, see detail 6/A521.
B. Lighting tag #7 in room 102 to be updated per E000 noted below.
C. Entire ceiling in 108B to be (N) AquaTough GWB ceiling.
- ITEM 8. A112 –
A. Closets 202A & 203B were previously removed by owner.

- ITEM 9. 3/A203 – All shelving to be retained in Room 104. Install wallpaper behind shelves. Clean and refinish all woodwork on this elevation.
- ITEM 10. HE-A201 –
A. Replace note reading “Install (N) bulkhead door and access” with:
 “See detail 3-5/A100 & A501 for new opening.”
B. Replace note reading “Install (N) historic lattice” with:
 “Historic Lattice, supplied by Owner. Reference hatch above for SOW.”
- ITEM 11. A501 –
A. D001-1 to be (N) board door, per 3-5/A100.
- ITEM 12. E000 Light Fixture Schedule – L7 will not be salvaged. A new fixture will be supplied. Marchetti Lighting, Niagara Luminaire, Model S60.
- ITEM 13. All Drawings –
A. All reference to HE-A501 are references to A501.
- ITEM 14. Contractor to salvage & retain 4 radiators selected by owner. Contractor to refinish radiators to be reinstalled. Installation location will be selected by owner, but the radiators will only be decorative and will not be reconnected.

End of Clarification

SECTION 011000 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project Description.
2. Regulatory requirements.
3. Access to the site and the Contractor's use of the premises.
4. Pre-construction meeting.
5. Coordination requirements.

1.2 PROJECT DESCRIPTION

- A. Project Name: Interior Renovations at the Mary Etta Cox House.
- B. Owner: Ocean County Department of Parks and Recreation, Toms River, NJ. The contact person is Joseph Pirozek, Ocean County Department of Parks and Recreation, Tel 732-506-9090, ext. 5952, Fax 732-270-9464.
- C. Architect: Historic Building Architects, LLC, 312 West State Street, Trenton, NJ 08618. The contact person is Annabelle Radcliffe-Trenner, Principal-in-Charge, Tel 609-393-3999.
- D. Consultant Team:
 1. KSI – Structural Engineers, LLC, 149 Yellowbrook Road, Farmingdale, NJ 07727. The contact person is Pat Cronin, Principal, Tel 732-938-2666.
 2. PEG – MEP Engineers, 100A Forrestal Road, Princeton, NJ. The contact persons are as follows: Mechanical & Plumbing - Michael Berry, Electrical - Rich Olszewski, Tel 609-243-9286.
- E. The project received a 2022 NJHT grant which has been reviewed by NJHT and must be complete in accordance with the *Secretary of Interior's Standards* for Rehabilitation (SIS).

1.3 SCOPE OF WORK

This section provides a General Overview summary of the work but does not represent a complete list refer to drawings and specification for additional information and context.

1. Division 02 Existing Conditions:
 - a. Remove and salvage all siding. Remove all paint from siding down to bare wood. See Division 6. If paint can be removed satisfactorily in place then siding removal is not required.
 - b. Remove and restore historic basement fabric such as wood trim for restoration and reinstallation.
 - c. Remove existing mechanical, electrical and plumbing, except for new work completed in previous phase.
 - d. Selective removal of basement floor slab for new footings.
 - e. Remove sump pump from basement and modify floor opening as necessary for new sump pump.
 - f. Remove existing lighting as shown in the lighting schedule. See drawings.
 - g. Remove and/or salvage doors as noted in door schedule.
 - h. All Existing ceilings removed to expose all floor framing on all levels by owner prior to bidding.
 - i. Remove and salvage wood floor at cut out location for new lift.
 - j. Remove plaster and tile walls at first floor bathroom.

- k. Remove carpeting at stairs and all associated nails and mastic.
 - l. Partially remove partition wall in second floor bathroom.
 - m. Strip interior paint and stain varnish finishes as noted on drawings.
 - n. Strip exterior paint from entire house.
2. Division 03 Cast-in-Place Concrete:
 - a. Install new interior footings.
 - b. Install new concrete floor for lift.
 3. Division 04 Masonry:
 - a. CMU reinforced wall for new lift shaft.
 - b. Clean interior basement masonry walls.
 - c. Rake out and repoint interior basement walls as shown on drawings. See Alternate
 - d. Provide brick wall infill, where noted on drawings.
 - e. Cut out masonry as noted for new ductwork openings.
 4. Division 05 Metals
 - a. Structural steel.
 5. Division 06 Wood and Plastics:
 - a. Rough carpentry typical blocking.
 - b. Repair rotten or deteriorated framing members, including roof framing.
 - c. Install new sill plate at lift shaft walls.
 - d. Install LVL joist reinforcement, where indicated on drawings.
 - e. Install new solid decking and battens on the roof, as indicated on the drawings.
 - f. Repair of existing exterior wood trim at the roof, at existing doors and windows, soffits, and as noted on the drawings.
 - g. Repair, restore, and re-install existing interior decorative wood, including beadboard, door and window trim, and baseboard.
 - h. Replace of interior running trim, frames and jambs.
 - i. Install of new thresholds at openings as indicated on drawings.
 - j. Install new interior wood cabinets and casework.
 - k. Shop finishing interior woodwork.
 - l. Repair Sleep Portch and South Porch including restoration and replacement of all woodwork.
 - m. Repair balustrade on south side of house and install new balustrade at Roof R13
 - n. Install new wood balustrade at West Porch.
 - o. Remove, store, and re-install all shutters as indicated on drawings, including hardware.
 - p. Repair and reinstall clapboard and trim on entire house.
 6. Division 07 Thermal & Moisture Protection:
 - a. Install insulation as noted on drawings.
 - b. Install joint sealants.
 - c. Repair and install new roofing materials, including asphalt shingle and CLAM.
 - d. Install new CLAM roof and balustrade at R13.
 - e. Install new flashing, as specified and shown on drawings.
 7. Division 08 Openings:
 - a. Remove sash (restored in previous phase), protect opening and restore window frame and trim interior and exterior. Reinstall sash and all hardware and weatherstripping and make fully operable. Paint or stain interior of sash which was only primed on Phase 1.
 - b. Repair and refinish all existing historic interior stile and rail wood doors.
 - c. Repair, refinish, and replace historic hardware per door schedule.
 - d. Provide new hardware per door schedule.
 - e. Install new stile and rail wood door as indicated on door schedule.
 - f. Remove, reinstall and make operable existing historic wood shutters restored in previous phase.
 - g. Install new shutter hardware.

8. Division 09 Finishes:
 - a. Repair all damaged historic plaster.
 - b. Patch existing historic wood floors including restoration of parquet floor.
 - c. Repair existing T&G floor and walls on 3rd floor.
 - d. Stucco repairs at foundation walls as indicated on the drawings.
 - e. Install new GWB.
 - f. Install new veneer plaster over new GWB as note don drawings.
 - g. Install new tile floors on existing floors and new tile on walls at new GWB.
 - h. Supply and install carpet runner at stairs.
 - i. Install new carpet in rooms as noted on the schedule.
 - j. Installation of new wallpaper.
 - k. Apply masonry paint at basement as noted on drawings.
 - l. Interior painting.
 - m. Stain and varnish all new and existing historic woodwork including floors, trim, interior faces of doors and sash.
 - n. Paint all East Porch and South/Sleep Porch floors, columns, railings, stairs, and ceilings.
 - o. Paint West Porch ceiling and apply non-slip sanded paint to stair treads.
 - p. Paint house exterior, including clapboard and trim.
9. Division 14 Conveying Equipment
 - a. Wheelchair lift with new door at grade.
10. Division 22 Plumbing:
 - a. Remove existing water, sanitary, vent, and gas piping, fixtures, and equipment as indicated on drawings.
 - b. Replace sump pumps and provide piping.
 - c. Provide water heater.
 - d. Extend cold and hot water, sanitary, vent, and gas piping as indicated on drawings.
 - e. Provide plumbing fixtures as indicated on drawings.
 - f. Connect to existing water, sanitary, and gas services as indicated on drawings.
 - g. Coordinate with previous Phase 1 work
11. Division 23 Heating, Ventilating, and Air-Conditioning:
 - a. Remove existing heating system
 - b. Provide ducted heating and cooling system as indicated on drawings.
 - c. Provide gas fired furnaces and direct expansion cooling as indicated on drawings.
 - d. Provide exhaust systems as indicated on drawings.
 - e. Provide controls as indicated in the drawings and specifications.
 - f. Coordinate with previous Phase 1 work
12. Division 26 Electrical:
 - a. Remove all branch wiring from building as indicated on drawings.
 - b. Provide power distribution and lighting as indicated on drawings.
 - c. Provide controls as indicated on drawings.
 - d. Provide fire alarm/security as indicated on drawings.
 - e. Coordinate with previous Phase 1 work.
13. Division 31 Earthwork
 - a. Provide shoring and bracing as indicated on the drawings.

1.4 Owner Supplied Materials

- A. Owner supplied materials to be installed by contractor include the following: glass railings, trellises, shutters, window sash and all associated hardware.

1.5 HISTORIC SIGNIFICANCE

The Mary Etta Cox House is historically significant as the iconic sea captain's house acting as the town manor house at the center of historic Barnegat Village and is listed on the National Register of Historic Places. The property is also at the terminus of the 15.9 Ocean County Park linear Barnegat Branch Trail. The Cox House has become associated with two powerful, barrier-breaking women: Mary Etta Cox (1867 - 1949) in the early 20th Century and Mary Ann Cox (1901 - 1983) in the second half of the 20th Century. Mary Etta Cox is credited with the design and management of the 1904 major renovations to the property in the style of Colonial Revival/Queen Anne. Although the county has not been able to find evidence of her involvement, Mary Etta Cox was an active community member during the 1915 New Jersey vote on Women's Suffrage. As a reminder, Ocean County was the only NJ County to vote in the affirmative, a fact that is heralded by a New York Times Editorial (see USB section H).

Mary Ann Cox was one of the first female editor/publisher in New Jersey and became a major political and cultural force in Southern Ocean County. She was a patron of local arts, holding a cultural *Salone*, purchasing painted and fiber art works and received dedication to a number of author's works. At the time of title transfer to the Ocean County Board of Chosen Freeholders, the remaining art collection contained over 232 items. The items are on display at Cedar Bridge Tavern and the Lakewood office of the Ocean County Cultural & Heritage Commission.

DEFINITIONS

- A. Contractor: The term "Contractor" shall mean the General Contractor responsible for administering the contract.
- B. Furnish: Purchase a product together with its accessories and fastenings, deliver it, store and protect it before installation, and replace it if defective.
- C. Install: Assemble, mix, erect, apply, fasten, put in working order, repair, clean, protect and otherwise incorporate in the Work as a complete, secure and functioning item. Surface preparation, bracing, cutting, patching, curing, wiring, piping, energizing, testing, adjusting, finishing and other work customarily associated with a product shall be part of installing it.
- D. Provide: To furnish and install.
- E. Shown, drawn, noted, scheduled, specified, or otherwise included in the contract documents.

1.6 REGULATORY REQUIREMENTS

- A. Permits and Licenses:
 - 1. Contractor will obtain all building permits required by regulations and pay all fees using the Allowance provided.
 - 2. Contractor will submit copies of all permits and receipts for fees paid to the Owner directly.

1.7 ACCESS TO THE SITE AND USE OF THE PREMISES

- A. The spaces available to the Contractor for performance of the work and storage areas are indicated in the Contract Documents.
 - 1. The contractor will be given a designated area for site set up and storage on the property.
 - 2. The buildings and trees are to be carefully protected during construction. Site set up will need to be carefully coordinated as described in the Temporary Facilities section of the specifications.
- B. Access to the site is only along those routes designated by the Owner.
- C. Security Procedures:
 - 1. Limit access to the site to persons involved in the work. A list of persons working on the site should be given to the Owner on a weekly basis.
 - 2. Provide secure dry storage for materials for which the Owner has made payment, and which are stored on site.
 - 3. Secure completed work as required to prevent loss.
- D. Signs: All signs must be submitted for review and acceptance prior to posting.
 - 1. Do not install, or allow to be installed, signs other than accepted signs.
 - 2. NJHT sign is to be provided by the contractor.

PART 2 - PRODUCTS

2.1 NJHT PROJECT SIGN SPECIFICATIONS

- A. Project Sign:
 - 1. The New Jersey Historic Trust requires that construction grant recipients prominently display a project identification sign at the project site. This sign must acknowledge Trust involvement, see Garden State Historic Preservation Trust Fund Grants Program rules, N.J.A.C. 15:34-5.1 (a)
 - 2. Project Signs must be constructed and erected at the beginning of the project and maintained until the final grant payment has been received. The Trust requests that the sign be erected as soon as possible after the signing of the grant agreement, whether actual work has commenced or not. Grant recipients are required to submit a photograph of the project sign with the first performance report and/or reimbursement request.
 - 3. Minimum dimensions: Project sign must be at least 6'-0" long by 3'-4" high and made of 3/4" medium density overlay (MDO) plywood. Increase dimensions as necessary to indicate consultants, contractors, and supplemental information as desired. Secure the project sign with two 4" by 4" pressure treated wood posts set 3'-0" deep into the ground. Project sign must be prominently displayed so that the text is readily visible to the public.
 - 4. Color: Sign should be printed with black text on a white background. The NJ Historic Trust logo and any additional logos can be printed in full color or black and white.
 - 5. The project sign, specifications, and Trust logo are available for download at <https://www.nj.gov/dca/njht/resources/grantees/> - Logos and Project Sign.

B. Sample layout:

6'0" or larger

Project Name (from Grant Agreement)

This Historic Site is being

P R E S E R V E D

with a Matching Grant through the

Preserve New Jersey Historic Preservation Fund

3'4"



Department of Community Affairs
State of New Jersey

PART 3 - EXECUTION

3.1 PRE-CONSTRUCTION MEETING

- A. A pre-construction meeting will be held on site at a mutually agreed time, for the purpose of identifying responsibilities of the Owner's and the Architect's personnel and explaining administrative procedures.
- B. The Contractor shall also use this meeting for the following minimum agenda, refer also to Section 013100 Project Management and Coordination for additional requirements.
1. Designation of responsible personnel.
 2. Working hours.
 3. Construction schedule.
 4. Use of areas of the site and parking.
 5. Protection and preservation procedures.
 6. Delivery and storage.
 7. Safety.
 8. Security.
 9. Cleaning up.
 10. Procedures relating to:
 - a. Submittals.
 - b. Applications for payment.
 - c. Record documents.

C. Attendees shall include:

1. The Owner.

2. The Architect and any consultants.
3. The Contractor and superintendent.
4. Subcontractors, major suppliers and fabricators.

3.2 COORDINATION AND SCHEDULING OF WORK

- A. General: Coordinate all administrative, restoration and construction activities including temporary facilities and services required for performance of the work.
- B. Inform each party involved, in writing, of procedures required for coordination; include requirements for giving notice, submitting reports, and attending meetings.
- C. Coordination with Occupants: The building will not be occupied during this project.
- D. Coordinate all submittals required by the contract documents.

END OF SECTION 01100

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing allowances.
 - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order.
 - 2. All allowances include overhead and profit, and the use of the allowance is at cost.
- B. Types of allowances include the following:
 - 1. Lump-sum allowances.
 - 2. Unit price allowances.
 - 3. Quantity allowances.
 - 4. Contingency allowances.
 - 5. Testing and inspecting allowances.
- C. Related Sections include the following:
 - 1. Section 012580 "Contract Modification Procedures" for procedures for submitting and handling Change Orders for allowances.
 - 2. Section 012200 "Unit Prices" for procedures for using unit prices.
 - 3. Section 014000 "Quality Requirements" for procedures governing the use of allowances for testing and inspecting.
 - 4. Divisions 2 through 31; Sections for items of Work covered by allowances.

1.3 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

1.4 SUBMITTALS

- A. Submit proposals for purchase of products or services included in allowances, in the form specified for Change Orders.
- B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 QUANTITY ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and services ordered by Owner under allowance and shall include taxes, freight, and delivery to Project site.
- B. Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. The contractor is not permitted to mark-up costs for any services, such as archeology, included as an allowance.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

1. Allowance 1: A \$15,000 Allowance for construction permits.
2. Allowance 2: A \$5,000 Allowance for testing and inspections.
3. Allowance 3: A \$2,000 Allowance for Contractor's structural engineering design services for shoring and bracing.
4. Allowance 4: A \$25,000 Allowance for miscellaneous unforeseen conditions.
5. Allowance 5: A \$25,000 Allowance for window treatments

END OF SECTION 012100

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for unit prices.
- B. Related Sections include the following:
 - 1. Section 012100 "Allowances" for procedures for using unit prices to adjust quantity allowances.
 - 2. Section 012580 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
 - 3. Section 014000 "Quality Requirements" for general testing and inspecting requirements.

1.3 DEFINITIONS

- A. Unit price is an amount proposed by bidders, stated on the Bid Form, 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.

1.4 PROCEDURES

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

A. See Bid Form Schedule of Unit Prices

END OF SECTION 012200

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for 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 in the Bid Form. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate. Drawings referenced provide details and specific information on alternates.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

1. Deduct the cost of all masonry rake out and repoint in Room 001. See 2/ A100 Room 001.
2. Deduct all carpets in Rooms 102, 202,203,205 and 206 except the main stair runner in Stairs and Entry Hall, Rooms 101 and 201. See 6/A200 for stair carpet runner with all associated hardware to remain in base scope. See Specification Carpet Schedule 3.3 Section 096816
3. Deduct all new wallpaper and instead install 1 primer and 2 finish coats of paint over repaired plaster walls. See Specification Wall Coverings Schedule 3.5. Section 097200. Base scope requires removal of all existing wallpaper and repair of plaster walls.

END OF SECTION 012300

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Section:
 - 1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
 - 2. Section 013300 "Submittal Procedures" specifies procedures for submitted submittals.
- C. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- D. Architect has the right to reject any or all substitutions proposed after bidding.

1.2 SUBMITTALS

- A. Substitution Requests: Submit electronically each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use attached form at the end of this Section.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication, or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

- i. Research reports evidencing compliance with building code in effect for Project.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.3 QUALITY ASSURANCE

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

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 30 days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Requested substitution will not adversely affect Contractor's construction schedule.
 - c. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - d. Requested substitution is compatible with other portions of the Work.
 - e. Requested substitution has been coordinated with other portions of the Work.
 - f. Requested substitution provides specified warranty.

- g. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Not allowed.
- C. Substitutions for Basis of Design Products Specified: Architect will consider requests for substitution if received within 60 days after contract award date.
- 1. Conditions: Architect will consider Contractor's request for substitution to “Basis of Design” when the following conditions are satisfied:
 - a. Request for substitution conforms to the *Secretary of Interior’s Standards* and does not compromise existing historic fabric in the opinion of the Architect who has sole discretionary review.
 - b. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - c. Requested substitution does not require extensive revisions to the Contract Documents.
 - d. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - e. Requested substitution will not adversely affect Contractor's construction schedule.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - g. Requested substitution is compatible with other portions of the Work.
 - h. Requested substitution has been coordinated with other portions of the Work.
 - i. Requested substitution provides specified warranty.
 - j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SEE ATTACHED SUBSTITUTION REQUEST FORM. CONTRACTOR REQUIRED TO COMPLETE AND SUBMIT THIS FORM FOR ALL PROPOSED SUBSTITUTIONS.

SUBSTITUTION REQUEST FORM

INTERIOR RENOVATIONS AT THE MARY ETTA COX HOUSE

Request No.: _____ Dated: _____

Specification(s): Section(s): _____ Paragraph(s): _____

Drawing(s): Drawing(s) No(s): _____ Detail(s) No(s): _____

Contractually Specified Product: _____

Contractor Proposed Product: _____

Proposed Product is: Equal: _____ Substitute: _____ Substitute to Basis of Design: _____

*See attached data for **both** specified and proposed products, as required in General Conditions.*

Data attached: Drawings: __ Product Data: _____ Reports: __ Samples: __ MSDS: _____

Tests: _____ Warranty: __ years Other: _____

Reason(s) for not providing the Specified Product:

Similar Installation:

Project: _____ **Architect:** _____

Address: _____ **Owner:** _____ **Date Installed:** _____

Will proposed substitution impact other parts of the Work? No ___ Yes ___ If Yes, attach explanation.

Will proposed substitution increase Contract Time? No ___ Yes ___ by number of days _____

The proposed substitution must be in compliance with the *Secretary of Interior's Standards*. Explain:

Actual Dollar Savings if substitution is accepted: \$ _____

The Undersigned Certifies that the proposed Request for an Equal or Substitute Product conforms to all of the requirements of Division 01 General Requirements, Section 01250 Substitution Procedures.

Request Submitted by General Contractor: _____
(Firm's Typed Name)

By: _____
(Typed Name) *(Title)*

(Signature) *(Date)*

Consultant's Review - This Substitution Request is: Request Received on (Date): _____

___ **Approved:** (Submittals in accordance with Div 01 General Requirements, Section 01330 Submittal Procedures)

___ **Approved as Noted:** (Submittals in accordance with Div 01 General Requirements, Section 01330 Submittal Procedures)

___ **Rejected:** Use Specified Materials

___ **Rejected:** Request Not Received Within Specified Time Period - Use Specified Materials

Reviewed Issued by: _____
(Type Name) *(Signature)* *(Date)*

Send Copies to: Client: _____ Architect: _____ Consultant: _____ Contractor: _____

If Accepted: As Noted by Consultant: _____
(Signature) *(Date)*

SECTION 012580 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract Modifications.
- B. Related sections include the following:

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."

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 not instructions either to stop work in progress or to execute the proposed change. They are for information only.
 - 2. Within the time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change. For materials, include the cost given by supplier on supplier's letterhead paper.
 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. Comply with requirements in Division 01 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
 7. Proposal Request Form: Use AIA Document G709 for Proposal Requests. Use original documents. Facsimiles or copies will not be accepted.

1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Unit Price Adjustment: Refer to Division 01 Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit price work.

1.6 CHANGE ORDER PROCEDURES

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

1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Work Change Directive: Architect may issue a Construction Work Change Directive on AIA Document G714 Construction Work. Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
1. Construction Work 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 Work 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 012580

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related sections include the following:
 - 1. Section 012200 "Unit Prices" for administrative requirements governing use of unit prices.
 - 2. Section 012580 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 3. Section 013200 "Construction Progress Documentation" for administrative requirements, governing, preparation and submittal of contractor's construction schedule and submittal.

1.3 DEFINITIONS

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

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 - d. Contractor's Construction Schedule.
 - e. Unit quantities in base scope must be identified as individual line items with quantity noted.

2. Submit the schedule of values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Arrange schedule of values consistent with format of AIA Document G703 continuation sheets. Only original documents will be accepted. Facsimiles or copies will not be accepted.
 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of \$50,000 where appropriate. Include separate line items under required principal subcontracts for operation and maintenance manuals, punchlist activities, Project Record Documents, and demonstration and training in the amount of five percent of the Contract Sum.
 - a. Include separate line items under principal subcontracts for project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
 - b. Include separate line items for Grant awards.
 - c. Follow CSI format for the Schedule of Values.
 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.
 6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 7. Maximum amount of any single line item is **\$50,000** where appropriate. Where possible, the schedule should be broken down by Elevation for each trade and subcontractor. Materials should be listed separately to labor, wherever possible.
 8. Mobilization value and demobilization value must be equal to one another. Mobilization

consists of preparatory work and operations necessary for the movement of personnel, equipment, supplies, and incidentals to the project site; for the establishment of offices, buildings, and other facilities necessary for the work; for premiums on bond and insurance for the work; and for other operations performed or costs incurred before the beginning of work. Demobilization includes restoration of site, closeout documents as set out in the Specification Sections 107700, 017810, 017820, and 018200.

9. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place should be shown as separate line items in the Schedule of Values.
10. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment application is to coincide with each monthly project meeting. The period of construction work covered by each Application for Payment is the period prior to each monthly project meeting.
- C. Payment Application Times: Progress payments shall be submitted in draft form to Architect at project meeting. The Architect, Contractor and Owner's Representative will review the draft submittal and agree to a final version. Contractor will then submit to the Architect 4 original copies, with all supporting materials. When Architect approves the submittal, it will be sent to the Owner for payment. The period covered by each Application of Payment shall coincide with project meeting. Applications for Payment will not be accepted if work is not completed within the project meeting cycle. Refer to Contract and Agreements for additional progress payment requirements.
- D. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment. Only original AIA Documents will be accepted. Facsimiles or copies will not be accepted for Application of Payment.
- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 3. General Requirements to include site supervision and management and monthly costs for general site operations and all submittals. These costs can be set as monthly costs for the duration of the contract but must correlate with the percentage of construction work

complete in all other specification divisions, except Division 1, at the time of submission of Application for Payment.

- F. Application for Payment Checklist: the following additional items are required to be submitted with the Application for Payment for the period of the Application for Payment.
1. Certified Payroll
 2. Daily reports
 3. Progress photographs per specification section
 4. Release of liens for all subcontractors from the previous Application for Payment
 5. General Contractor release of liens
 6. Updated construction schedule
- G. Transmittal: Submit four signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments, required for all subcontractors.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- H. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from sub-subcontractors and suppliers in accordance with contract.
1. When an application shows completion of an item, submit conditional final or full waivers.
 2. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 3. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the work covered by the application who is lawfully entitled to a lien.
 4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values previously reviewed and accepted by Architect.
 3. Contractor's construction schedule (preliminary if not final).
 4. Products list.
 5. Schedule of unit prices.
 6. Submittal schedule (preliminary if not final).
 7. List of Contractor's staff assignments and contacts.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Report of preconstruction conference.
 13. Delete item from subparagraph below submitted before executing the Contract.
 14. Certificates of insurance and insurance policies.
 15. Performance and payment bonds.
- J. Interim Applications for Payment must include the following supplemental documents:
1. Pencil Copy for review

2. Progress Photographs with Key Plan
 3. Affidavit of Release of Liens
 4. Subcontractor Affidavit of Release of Liens from Previous Application for Payment
 5. Updated Construction Schedule
 6. Daily Construction Reports
 7. Material Location Reports and Purchase Reports
 8. Certified Payroll which must match the Daily Reports
- K. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Compliance with all contract requirements.
 2. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
- L. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Compliance with all contract requirements.
 2. Evidence of completion of Project closeout requirements.
 3. Insurance certificates for products and completed operations where required and proof that fees and similar obligations were paid, including proof of Owner's Tax Exempt Status.
 4. Updated final statement, accounting for final changes to the Contract Sum.
 5. Affidavit of Release of Liens AIA Document G706-1994, "Contractor's Affidavit of Payment of Debts and Claims."
 6. Affidavit of Release of Liens AIA Document G706A-1994, "Contractor's Affidavit of Release of Liens."
 7. AIA Document G707-1994, "Consent of Surety to Final Payment."
 8. Evidence that claims have been settled.
 9. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work, if applicable.
 10. Final liquidated damages settlement statement.
 11. Completion of all closeout procedures.

PART 2 - PRODUCTS (Not Used)

- 2.1 All final applications for payment must be submitted with a checklist to include the following information.

Application for Payment Check List

Each Application for Payment should include the following:

	Application for Payment- Three hardcopies of Applications to cover work performed for one month period.
	Photographic Documentation: Minimum 60 periodic construction photos- Posted on file sharing website each month in month folder.
	Updated Construction Schedule: Three hardcopies of updated Schedule to be submitted

	plus an electronic version uploaded to file sharing website.
	Daily Construction Reports: One electronic copy uploaded to file sharing website for period of application for payment.
	Material Location Reports: Photos of materials (on site only) with proof of payment. No offsite material will be paid for.
	<p>Waivers of Mechanic's Lien: Three hardcopies plus one electronic copy uploaded to file sharing website. With each Application for Payment, submit waivers of mechanic's lien from the general contractor, all subcontractors and suppliers for period covered by previous month's application. With each Application for Payment, submit Waivers of Mechanic's Lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.</p> <ol style="list-style-type: none"> 1. Submit partial waivers on each item for amount requested in previous month's application, after deduction for retainage, on each item. 2. When an application shows completion of an item, submit conditional final or full waivers. 3. Owner reserves the right to designate which entities involved in the Work must submit waivers. 4. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the work covered by the application who is lawfully entitled to a lien. 5. Waiver Forms: Submit waivers of lien on original AIA Document A706A, executed in a manner acceptable to Owner. Facsimiles or copies will not be accepted.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Administrative and supervisory personnel.
 - 3. Coordination drawings.
 - 4. Requests for Information (RFIs).
 - 5. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Sections:
 - 1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 2. Section 017000 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. RFI: Request from Contractor seeking information during construction.

1.4 COORDINATION

- A. Coordination: General contractor shall coordinate its construction operations with those of all subcontractors and entities to ensure efficient and orderly installation of each part of the Work. General contractor shall coordinate its operations and operations of each subcontractor with operations, included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with subcontractors to ensure maximum performance and accessibility for required maintenance, service, and repair.

3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate subcontractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of subcontractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.5 COORDINATION DRAWINGS

- A. Coordination Drawings: Prepare coordination drawings in accordance with requirements in individual Sections, where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
 - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - d. Indicate space requirements for routine maintenance and for anticipated

replacement of components during the life of the installation.

- e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
- f. Indicate required installation sequences.
- g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, mechanical, plumbing, fire alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to exposed beams. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate sub-framing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Basement: Provide coordination drawings for mechanical equipment located in the basement showing plans and elevations of mechanical, plumbing, fire alarm, security, and electrical equipment.
4. Structural and Architectural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.
7. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inch diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
8. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are the Contractor's responsibility. If the Architect determines that the coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, the Architect will inform the Contractor, who shall make changes as directed and resubmit.
9. Coordination Drawing Prints: Prepare coordination drawing prints in accordance with requirements of Division 01 Section "Submittal Procedures."

1.6 KEY PERSONNEL

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

1.7 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
 2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Architect.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, including photographs, as appropriate.
 11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Original AIA Document G716. Facsimiles or copies will not be accepted.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow 10 working days for Architect's response for each RFI. Allow 15 days when Architect's consultant is required for review. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:

- a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for coordination information already indicated in the Contract Documents.
 - d. Requests for adjustments in the Contract Time or the Contract Sum.
 - e. Requests for interpretation of Architect's actions on submittals.
 - f. Incomplete RFIs or inaccurately prepared RFIs.
2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 6 days of receipt of the RFI response.
- E. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
- F. RFI Log: Architect will prepare RFI log. Log will be updated and returned with response to each RFI.

1.8 PROJECT MEETINGS

- A. General: The Architect will schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
1. Attendees: The Architect will inform participants and others involved, and individuals whose presence is required, of date and time of each meeting.
 2. Agenda: The Architect will prepare the meeting agenda and distribute the agenda to all invited attendees.
 3. Minutes: The Architect will record significant discussions and agreements achieved and will distribute the meeting minutes to everyone concerned.
- B. Preconstruction Conference: The Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. The meeting will be held at the Project site.
 2. The meeting will review responsibilities and personnel assignments.
 3. Conduct the conference to review responsibilities and personnel assignments.
 4. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 5. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.

- c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Lines of communications.
 - f. Procedures for processing field decisions and Change Orders.
 - g. Procedures for RFIs.
 - h. Procedures for testing and inspecting.
 - i. Procedures for processing Applications for Payment.
 - j. Distribution of the Contract Documents.
 - k. Submittal procedures.
 - l. Preparation of record documents.
 - m. Use of the premises and existing building.
 - n. Work restrictions.
 - o. Working hours.
 - p. Owner's occupancy requirements.
 - q. Responsibility for temporary facilities and controls.
 - r. Procedures for moisture and mold control.
 - s. Procedures for disruptions and shutdowns.
 - t. Construction waste management and recycling.
 - u. Parking availability.
 - v. Office, work, and storage areas.
 - w. Equipment deliveries and priorities.
 - x. First aid.
 - y. Security.
 - z. Progress cleaning.
6. Minutes: Architect will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Review of mockups.
 - i. Possible conflicts.
 - j. Compatibility problems.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written recommendations.
 - n. Warranty requirements.
 - o. Compatibility of materials.
 - p. Acceptability of substrates.

- q. Temporary facilities and controls.
 - r. Space and access limitations.
 - s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.
 - u. Installation procedures.
 - v. Coordination with other work.
 - w. Required performance results.
 - x. Protection of adjacent work.
 - y. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Project Closeout Conference: The Architect will schedule and conduct a Project closeout conference, at a time convenient to Owner and Architect, but no later than 60 days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of record documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Submittal of written warranties.
 - d. Requirements for preparing sustainable design documentation.
 - e. Requirements for preparing operations and maintenance data.
 - f. Requirements for demonstration and training.
 - g. Preparation of Contractor's punch list.
 - h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - i. Submittal procedures.
 - j. Coordination of separate contracts.
 - k. Owner's partial occupancy requirements.
 - l. Installation of Owner's furniture, fixtures, and equipment.
 - m. Responsibility for removing temporary facilities and controls.
 4. Minutes: The Architect will record and distribute meeting minutes.
- E. Progress Meetings: The Architect will schedule and conduct progress meetings at monthly or at necessary intervals.
1. The dates of meetings will be coordinated with preparation of payment requests.

2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review current and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Progress cleaning.
 - 10) Quality and work standards.
 - 11) Status of correction of deficient items.
 - 12) Field observations.
 - 13) Status of RFIs.
 - 14) Status of proposal requests.
 - 15) Pending changes.
 - 16) Status of Change Orders.
 - 17) Pending claims and disputes.
 - 18) Documentation of information for payment requests.
 4. Minutes: The Architect will record and distribute the meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- F. Coordination Meetings: Conduct Project coordination meetings as needed. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and pre-installation conferences.
1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these

- meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review current and future needs of each contractor present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Change Orders.
 3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Start-up construction schedule.
2. Contractor's construction schedule.
3. Submittals schedule.
4. Daily construction reports.
5. Material location reports.
6. Field condition reports.
7. Special reports.

- B. Related Sections:

1. Section 012900 "Payment Procedures" for submitting Schedule of Values.
2. Section 013300 "Submittal Procedures" for submitting schedules and reports.
3. Section 013220 "Photographic Documentation" for submitting Construction Photographs.
4. Section 014000 "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

- B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by Architect.

- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of the Project.

- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit two 8 ½” x 11” paper copies and Excel file of submittal schedule. Arrange the following information in tabular form:
 - a. Schedule date for first submittal.
 - b. Specification Section names and titles.
 - c. Submittal category (action or information).
 - d. Name of subcontractor.
 - e. Description of work covered.
 - f. Schedule date for Architect’s final release or acceptance.
- B. Start-up construction schedule.
 - 1. Approval of cost-loaded start-up construction schedule will not constitute approval of schedule of values for cost-loaded activities.
- C. Start-up Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.
- D. Contractor's Construction Schedule: Initial schedule to display entire schedule for entire construction period. (Maximum size 11” x 17” must be landscape.)
 - 1. Submit PDF version and distribute color copies at project meetings with Application for Payment.
- E. Daily Construction Reports: Submit electronic copy at monthly intervals to be uploaded by contractors prior to submission of AFP.
- F. Material Location Reports: Submit electronic copy at monthly intervals. Prior to monthly Application for Payment.
- G. Field Condition Reports: Submit one copy at time of discovery of differing conditions. This must be submitted as an RFI.
- H. Special Reports: Submit two copies at time of unusual event.

1.5 QUALITY ASSURANCE

- A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request.
- B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
 - 1. Review software limitations and content and format for reports.
 - 2. Verify availability of qualified personnel needed to develop and update schedule.
 - 3. Discuss constraints, including phasing and partial Owner occupancy.
 - 4. Review delivery dates for Owner-furnished products.
 - 5. Review schedule for work of Owner's separate contracts.
 - 6. Review time required for review of submittals and resubmittals.
 - 7. Review requirements for tests and inspections by independent testing and inspecting agencies.
 - 8. Review time required for completion and startup procedures.
 - 9. Review and finalize list of construction activities to be included in schedule.
 - 10. Review submittal requirements and procedures.
 - 11. Review procedures for updating schedule.

1.6 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Procedures: Comply with procedures in AGC's "Construction Planning and Scheduling."
- B. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion. Start date is date of Notice to Proceed and Contractor must allow within schedule 30 days for permit review. Completion date is the date of substantial completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

- C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
 2. Procurement Activities: Include procurement process activities for any long lead items and/or major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
 4. Startup and Testing Time: Include not less than 15 days for startup and testing.
 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 6. Punch List and Final Completion: Include not more than 30 days for punch list and final completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
 2. Work under More Than One Contract: Include a separate activity for each contract.
 3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 4. Products Ordered in Advance: Include a separate activity for each product.
 5. Owner-Furnished Products: Include a separate activity for each product.
 6. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
 7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Sample testing.
 - g. Deliveries.
 - h. Installation.
 - i. Tests and inspections.
 - j. Adjusting.
 - k. Curing.

1. Startup and placement into final use and operation.
8. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
- a. Structural completion.
 - b. Permanent space enclosure.
 - c. Completion of mechanical installation.
 - d. Completion of electrical installation.
 - e. Substantial Completion.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- F. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.
1. Refer to Division 01 Section "Payment Procedures" for cost reporting and payment procedures.
- G. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
1. Unresolved issues.
 2. Unanswered RFIs.
 3. Rejected or unreturned submittals.
 4. Notations on returned submittals.
- H. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.
- I. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
1. Utilize CPM software to produce schedules; software to be mutually agreed upon at the initial meeting.
- 2.2 START-UP CONSTRUCTION SCHEDULE
- A. Bar-Chart Schedule: Submit start-up horizontal bar-chart-type construction schedule at start-up meeting.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Start-up Network Diagram: Submit diagram at the Preconstruction Meeting. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's construction schedule using a time-scaled CPM network analysis diagram for the Work.
 - 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after the Preconstruction Meeting.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
 - 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
 - 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 - 4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to correlate with Contract Time.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the start-up network diagram, prepare a skeleton network to identify probable critical paths.
 - 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Work by Owner that may affect or be affected by Contractor's activities.
 - i. Testing.
 - j. Punch list and final completion.
 - k. Activities occurring following final completion.
 - 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 - 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
 - 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

- a. Sub-networks on separate sheets are permissible for activities clearly off the critical path.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.
- F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
- 1. Contractor or subcontractor and the Work or activity.
 - 2. Description of activity.
 - 3. Principal events of activity.
 - 4. Immediate preceding and succeeding activities.
 - 5. Early and late start dates.
 - 6. Early and late finish dates.
 - 7. Activity duration in workdays.
 - 8. Total float or slack time.
 - 9. Average size of workforce.
 - 10. Dollar value of activity (coordinated with the schedule of values).
- G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
- 1. Identification of activities that have changed.
 - 2. Changes in early and late start dates.
 - 3. Changes in early and late finish dates.
 - 4. Changes in activity durations in workdays.
 - 5. Changes in the critical path.
 - 6. Changes in total float or slack time.
 - 7. Changes in the Contract Time.
- H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
- 1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
 - 2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
 - 3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
 - 4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
 - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
 - b. Submit value summary printouts one week before each regularly scheduled progress meeting.

2.4 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
 2. List of separate contractors at Project site.
 3. Approximate count of personnel at Project site.
 4. Equipment at Project site.
 5. Material deliveries.
 6. High and low temperatures and general weather conditions, including presence of rain or snow.
 7. Accidents.
 8. Meetings and significant decisions.
 9. Unusual events (refer to special reports).
 10. Stoppages, delays, shortages, and losses.
 11. Meter readings and similar recordings.
 12. Emergency procedures.
 13. Orders and requests of authorities having jurisdiction.
 14. Change Orders received and implemented.
 15. Construction Change Directives received and implemented.
 16. Services connected and disconnected.
 17. Equipment or system tests and startups.
 18. Partial completions and occupancies.
 19. Substantial Completions authorized.
- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.
- C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.5 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.
 - 1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
 - 2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- B. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate final completion percentage for each activity.
- C. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013220 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
 - 1. Preconstruction photographs.
 - 2. Periodic construction photographs.
 - 3. Final Completion construction photographs.

- B. Related Sections include the following:
 - 1. Section 012100 "Allowances" for requirements for photographic documentation provided under an allowance.
 - 2. Section 012200 "Unit Prices" for procedures for unit prices for extra photographs.
 - 3. Section 013300 "Submittal Procedures" for submitting photographic documentation.
 - 4. Section 017700 "Closeout Procedures" for submitting media as Project Record Documents at Project closeout.

1.3 SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same label information as corresponding set of photographs.

- B. Construction Progress Photographs: Upload photographs in JPG format and Key Plan with color printout at Project Meeting.
 - 1. Format: Use JPG format with a set of contact sheets with 16 images with file name on each contact sheet and Key Plan. File name to be formatted as follows; MECH PH2 YEAR MONTHDAY AFP#X (i.e. MECH PH2 2022 0701 AFP#1)
 - 2. Upload monthly photographs properly labeled with contact sheet and key plan. Folders on construction website provided for upload.

1.4 USAGE RIGHTS

- A. Owner and Architect for unlimited reproduction of photographic documentation. Contractor is prohibited from using any photographic documentation of the building and property without the Owner's prior written consent and approval.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

- A. Digital Images: Provide images in uncompressed JPG format, produced by a digital camera with minimum sensor size of 8.0 megapixels, and at an image resolution of not less than 3264 x 2448 pixels.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
 - 1. Date and Time: Include date and time in filename for each image.
 - 2. Field Office Images: Maintain one set of images in a digital format, i.e. USB Drive, in the field office at Project site, available at all times for reference. Identify images same as for those submitted to Architect.
- C. Preconstruction Photographs: Before starting construction take digital photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
 - 1. Flag construction limits before taking construction photographs.
 - 2. Take a minimum of 100 photographs to show existing conditions adjacent to property before starting the Work.
 - 3. Take a minimum of 100 photographs of the existing buildings property to accurately record physical conditions at start of construction.
 - 4. Take additional photographs as required to record settlement or cracking of structures, pavements, and improvements.
- D. Periodic Construction Photographs: Take minimum 60 digital photographs monthly coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken. Provide 2 sets of photographs. See Section 1.3 B1 for format.
- E. Architect-Directed Construction Photographs: From time to time, Architect will instruct photographer about number and frequency of color, digital photographs and general directions on vantage points. Select actual vantage points and take photographs to show the status of construction and progress since last photographs were taken.
- F. Final Completion Construction Photographs: Provide final photographs. Locations of photographs to be keyed to a Key Plan and submitted with each photographic digital drive. Allow for a minimum of 100 photos on digital drive.

1. Do not include date stamp.
 2. Photographs are to show all work completed and the site fully restored with all construction-related equipment removed.
- G. Additional Photographs: Architect may issue requests for additional photographs, in addition to periodic photographs specified.
1. Three days' notice will be given, where feasible.
 2. In emergency situations, take additional photographs within 24 hours of request.
 3. Circumstances that could require additional photographs include, but are not limited to, the following:
 - a. Immediate follow-up when on-site events result in construction damage or losses.
 - b. Photographs requested by Architect to help clarify field conditions, such as for an RFI.
 - c. Photographs to be taken at fabrication locations away from Project site.
 - d. Substantial Completion of a major phase or component of the Work.
 - e. Extra record photographs at time of final acceptance.
 - f. Owner's request for special publicity photographs.

END OF SECTION 013220

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections:
 - 1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
 - 2. Section 013100 "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting coordination drawings.
 - 3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
 - 4. Section 013220 "Photographic Documentation" for submitting construction photographs.
 - 5. Section 014000 "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
 - 6. Section 017700 "Closeout Procedures" for submitting warranties.
 - 7. Section 017810 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 DEFINITIONS

- A. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as informational submittals.
- B. 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 modifications to submittals noted by the Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with start-up construction schedule. Include submittals required during the first 60 days of construction. List those submittals 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.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal category: Action, Informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled dates for purchasing.
 - g. Scheduled dates for installation.
 - h. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: Electronic copies of CAD Drawings of the Contract Drawings will **NOT** be provided by Architect for Contractor's use in preparing submittals. However, Architect will provide base plans, elevations in CAD. The Architects is not responsible for any inaccuracies in the CAD plans and the contractor shall field verify all dimensions.
- 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 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 10 working days for initial review of each submittal. Allow 15

- working days if consultant must review 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 10 working days for review of each resubmittal. Allow 15 working days if Consultant must review submittal. See footer on Specifications for Sections to be reviewed by Consultants.
- D. Identification and Information: Place a permanent label or title block on each paper copy submittal item for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 x 8 inches 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 and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include a numeric suffix after another decimal point (e.g., 06100.01.1) which will increase with each subsequent resubmission (e.g., 06100.01.2).
 - 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.
- E. Deviations: Encircle or otherwise specifically identify deviations from the Contract Documents on submittals.
- F. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
- G. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
1. Transmittal Form: Use AIA Document G810 or similar document.
 2. Provide the following information:

- a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Drawing number and detail references, as appropriate.
 - j. Transmittal number, numbered consecutively.
 - k. Submittal and transmittal distribution record.
 - l. Remarks.
 - m. Signature of transmitter.
3. 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.
- H. 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 with acceptance notation from Architect's action stamp.
- I. 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.
- J. Use for Construction: Use only final submittals that are marked with acceptance notation from Architect's action stamp.

•	ACCEPTED	Fabrication/installation may be undertaken. Approval does not authorize changes in the Contract Sum or Contract Time unless stated by Change Order or Construction Change Directive.
•	ACCEPTED AS CORRECTED	
•	REVISE AND RESUBMIT	Fabrication/installation MAY NOT be undertaken. In resubmitting, limit corrections to the items marked.
•	REJECTED	

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by
- SUBMITTAL PROCEDURES
- Interior Renovations at the Mary Etta Cox House

individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Action Submittals: Submit electronic PDF of each submittal, unless otherwise indicated. Architect will post electronic.
 2. Informational Submittals: Submit electronic PDF of each submittal, unless otherwise indicated. Architect will not return copies.
 3. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."
 4. 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 notarized statement on original paper copy certificates and certifications where indicated.
 5. Test and Inspection Reports Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."
- 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 published data is 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. Manufacture's written recommendations.
 - b. Manufacturer's catalog cuts.
 - c. Manufacturer's product specifications.
 - d. Manufacturer's installation requirements.
 - e. Standard color charts.
 - f. Statement of compliance with specified referenced standards.
 - g. Testing by recognized testing agency.
 - h. Application of testing agency labels and seals.
 - i. Notation of coordination requirements.
 - j. Availability and delivery time information.
 4. Submit Product Data before or concurrent with Samples.
 5. Submit Product Data in the following format:
 - a. Electronic PDF format.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions: These must be field verified with existing conditions.
 - b. Identification of products.
 - c. Fabrication and installation.

- d. Rough-in drawings and setting diagrams.
 - e. Schedules.
 - f. Compliance with specified standards.
 - g. Notation of coordination requirements.
 - h. Notation of dimensions established by field measurement.
 - i. Relationship and attachment to adjoining construction clearly indicated.
 - j. Seal and signature of professional engineer if specified.
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 24" x 36".
 3. Submit Shop Drawings in the following format:
 - a. Submit electronic PDF file. Architect will return reviewed as an electronic PDF file posted on a secure website.
- 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 applicable 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 undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. 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: 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. Manufacturer and product name, and model number if applicable.
 3. Number and name of room, space or location.
 4. Specific location within room, space or location.
 5. Submit product schedule as an electronic PDF file. Architect will return reviewed as an electronic PDF file posted on a secure website.
- F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- 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. Use CSI Form 1.5A or similar document in tabular format. Include the following information:
 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.
 4. Submit subcontract list in the following format:
 - a. Number of Copies: Three paper copies of subcontractor list, unless otherwise indicated.
- J. Coordination Drawings: Comply with requirements specified in Division 01 Section "Project Management and Coordination."
- K. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

- L. Installer Certificates: Submit 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.
- M. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- N. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- O. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- P. Material Test Reports: Submit 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.
- Q. Product Test Reports: Submit 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.
- R. Research or Evaluation Reports: Submit 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.
- S. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements."
- T. Preconstruction Test Reports: Submit 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.
- U. Compatibility Test Reports: Submit 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.
- V. Field Test Reports: Submit reports 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.
- W. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

- X. Design Data: Prepare and submit 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.
- Y. 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.
- Z. 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.
- AA. 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.
- BB. Construction Photographs: Comply with requirements specified in Division 1 Section "Photographic Documentation."
- CC. Material Safety Data Sheets (MSDSs): Submit information to Architect.

2.2 DELEGATED-DESIGN SERVICES

- 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 Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit three paper copies of certificate, 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. Action and Informational Submittals: 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. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Division 01 Section "Closeout Procedures."
- C. 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 as follows:

•	ACCEPTED	Fabrication/installation may be undertaken. Approval does not authorize changes in the Contract Sum or Contract Time unless stated by Change Order or Construction Change Directive.
•	ACCEPTED AS CORRECTED	
•	REVISE AND RESUBMIT	Fabrication/installation MAY NOT be undertaken. In resubmitting, limit corrections to the items marked.
•	REJECTED	

- C. Revise and Resubmit: The Architect will only review one set of "Revise and Resubmit" or "Rejected" submittal.

- D. 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.
- E. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- F. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300

SECTION 013510 – SPECIAL PROCEDURES FOR HISTORIC TREATMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. It should be noted that the property is registered on the National Register of Historic Places.

1.2 SUMMARY

- A. This Section includes general protection and treatment procedures for the entire Project including, but not limited to the following specific work:
 - 1. Historic removal and dismantling.
 - 2. Storage and protection of historic materials.
 - 3. Temporary protection of historic materials during construction.
 - 4. Protection during application of chemicals.
 - 5. Protection during use of heating-generating equipment.
 - 6. Procedures for cleaning, rehabilitating or reinstalling historic material.
- B. Related Sections:
 - 1. Section 013200 “Construction Progress Documentation” for preconstruction photographs taken before historic treatment.
 - 2. Section 013220 “Photographic Documentation” for requirements for taking photographs.
 - 3. All Technical Sections associated with restoration and repair of historic fabric.

1.3 DEFINITIONS

- A. Consolidate: To strengthen loose or deteriorated materials in place.
- B. Dismantle: To disassemble and detach items by hand from existing construction to the limits indicated, using small hand tools and small one-hand power tools, so as to protect nearby historic surfaces; and legally dispose of dismantled items off-site, unless indicated to be salvaged or reinstalled.
- C. Existing to Remain: Existing items that are not to be removed or dismantled.
- D. Hazardous Material: does not include lead paint which is addressed in specification section 099113 Painting and Lead Safe Practices.
- E. Historic: Spaces, areas, rooms, surfaces, materials, finishes, and overall appearance, which are important to the successful preservation, rehabilitation, restoration, and reconstruction, as determined by the Architect. Designated historic spaces are indicated on the Site Set Up Plan and Drawings.
- F. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by the Architect.

- G. Reconstruct: To remove existing item, replicate damaged or missing components, and reinstall in original position.
- H. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.
- I. Reinstall: To protect removed or dismantled item, repair and clean it as indicated for reuse, and reinstall it in original position, or where indicated.
- J. Remove: Specifically for historic spaces, areas, rooms, and surfaces, the term means to detach an item from existing construction to the limits indicated, using hand tools and hand-operated power equipment, and legally dispose of it off-site, unless indicated to be salvaged or reinstalled.
- K. Repair: To correct damage and defects, retaining existing materials, features, and finishes while employing as little new material as possible. Includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.
- L. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.
- M. Replicate: To reproduce in exact detail, materials, and finish, unless otherwise indicated.
- N. Reproduce: To fabricate a new item, accurate in detail to the original, and in either the same or a similar material as the original, unless otherwise indicated.
- O. Restore: To consolidate, replicate, reproduce, repair, and refinish as required to achieve the indicated results.
- P. Retain: To keep existing items that are not to be removed or dismantled.
- Q. Reversible: New construction work, treatments, or processes that can be removed or undone in the future without damaging historic materials, unless otherwise indicated.
- R. Salvage: To protect removed or dismantled items and deliver them to Owner.
- S. Stabilize: To provide structural reinforcement of unsafe or deteriorated items while maintaining the essential form as it exists at present; also, to reestablish a weather-resistant enclosure.
- T. Strip: To remove existing finish down to base material, unless otherwise indicated.

1.4 MATERIALS OWNERSHIP

- A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, planters, exterior furniture and plantings, antiques, and other items of interest or value to Owner that may be encountered during removal and dismantling work remain Owner's property. Carefully dismantle and salvage each item or object.
- B. Coordinate with Architect who will establish special procedures for dismantling and salvage.

1.5 SUBMITTALS

- A. Construction Schedule for Historic Treatments: Indicate for the entire Project the following for each activity to be performed in historic spaces, areas, and rooms, and on historic surfaces:
 - 1. Detailed sequence of historic treatment work, with starting and ending dates, coordinated with Owner's continuing operations and other known work in progress.
 - 2. Utility Services: Indicate how long utility services will be interrupted. Coordinate shutoff, capping, and continuation of utility services.
 - 3. Use of stairs.
 - 4. Coordination of Owner's and others' continuing occupancy of existing building and of Owner's occupancy of completed Work.
 - 5. Equipment Data: List gross loaded weight, axle-load distribution, and wheel-base dimension data for mobile and heavy equipment proposed for use. Do not use such equipment without Contractor's professional engineer's certification that the structure can support the imposed loadings without damage.
- B. Preconstruction Digital Photographs: Show preexisting conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by historic treatment operations. See Division 01 Section "Photographic Documentation" for preconstruction requirements.
- C. Historic Treatment Program: Submit a written plan for each phase or process, including protection of surrounding materials during operations. Describe in detail materials, methods, and equipment to be used for each phase of work.
- D. Alternative Methods and Materials: If alternative methods and materials to those indicated are proposed for any phase of work, provide a written description, including evidence of successful use on other, comparable projects and program of testing to demonstrate effectiveness for use on this Project.
- E. Fire-Prevention Plan: Submit a written plan before work begins.
- F. Inventory of Salvaged Items: After removal or dismantling work is complete, submit a list of items that have been salvaged.

1.6 QUALITY ASSURANCE

- A. Historic Treatment Specialist Qualifications: An experienced firm regularly engaged in historic treatments similar in nature, materials, design, and extent to this work as specified in each section, and that has completed a minimum of five recent projects with a record of successful in-service performance that demonstrate the firm's qualifications to perform this work.
 - 1. Field Supervisor Qualifications: Full-time supervisors experienced in historic treatment work similar in nature, material, design, and extent to that indicated for this Project. Supervisors shall be on Project site during times that historic treatment work is in progress. Supervisors shall not be changed during Project except for causes beyond the control of the specialist firm.
 - 2. Worker Qualification: Persons who are experienced in historic treatment work of types they will be performing.

- B. Historic Removal and Dismantling Specialist Qualifications: A qualified historic treatment specialist. General selective demolition experience is not sufficient experience for historic removal and dismantling work.
- C. Historic Treatment Program: Prepare a written plan for historic treatment for the whole Project, including each phase or process and protection of surrounding materials during operations. Describe in detail materials, methods, and equipment to be used for each phase of work. Show compliance with indicated methods and procedures specified in this and other sections.
 - 1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
 - 2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.
- D. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-prevention devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include each fire watch's training, duties, and authority to enforce fire safety.
- E. Mockups: Prepare mockups of specific historic treatment procedures specified in this Section to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
- F. Regulatory Requirements: Comply with governing EPA notification regulations before beginning removal and dismantling work. Comply with hauling and disposal regulations of authorities having jurisdiction.
- G. Standards: Comply with ANSI/ASSE A10.6.
- H. Historic Treatment Preconstruction Conference: Conduct conference at Project Site to comply with requirements in Division 01 Section "Project Management and Coordination."
 - 1. General: Review methods and procedures related to historic treatment including, but not limited to, the following:
 - a. Review manufacturer's written instructions for precautions and effects of historic treatment procedures on materials, components, and vegetation.
 - b. Review and finalize historic treatment construction schedule; verify availability of materials, equipment, and facilities needed to make progress and avoid delays.
 - c. Review qualifications of personnel assigned to the work and assign duties.
 - d. Review material application, work sequencing, tolerances, and required clearances.
 - e. Review areas where existing construction is to remain and requires protection.
 - 2. Removal and Dismantling:
 - a. Inspect and discuss condition of construction to be removed or dismantled.
 - b. Review requirements of other work that relies on substrates exposed by removal and dismantling work.

1.7 STORAGE AND PROTECTION OF HISTORIC MATERIALS

A. Salvaged Historic Materials:

1. Clean only loose debris from salvaged historic items unless more extensive cleaning is indicated.
2. Number and label all items removed and reference location of removal to a drawing. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

B. Historic Materials for Reinstallation:

1. Repair and clean historic items as indicated and to functional condition for reuse.
2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label 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 unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make item functional for use indicated.

C. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after historic treatment and construction work in the vicinity is complete.

D. Storage and Protection: When taken from their existing locations, catalog and store historic items within a weathertight enclosure where they are protected from wetting by rain, snow, condensation, or ground water, and from freezing temperatures.

1. Identify each item with a nonpermanent mark to document its original location. Indicate original locations on plans elevations, sections, or photographs by annotating the identifying marks.
2. Secure stored materials to protect from theft.
3. All material to be kept on site.

1.8 PROJECT SITE CONDITIONS

A. Conduct removal and dismantling work so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.

D. Hazardous Materials:

1. Assume all existing paint is lead based and will be removed following safe lead paint removal practices included in the specifications.

2. If other materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.

E. Storage or sale of removed or dismantled items on-site is not permitted unless otherwise indicated.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 HISTORIC REMOVAL AND DISMANTLING SPECIALIST

- A. Historic Removal and Dismantling Specialist Firms: An experienced firm regularly engaged in historic treatments similar in nature, materials, design and extent to this work.
 1. Written proof of previous experience will be required unless the pre-qualified contractor will perform the work.

3.2 HISTORIC REMOVAL AND DISMANTLING EQUIPMENT

- A. Removal Equipment: Use only hand-held tools and equipment that minimizes damage to existing historic fabric to remain except as follows or unless otherwise approved by the Architect on a case-by-case basis:
 1. Large air hammers are not permitted.
- B. Dismantling Equipment: Use manual, hand-held tools, except as follows or otherwise approved by the Architect on a case-by-case basis:
 1. Hand-held power tools and cutting torches are permitted only as submitted in the historic treatment program. They must be adjustable so as to penetrate or cut only the thickness of material being removed.
 2. Pry bars over 18 inches long and hammers weighing over 2 lb are not permitted for dismantling work.

3.3 EXAMINATION

- A. Preparation for Removal and Dismantling: Examine construction to be removed or dismantled to determine best methods to safely and effectively perform removal and dismantling work. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be removed or dismantled and location of utilities and services to remain that may be hidden by construction that is to be removed or dismantled.
 1. Verify that affected utilities have been disconnected and capped.
 2. Inventory and record the condition of items to be removed and dismantled for reinstallation or salvage.
 3. Before removal or dismantling of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

- B. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs and preconstruction videos.
 - 1. Comply with requirements specified in Division 01 Section "Photographic Documentation."
- C. Perform surveys as the Work progresses to detect hazards resulting from historic treatment procedures.

3.4 PROTECTION, GENERAL

- A. Ensure that supervisory personnel are on-site and on duty when historic treatment work begins and during its progress.
- B. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, trees, and surrounding buildings from harm resulting from historic treatment procedures.
 - 1. Use only proven protection methods, appropriate to each area and surface being protected.
 - 2. Provide barricades, barriers, and temporary directional signage to exclude public from areas where historic treatment work is being performed.
 - 3. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of historic treatment work.
 - 4. Contain dust and debris generated by removal and dismantling work and prevent it from reaching the public or adjacent surfaces.
 - 5. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
 - 6. Protect floors and other surfaces along haul routes from damage, wear, and staining.
 - 7. Provide supplemental sound-control treatment to isolate removal and dismantling work from other areas of the building.
- C. Temporary Protection of Historic Materials:
 - 1. Protect existing historic materials with temporary protections and construction. Do not deface or remove existing materials.
 - 2. Do not attach temporary protection to historic surfaces except as indicated as part of the historic treatment program and approved by Architect.
- D. Protect Landscape Work adjacent to and within Work Areas.
- E. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.
- F. Utility and Communications Services:
 - 1. Notify the Owner, Architect, and authorities having jurisdiction, owning or controlling wires, conduits, pipes, and other services affected by the historic treatment work before commencing operations.
 - 2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for the historic treatment work.
 - 3. Maintain existing services unless otherwise indicated; keep in service and protect against damage during operations. Provide temporary services during interruptions to existing utilities.

- G. Doors and Openings: Provide temporary protection including temporary operational and lockable doors, where doors and windows are removed for restoration work.

3.5 PROTECTION DURING APPLICATION OF CHEMICALS

- A. Protect motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm or damage resulting from applications of chemical cleaners and paint removers.
- B. Cover adjacent surfaces with protective materials that are proven to resist chemicals selected for Project unless chemicals being used will not damage adjacent surfaces as indicated in historic treatment program. Use covering materials and masking agents that are waterproof, UV-resistant, and will not stain or leave residue on surfaces to which they are applied. Apply protective materials according to manufacturer's written instructions. Do not apply liquid masking agents or adhesives to painted or porous surfaces. When no longer needed, promptly remove protective materials staining.
- C. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.
- D. Collect and dispose of runoff from chemical operations by legal means and in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

3.6 PROTECTION FROM FIRE

- A. General: Follow fire-prevention plan and the following.
 - 1. Comply with NFPA 241 requirements unless otherwise indicated.
 - 2. Remove and keep area free of combustibles including, rubbish, paper, waste, and chemicals, except to the degree necessary for the immediate work.
 - a. If combustible material cannot be removed, provide fire blankets to cover such materials.
 - 3. Prohibit smoking by all persons within the entire Project work area.
- B. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or highly combustible materials, including welding, torch-cutting, soldering, brazing, paint removal with heat, or other operations where open flames or implements utilizing high heat or combustible solvents and chemicals are anticipated.
 - 1. As far as practical, restrict heat-generating equipment to shop areas or outside the building.
 - 2. Use of open-flame equipment is not permitted unless authorized by Architect/Owner.
 - 3. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
 - 4. Use fireproof baffles to prevent flames, sparks, hot gasses, or other high-temperature material from reaching surrounding combustible material.
 - 5. Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
 - 6. Fire Watch: Before working with heat-generating equipment or highly combustible

materials, station personnel to serve as a fire watch at each location where such work is performed. Fire watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows.

- a. Train each fire watch in the proper operation of fire-control equipment and alarms.
 - b. Prohibit fire-watch personnel from other work that would be a distraction from fire-watch duties.
 - c. Cease work with heat-generating equipment whenever fire-watch personnel are not present.
 - d. Have fire watch perform final fire-safety inspection each day beginning no sooner than 30 minutes after conclusion of work at each area of the Project site to detect hidden or smoldering fires and to ensure that proper fire-prevention is maintained.
 - e. Maintain fire-watch personnel at each area of the Project site until 60 minutes after conclusion of daily work.
- C. Fire Extinguishers, Fire Blankets, and Rag Buckets: Maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire watch are trained in fire-extinguisher and blanket operation.

3.7 GENERAL HISTORIC TREATMENT

- A. Ensure that supervisory personnel are present when historic treatment work begins and during its progress.
- B. Halt the process of deterioration and stabilize conditions, unless otherwise indicated. Perform work as indicated on Drawings. Follow the procedures in subparagraphs below and procedures approved in historic treatment program.
 1. Retain as much existing material as possible; repair and consolidate rather than replace.
 2. Use additional material or structure to reinforce, strengthen, prop, tie, and support existing material or structure.
 3. Use reversible processes wherever possible.
 4. Use historically accurate repair and replacement materials and techniques unless otherwise indicated.
 5. Record existing work before each procedure (preconstruction) and progress during the work with digital preconstruction documentation photographs and USB drive. Comply with requirements in Division 01 Section "Photographic Documentation."
- C. Notify Architect of visible changes in the integrity of material or components whether due to environmental causes including biological attack, UV degradation, freezing, or thawing; or due to structural defects including cracks, movement, or distortion.
 1. Do not proceed with the work in question until directed by Architect.
- D. Where missing features are indicated to be repaired or replaced, provide features whose designs are based on accurate duplications rather than on conjectural designs, subject to the approval of Architect.
- E. Where Work requires existing features to be removed or dismantled and reinstalled, perform these operations without damage to the material itself, to adjacent materials, or to the substrate.
- F. Identify new and replacement materials and features with permanent marks hidden in the completed work to distinguish them from original materials. Record a legend of identification marks and the locations of the items on Record Drawings.

3.8 HISTORIC REMOVAL AND DISMANTLING

- A. General: Have removal and dismantling work performed by a qualified historic removal and dismantling specialist. Ensure that historic removal and dismantling specialist's field supervisors are present when removal and dismantling work begins and during its progress.
- B. Perform work in accordance with the historic treatment program and accepted mockups.
 - 1. Provide supports or reinforcement for existing construction that becomes temporarily weakened by the work, until the work is completed.
 - 2. Perform cutting by hand or with small power tools wherever possible. Cut holes and slots neatly to size required, with minimum disturbance of adjacent work.
 - 3. Do not operate air compressors inside the building, unless approved by Architect in each case.
 - 4. Do not drill or cut columns, beams, joints, girders, structural slabs, or other structural supporting elements, without reviewing with design engineer for each location before such work is begun.
 - 5. Do not use explosives.
- C. Unacceptable Equipment: Keep equipment that is not permitted for historic removal or dismantling work away from the vicinity where such work is being performed.
- D. Removing and Dismantling Items on or near Historic Surfaces:
 - 1. Use only dismantling tools and procedures within 12 inches of historic surface. Do not use pry bars. Protect historic surface from contact with or damage by tools.
 - 2. Unfasten items to be removed, in the opposite order from which they were installed.
 - 3. Support each item as it becomes loosened to prevent stress and damage to the historic surface.
 - 4. Dismantle anchorages.

END OF SECTION 013510

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections:
 - 1. Section 012100 "Allowances" for testing and inspecting allowances.
 - 2. Section 013200 "Construction Progress Documentation" for developing a schedule of required tests and inspections.
 - 3. Section 017310 "Cutting and Patching" for repairs, restoration of construction disturbed by testing, and inspecting activities.
 - 4. Divisions 02 through 16 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to

show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Integrated Exterior Mockups: Full size, physical assemblies constructed on the project site, consisting of multiple products, assemblies and subassemblies.
- D. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade or trades.
- E. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 ACTION SUBMITTALS

- A. Shop Drawings: For all types of mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.
1. Indicate manufacturer and model number of individual components.
 2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Contractor's Quality-Control Manager Qualifications: For supervisory personnel.
- C. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

D. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan at Preconstruction Meeting. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
1. Project quality-control manager may also serve as the Project superintendent but must be prequalified.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: Include in quality-control plan a comprehensive schedule of Work requiring testing or inspection, including the following:
1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
 2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.8 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue.
 2. Project title and number.
 3. Name, address, and telephone number of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical 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.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.9 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:

- a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups do not reuse products on Project.
2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at the Project.
 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 5. Obtain Architect's acceptance of mockups before starting work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 7. Demolish and remove mockups when directed, unless otherwise indicated.
- L. Integrated Exterior Mockups: Construct integrated exterior mockup in accordance with approved Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual specification sections, along with supporting materials.
- M. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Specification Sections in Divisions 02 through 16.

1.10 QUALITY CONTROL

- A. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- B. **Manufacturer's Field Services:** Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."
- C. **Manufacturer's Technical Services:** Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports, as specified in Division 01 Section "Submittal Procedures."
- D. **Retesting/Reinspecting:** Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. **Testing Agency Responsibilities:** Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
- F. **Associated Services:** Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- H. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.
1. Distribution: Distribute schedule to Owner, Architect testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.11 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Conducted by a qualified testing agency or special inspector as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.

2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Architect.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Sections:
 - 1. Section 011000 "Summary of Work" for work restrictions and limitations on utility interruptions.
 - 2. Section 013300 "Submittal Procedures" for procedures for submitting copies of Site Set Up Plan and Implementation and Termination Schedule for Utilities and Utility Reports.

1.3 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. 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. Water Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges.

1.4 SUBMITTALS

- A. Site Set Up 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.
- C. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage, including delivery, handling, and storage provisions for materials subject to water absorption or water damage, discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water damaged Work.

1. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, stuccoing, and masonry cleaning, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- D. Dust-Control: Submit coordination drawing and narrative that indicates the dust-control measures proposed and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
1. Locations of dust-control partitions at each phase of the work.
 2. Location of proposed air filtration system discharge.
 3. Other dust-control measures.
 4. Waste management plan.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in ICC/ANSI A117.1.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage installer of each permanent service to 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.
- B. Newly installed HVAC systems may not be used on a temporary basis until construction is substantially complete.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch thick, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch OD top rails. Install 4'-0" high slat screen as part of fence installation.
- B. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch thick, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 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 concrete bases for supporting posts.

2.2 TEMPORARY FACILITIES

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Water Service: Use of Owner's existing well water service will be permitted, as long as facilities are cleaned and maintained.
- C. Sanitary Facilities: Contractor can use existing public restrooms in other building on site.
- D. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. The building interior must be kept at 55 degrees Fahrenheit minimum at all times. Temporary heat units are not permitted inside the building and must be installed with temporary duct work from the exterior.
- E. 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.
- F. Electric Power Service: Use of Owner's existing electric power service will be permitted, as long as equipment is maintained safely and in a condition acceptable to Owner.
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- H. Telephone & Internet Service: Supervisor is required to have an operational cell phone on site.
 - 1. Provide wireless internet service on site for use of contractor, owner, and professional team.
 - 2. Post a list of important telephone numbers in site office.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Architect's office.
 - e. Engineers' offices.
 - f. Owner's office.
 - g. Principal subcontractors' field and home offices.
 - 3. Provide a tablet for project supervisor coordinated with appropriate software for project construction administration.
 - 4. Supervisor to have a computer and printer on site with internet access.
- M. Electronic Communication Service: Provide temporary electronic communication service, including electronic mail, in common-use facilities.

- N. Meeting room: Project meetings will be held in the Mary Etta Cox House. Set up temporary office in house.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities as indicated on the drawings and determined by Owner.
- B. 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 of Work."
- C. 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 service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sanitary Facilities: Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- C. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- D. 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.
 - 1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- E. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

- F. Telephone & Internet Service: Provide superintendent with cellular telephone for use and internet services with tablet.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
 - 2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- C. Parking: Use designated areas noted in the Contract Drawings and coordinated with Owner for parking areas for construction personnel. Parking only permitted at areas designated by Owner.
- D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
 - 2. Remove snow and ice as required to minimize accumulations.
- E. Project Signs: Provide Project signs as indicated on drawings. Unauthorized signs are not permitted.
 - 1. Identification Signs: Provide Project identification signs as indicated on Drawings. Submit for Architect review and acceptance. Do not install signs until accepted in writing by Architect.
 - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 - 3. Maintain and touchup signs so they are legible at all times.
- F. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 01 Section "Execution" for progress cleaning requirements.
- G. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- H. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- I. Temporary Use of Permanent Stairs: Use of existing stairs for construction traffic will be permitted, provided stairs are protected and finishes restored at time of Substantial Completion.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to 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. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
 - 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
 - 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 - 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from the project site during the course of the project.
 - 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- C. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- D. Tree 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.
- E. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Obtain extended warranty for Owner. Perform control operations lawfully, using environmentally safe materials.
- F. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- H. 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 heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.
- I. 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.
 - 1. Prohibit smoking in construction areas.
 - 2. No open flame welding operations, combustion-type temporary heating units, and similar sources of fire ignition are allowed on Project Site.

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.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard, replace or clean stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use permanent HVAC system to control humidity.
 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
 - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record daily readings over a forty-eight-hour period. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
 - c. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.6 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 a 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. Owner reserves right to take possession of Project identification signs.
 - 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 - 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 015000

SECTION 015423 - SCAFFOLDING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. The Contractor shall be responsible for the final design, fabrication, erection, and disassembly of the scaffolding, all supporting structures, and all related elements.
- B. Unless noted otherwise, all references to “scaffolding” shall refer to the exterior scaffolding and, if required, interior scaffolding. Also, unless noted otherwise, all references to “scaffolding” shall refer to the actual scaffolding (piped, modular, systems, etc.) and to any required structural support system.
- C. Scaffolding must be carefully coordinated with existing site conditions. Plantings around the exterior of the building will need to be temporarily removed prior to scaffolding construction and then reinstalled after scaffolding is removed. Contractor to lay down protective tarps where paint stripping will occur.
- D. The scope of scaffolding is:
 - 1. Provide scaffolding for access to house exterior restoration work.
 - 2. Provide scaffolding, if required, to access house interior work.
- E. Verify all existing utilities that may be impacted by this Project. Protect and maintain existing active service and utility lines encountered, including those below grade.
- F. Scaffolding signed and sealed engineered drawings and calculations are required and must be prepared by a licensed structural engineer. The contractor is responsible for paying for these drawings and calculations which will be submitted for review by the Design Structural Engineer. The contractor's engineer should provide for at least two revise and resubmits of these drawings and calculations based on the fragility of the historic building.

1.2 REFERENCES

- A. See Specification Section 314100 – Shoring & Bracing
- B. See General Requirements Division 1

1.3 WORK INCLUDED

- A. The Contractor shall provide all labor, materials, equipment, services, supervision necessary for the complete installation of the work as shown on the drawings and specified herein, including, but not limited to:
 - 1. Fixed scaffolding, with all shoring and bracing as required, and all necessary lateral tiebacks between the scaffolding and the building structure. Scaffolding system shall be capable of providing access and work platforms for the entire proposed work. The Contractor shall verify the existing allowable bearing capacity of the soil prior to the start of design or procurement of the scaffolding materials. Scaffolding shall be used to support Dead and Live Loads.

2. Stair providing access between all levels of the scaffolding.
3. Staging areas and fences. No storage on or under the scaffolding will be permitted. Storage on the site will be permitted only in designated areas.
4. Safety netting, toe guards, and all other required safety equipment.
5. All required relocation of planking, throughout the duration of the erected life of the scaffolding.
6. Installation of all fences, plywood barriers, and locks are required at the base of the scaffolding to prevent access and vandalism.
7. Maintenance of all the installations listed above.

1.4 QUALITY ASSURANCE

- A. Work to comply with the applicable provisions of the New Jersey Uniform Construction Building Code, Federal OSHA, ANSI, and all other codes or regulations having appropriate jurisdiction. In the case of conflicting guidance between code requirements and this specification, the most stringent one shall apply.
 1. The Contractor shall comply with the following regulations and/ or standards:
 - a. OSHA 1910, latest edition.
 - b. OSHA 1926, latest edition.
 - c. All other applicable OSHA requirements.
 2. Scaffolding shall also conform to the recommendations of the Scaffolding and Shoring Institute including safety rules and erection procedures. Again, in the case of conflicting guidance between code requirements and this specification, the most stringent one shall apply.

1.5 SUBMITTALS

- A. Prepare and submit to Architect for review and distribution drawings to scale showing all shoring and bracing support systems, the scaffolding system including all levels, the enclosure system, the tiebacks, and all required supporting elements of the stairs. The scaffolding drawings shall show planking levels. All planking levels shall provide access every 8'-0" (maximum). Drawings must be submitted for review and accepted prior to installation of scaffolding.
- B. Prior to preparing drawings and calculations for scaffolding the contractor's scaffolding engineer must attend a pre-design meeting to review the site conditions and meet with design team members in order to fully understand the unique site conditions.

1.6 INTERRUPTIONS TO BUILDING FACILITIES

- A. While the work of the contract is proceeding, the Contractor shall not block any entrances to the building.
- B. The contractor shall not interrupt any electrical, mechanical, plumbing or other building services. Only use the space inside the building for storage, no outside storage permitted.

- C. Prior to the erection of the scaffolding, the Contractor shall arrange a field meeting with the Owner and Architect to coordinate all installation of shoring and scaffolding.

1.7 DAMAGE

- A. Should the building suffer damage of any nature during the installation of items listed herein, the Contractor shall report the conditions and circumstances to the Architect and Owner. If damage is due to Contractor's negligence, he shall pay at his own expense for all necessary repairs and replacements to such damage areas with new materials to identically match existing in every respect, as approved by the Architect/ Engineer.
- B. Any staining of the building due to corrosion of the scaffolding or its accessories or from any other related cause shall not be permitted. The Contractor shall clean immediately, at his expense any stains resulting from the scaffolding installation, in a manner approved in writing by the Architect.

1.8 SAFETY

- A. The Contractor shall provide all necessary safeguards in conjunction with the performance of his work, such as netting, barricades, fences, etc. to protect the public, the building occupants, and the construction workers from injury.
- B. The Contractor shall install all necessary safety hardware and signage as required to provide for safe egress. All scaffolding must be green tagged for use; orange tags are not acceptable.

1.9 MAINTENANCE AND INSPECTION

- A. Contractor shall provide ongoing inspection and maintenance, including but not limited to periodically, and not less than two times monthly, inspect scaffolding anchors, hoist, etc. and make all necessary repairs and maintenance. Coordinate scheduled inspections with the Architect. As required, the Contractor shall have his engineer inspect the scaffolding and all supporting elements to verify that it is safe to occupy and use the scaffolding. This inspection and maintenance shall be provided as part of the monthly rental. All scaffolding must be green tagged prior to use.
- B. In addition to repairs resulting from ongoing inspections by the contractor, additional repairs shall be performed by the contractor as directed by the Architect. Within 24 hours of notice by the Architect or discovery by ongoing contractor inspections, contractor shall repair or replace any portions of the scaffold or temporary scaffold lighting that are loose, deteriorated or damaged.
- C. Contractor will provide for removal of snow and ice from the scaffold. Removal to be accomplished by 7:00 a.m. following any storm. Include typical non-workdays if work is scheduled.

PART 2 - PRODUCTS

2.1 SCAFFOLDING

- A. All materials used for the scaffolding shall be clean, sound with no rusting. All painted

components shall be installed painted with rust-inhibitive paint, substrate shall be rust free and prepared in accordance with paint manufacturer's recommendation.

- B. All scaffolding accessories, including tiebacks, shall be corrosion resistant. Any of these items, which cannot be painted, shall be stainless steel Type 316. Anchors are to be installed in wood framing. All anchors shall be removed by the Contractor at the completion of the work.
- C. Scaffold planking shall be all made of good quality sound wood or aluminum capable of safely supporting the OSHA required loads. The planking shall have mechanical anchorage to the scaffolding to prevent uplift. Joints between planks shall be flush, with no raised edges whether loaded or not.

PART 3 - EXECUTION

3.1 REQUIREMENTS

- A. All work shall be performed by workers skilled and experienced in the performance of work of this section.
- B. Existing roofs may not be used to mount equipment for hoisting scaffolding components.
- C. Contractor shall provide all labor and materials necessary for the complete execution of the items listed below.
- D. All protection of glass and openings must be installed prior to scaffolding.

3.2 SCAFFOLDING - DESCRIPTION OF WORK

- A. All scaffolding systems should be designed to distribute the weight of the scaffolding so as not to exceed 20 psf on any roof surface. Scaffold system must be designed to account for snow loading if installed during winter months.
- B. Fences, barricades, black vinyl mesh and other items necessary for protecting pedestrian traffic shall be provided as necessary in conjunction with the scaffolding.
- C. Loadings on roof structures, including the scaffolding system described in 3.2.A, is not permitted.
- D. Safety netting shall be installed on the entire exterior face of the scaffolding. Netting to comply with applicable codes and regulations.
- E. Contractor to provide temporary protection of existing windows adjacent to the areas of scaffolding, shoring, bracing, hoists, stairs, as required to prevent any damage from occurring; this temporary protection does not include any sound proofing or baffling of the windows.
- F. No work or modifications to the Scaffolding, Shoring and Bracing will be permitted by any other contractor than the Scaffolding Contractor that erected these elements.

3.3 SCAFFOLDING TIEBACKS - DESCRIPTION OF WORK

- A. The scaffolding shall be tied back to the building as necessary by all applicable laws and codes. Tiebacks are to be attached to the wood framing of the building and locations to be reviewed with the Architect.
- B. There may be certain areas of building where ties may have to be skipped or cannot be installed due to the configuration of the proposed scaffolding system. In these locations, the Contractor may need to prepare a means of bridging those areas by stiffening and/or reinforcing the scaffold, space frames, diaphragms, reinforcement or walkways, etc. The cost of this work is to be included in the base price.

3.4 PLATFORMS - DESCRIPTION OF WORK

- A. Platforms providing circulation through the scaffolding frames shall be installed at every level of the scaffolding. Circulation shall not be obstructed by access stairs or ladders.
- B. All access platforms shall be capable of being loaded with a 500 lb rolling load in addition to other loads required by code. Scaffolding must be able to support a minimum live load of 50 psf on two levels of planking acting simultaneously.
- C. All platforms shall be designed and installed to resist uplift from wind with mechanical fasteners and provide a level surface to facilitate foot traffic and rolling loads.
- D. Platform shall have a toe-board assembly at the outer edge. Height to comply with applicable code.
- E. Scaffold walkways shall be approximately 5 ft. wide minimum.
- F. 20" side arm brackets shall be installed on the building side of the scaffolding frames at each scaffolding level, with planks spanning between, to provide an unobstructed continuous work platform 19" to 20" wide, around the whole perimeter of the facade at each scaffolding level, no more than 4" from building face. Provide horizontal mid and top safety cables at all levels of planking along the scaffolding frames (for all exterior, perimeter, or exposed portions of the scaffolding).
- G. Scaffold bracing shall be of a walk-through design at corners to allow unobstructed passage around corners.

END OF SECTION 015423

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Section:
 - 1. Section 012500 "Substitution Procedures" for requests for substitutions.
 - 2. Section 017700 "Closeout Procedures" for submitting warranties for Contract closeout.
 - 3. Divisions 02 through 16 for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 SUBMITTALS

- A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
 2. Form: Tabulate information for each product under the following column headings:
 - a. Specification Section number and title.
 - b. Generic name used in the Contract Documents.
 - c. Proprietary name, model number, and similar designations.
 - d. Manufacturer's name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date or time span of delivery period.
 - h. Identification of items that require early submittal approval for scheduled delivery date.
 3. Initial Submittal: Within 30 days after date of commencement of the Work, submit digital copy of initial product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 - a. At Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.
 4. Completed List: Within 60 days after date of commencement of the Work, submit digital copy of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 5. Architect's Action: Architect will respond in writing to Contractor within 15 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.
- B. Substitution Requests: Submit digital copy of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.

- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
- C. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
- 1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor through Construction Manager of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
 - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- D. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
 - 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.

2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which product shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
 1. Store products to allow for inspection and measurement of quantity or counting of units.
 2. Store materials in a manner that will not endanger Project structure.
 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 4. Store cementitious products and materials on elevated platforms.
 5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 7. Protect stored products from damage and liquids from freezing.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a

- written document using indicated form properly executed.
3. Refer to Divisions 02 through 16. Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
 6. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 7. Or Equal: Where products are specified by name and accompanied by the term "or approved equal" or "or approved," comply with provisions in Part 2 "Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless contractor follows the substitution procedures included in this section.
 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless contractor follows the substitution procedures included in this section.
 3. Products:
 - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - b. Non-restricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

4. Manufacturers:
 - a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - b. Non-restricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
 5. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specified product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
 6. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
- C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Division 01 Section "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect in collaboration with Owner will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

- A. Timing: Architect will consider requests for substitution if received within 10 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.
- B. Refer to and comply with Section 01250 Substitution Procedures and Complete Substitution Request Form.
- C. Additional Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 1. Requests for substitutions are in compliance with the *Secretary of Interior's Standards for Rehabilitation* and are compatible with the existing materials.

2. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
3. Requested substitution does not require extensive revisions to the Contract Documents.
4. Requested substitution is consistent with the Contract Documents and will produce indicated results.
5. Substitution request is fully documented and properly submitted.
6. Requested substitution will not adversely affect Contractor's Construction Schedule.
7. Requested substitution has received necessary approvals of authorities having jurisdiction.
8. Requested substitution is compatible with other portions of the Work.
9. Requested substitution has been coordinated with other portions of the Work.
10. Requested substitution provides specified warranty.
11. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

2.3 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as compatibility with existing historic fabric, performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01600

SECTION 017000 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Coordination of Owner-installed products.
6. Progress cleaning.
7. Starting and adjusting.
8. Protection of installed construction.
9. Correction of the Work.

- B. Related Sections:

1. Section 013100 "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
2. Section 013300 "Submittal Procedures" for submitting surveys.
3. Section 017310 "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
4. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
5. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the project.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer 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.

- B. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 3. Products: List products to be used for patching and firms or entities that will perform patching work.
 4. Dates: Indicate when cutting and patching will be performed.
 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate how long services and systems will be disrupted.
- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.5 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from the Architect before proceeding. Shore, brace, and support structural element during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
 - a. Primary operational systems and equipment.
 - b. Fire separation assemblies.
 - c. Air or smoke barriers.
 - d. Fire-suppression systems.
 - e. Mechanical systems piping and ducts.
 - f. Control systems.
 - g. Communication systems.
 - h. Conveying systems.
 - i. Electrical wiring systems.
 - j. Operating systems of special construction.
 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
 - a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.

- c. Equipment supports.
 - d. Piping, ductwork, vessels, and equipment.
 - e. Noise- and vibration-control elements and systems.
4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction 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.
- B. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

1.6 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Comply with requirements specified in Division 01 Section "Cutting and Patching." Use materials for patching 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 provide a match acceptable to the Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, the irrigation system and other construction.
- 1. Mark out on site all underground systems so as to prevent any heavy equipment from passing over them and causing any damage to subsurface constructions.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where

indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of the Contractor, submit a request for information to Architect according to requirements in Division 01 Section "Project Management and Coordination."

3.3 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 1. Make vertical work plumb and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect in conjunction with Owners input.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 CUTTING AND PATCHING

- A. Cutting and Patching, 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. Temporary Support: Provide temporary support of work to be cut.
- C. 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.
- D. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements of Division 01 Section "Summary."

- E. 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.
- F. 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. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Saw cut with even straight lines.
 4. Excavating and Backfilling: Comply with requirements in applicable Division 02 Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
- G. 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 practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. 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, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

- H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.5 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Utilize containers intended for holding waste materials of type to be stored.
 - 4. Coordinate progress cleaning for joint-use areas where more than one installer has worked.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01 Section "Temporary Facilities and Controls."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.6 STARTING AND ADJUSTING

- A. Coordinate startup and adjustment of equipment and operating components with requirements in Division 01 Section "Operation and Maintenance Data."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Requirements."

3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.8 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017000

SECTION 017310 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This section includes procedural requirements for cutting and patching.
- B. Related Sections include the following:
 - 1. Division 02 Section "Selective Demolition" for demolition of selected portions of the building.
 - 2. Divisions 02 through 16 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
- C. All cutting and patching must be completed by a carpenter qualified and experienced in historic preservation construction work and familiar with the *Secretary of Interior's Standards for Rehabilitation*. No cutting and patching of historic fabric is permitted by other trades.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- 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 at least 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. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.

6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
7. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.5 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include the following:
 1. Primary operational systems and equipment.
 2. Air or smoke barriers.
 3. Fire-suppression systems.
 4. Mechanical systems piping and ducts.
 5. Control systems.
 6. Communication systems.
 7. Conveying systems.
 8. Electrical wiring systems.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Miscellaneous elements include the following:
 1. Water, moisture, or vapor barriers.
 2. Membranes and flashings.
 3. Equipment supports.
 4. Piping, ductwork, vessels, and equipment.
 5. Noise- and vibration-control elements and systems.
- D. 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.
- E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.6 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

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 prevent 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. 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.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. 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. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 2. 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.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. 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.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 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 017310

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project Record Documents.
 - 3. Operation and maintenance manuals.
 - 4. Warranties.
 - 5. Instruction of Owner's personnel.
 - 6. Final cleaning.
- B. Related Sections include the following:
 - 1. Section 012900 "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
 - 2. Section 013220 "Photographic Documentation" for submitting final completion construction photographic documentation.
 - 3. Section 017300 "Execution" for progress cleaning of Project site.
 - 4. Section 017810 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 5. Divisions 02 through 16 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection to determine the date of Substantial Completion, complete the following.
 - 1. Prepare a list of items to be completed and corrected (contractor 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, certificates of acceptance, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs.

6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 8. Complete startup testing of systems.
 9. Submit test/adjust/balance records.
 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 11. Advise Owner of changeover in heat and other utilities as appropriate.
 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 13. Complete final cleaning requirements, including touchup painting.
 14. 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 a final Application for Payment according to Division 1 Section "Payment Procedures."
 2. 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.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report and warranty.
 5. 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 (CONTRACTOR PUNCHLIST)

- A. Preparation: Submit one electronic copy of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. List value for each incomplete item and items needing correction.
1. Organize list of spaces in sequential order. Interior, new addition exterior, new addition interior.
 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 Contractor.
 - e. Page number.
 4. Submit list of incomplete items in the following format:
 - a. One electronic copy of product schedule or list, unless otherwise indicated.

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. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 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.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

1.7 INFORMATION ORGANIZATION

- A. Provide heavy-duty 3-ring binders, with colored tabs separating warranties, operating maintenance manuals and project record documents.
- B. Include in manuals tables by CSI Section with copies of all information or restoration materials included. This section should include at a minimum all masonry, sealant, roofing, flashing and paint products.

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 CLOSEOUT CHECKLIST

- A. Final Project Closeout Manual: Architect will supply close out check list for contractor to follow:
 - 1. Project Close Out Binder: Project record documents are to be organized in binders and submitted to the Architect. The binders should be organized with labels, tabs, etc., as follows in accordance with Closeout Procedures Section 01770:
 - a. **Section A: Legal Documents:** Warranties, release of liens, insurance, list of personnel, daily reports and substantial completion certificate.
 - b. **Section B: Project Record Documents:** (This may require more than one binder to complete.) Use B1: Drawings, B2: Specifications, and B3: Products. Provide an updated submittal log with all accepted submittals.
 - c. **Section C: Field Conditions:** Final photos with a key plan, punch list signed off by the General Contractor and Owner, field report of outstanding items corrections with photos, and temporary facilities closeout photos.

	SECTION
1. <u>Substantial Completion Certificate</u>: A Substantial Completion Certificate will be issued upon satisfactory completion of a final site visit.	Section A
2. <u>List of Subcontractors and Suppliers</u>: Contractor to provide a full list of all subcontractors and suppliers and all staff who have worked on this project with a reference to the trade(s) for which they were responsible.	Section A
3. <u>Affidavits "Release of Liens"</u>: ALL release of liens must clearly state "FINAL PAYMENT" for all subcontractors and suppliers previously provided each month with the AFP. <ul style="list-style-type: none">a. Contractors Affidavit of Payment of Debts and Claims AIA G706.b. Contractors Affidavit of Liens AIA-G706A for all sub-contractor.	Section A

4. Daily Reports: Provide all daily reports for all work completed on this project.	Section A
5. General Contractor Warranty: Maintenance Warranty 18 months from substantial completion date. See Section 01770.	Section A
6. Manufacturers' Product Warranties: Provide copies of all warranties for product items.	Section A
7. Building Permit Final Inspections: Copies of all inspections to be issued by Contractor at substantial completion.	Section A
8. Field Report Outstanding Items: All outstanding action items (in red) to be signed off by Owner and Contractor as complete and submitted as part of the final Closeout Documents.	Section A
9. Extra Materials: Refer to individual specifications. Contractor should prepare a list of extra materials and items delivered to Owner. The list should be signed by Owner confirming receipt and included in the Closeout binders.	Section A
10. Performance Bond: Contractor to provide a copy of the Bond if included in the contract.	Section A
11. Payment Bond: Contractor to provide a copy of the Bond if included in the contract.	Section A
12. Record Drawings and Specifications: All information to be put on <u>2 sets</u> of final record drawings <u>and</u> 1 set of record specifications as set out in Closeout Procedures, Section 01770. One electronic PDF set of the Project Record Documents required to be submitted. The following items are drawn to your attention as specific information to be submitted. The submission is not limited to these items and must include a comprehensive record of all work completed. <ul style="list-style-type: none"> a. Record Drawings: Provide Record Drawings showings all changes, corrections, and existing conditions. Shop Drawings and Sketches are to be cross-referenced to the main set of Record Drawings. b. Record Specifications: Provide Record Specifications showing all substitutions and referencing submittal numbers. c. Record Product Data: Provide all product submittals including an updated submittal log. 	Section B
13. Architect's on site final review prepared by HBA after the site visit. Contractor and Owner's Representative to review and sign off each item identified. To be submitted to HBA as part of closeout package.	Section C
14. Final Completion Construction Photographs: Contractor to submit photographs of completed project. Label backs of each picture and <u>provide a Key Plan</u> showing locations. Refer to Photographic Documentation Section 01322.	Section C
15. Temporary Facilities and Controls: Remove all items from site. Refer to temporary Facilities and Controls Section 01500. Provide photographs of clean fully restored site.	Section C
16. Operations and Maintenance Data: Provide operations manuals for systems, sub-systems and equipment. Provide maintenance manuals for the care and maintenance of products, materials and finishes, as specified. Refer to Section 01782.	Section D
17. Demonstration and Training: Provide training for operation and maintenance for the following items: Provide a letter, which is to be signed off by the Owner, indicating the dates of training and persons present.	Section D
18. Testing and Inspection Reports: Provide testing, inspection reports, and field quality test reports, as outlined in each section of the specifications.	Section D

3.2 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 professional cleaners for final cleaning of interior spaces.
 - 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.
 - i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - j. Remove labels that are not permanent.
 - k. 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 other required labels and identification, including mechanical and electrical nameplates.
 - l. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 - n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

- o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - p. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter upon inspection.
 - 1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report upon completion of cleaning.
 - q. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - r. Leave Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.

END OF SECTION 017700

SECTION 017810 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
- B. Related Sections include the following:
 - 1. Section 017700 "Closeout Procedures" for general closeout procedures.
 - 2. Divisions 02 through 16 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.3 SUBMITTALS

- A. Record Drawings: Submit two sets of marked up Record Drawings (if required by Owner) and one electronic PDF set of files. (Page size to match contract page sizes.).
- B. Record Specifications: Submit one hardcopy and one electronic PDF set of files of Project's Specifications, including addenda, RFI's, sketches, and contract modifications.
- C. Record Product Data: Submit one hardcopy and one electronic PDF set of files of each Product Data submittal.
 - 1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings for review by Architect at each site visit/project meeting.

1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, Subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below basement floor.
 - d. Locations and depths of underground utilities (if applicable).
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. All changes made by consultants in sketches and RFI's.
 - k. Changes made by Change Order or **Construction Work** Change Directive.
 - l. Changes made following Architect's written orders.
 - m. Details not on the original Contract Drawings.
 - n. Field records for variable and concealed conditions.
 - o. Record information on the Work that is shown only schematically.
 3. Mark the Contract Drawings or coordination Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
 4. Mark record sets with erasable, red-colored pencil or annotated PDF files. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, RFI numbers, Submittal numbers and similar identification, where applicable.
- B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."

- d. Name of Architect.
- e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 - 4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
 - 5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.
 - 6. Cross reference all Submittal numbers to the Specification products.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 - 3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

2.5 PROJECT RECORD DOCUMENT SUBMISSION

- A. Project record documents are to be organized in binders and submitted to the Architect. The binders should be organized with labels, tabs, etc., as follows in accordance with Closeout Procedures Section 01770:

Section A: Legal Documents: Warranties, release of liens, insurance, list of personnel, daily reports and substantial completion certificate.

Section B: Project Record Documents (This may require more than one binder to complete.) Use B1: Drawings, B2: Specifications, and B3: Products. Provide an updated submittal log with all accepted submittals.

Section C: Field Conditions: Final photos with a key plan, punch list signed off by the General Contractor and Owner, field report of outstanding items corrections with photos, and temporary facilities closeout photos.

Section D: Operation and Maintenance Manuals and Training: Provide manuals in accordance with Operations and Maintenance Data for the maintenance of products, systems, equipment, and finishes

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

END OF SECTION 017810

SECTION 017820 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Emergency manuals.
 - 3. Operation manuals for systems, subsystems, and equipment.
 - 4. Maintenance manuals for the care and maintenance of products, materials, and finishes systems and equipment.
- B. Related Sections include the following:
 - 1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 2. Section 017700 "Closeout Procedures" for submitting operation and maintenance manuals.
 - 3. Section 017810 "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
 - 4. Section 018200 "Demonstration and Training" for Preparation and Maintenance Training.
 - 5. Divisions 2 through 16 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

- A. Initial Submittal: Submit 2 draft copies of each manual at least 15 days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Architect will return one copy of draft and mark whether general scope and content of manual are acceptable.
- B. Final Submittal: Submit one copy of each manual in final form at least 15 days before final inspection. Architect will return copy with comments within 15 days after final inspection.
 - 1. Correct or modify each manual to comply with Architect's comments. Submit 2 copies of each corrected manual within 15 days of receipt of Architect's comments.

1.5 COORDINATION

- A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Organization: Include a section in the directory for each of the following:
 - 1. List of documents.
 - 2. List of systems.
 - 3. List of equipment.
 - 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 MANUALS, GENERAL

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name, address, and telephone number of Contractor.
 - 6. Name and address of Architect.
 - 7. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
 1. System, subsystem, and equipment descriptions.
 2. Performance and design criteria if Contractor is delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
 1. Product name and model number.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.

9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

2.4 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - 1. Standard printed maintenance instructions and bulletins.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Precautions against improper maintenance.
 - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 5. Aligning, adjusting, and checking instructions.
 - 6. Demonstration and training videotape, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
1. Do not use original Project Record Documents as part of operation and maintenance manuals.
 2. Comply with requirements of newly prepared Record Drawings in Division 1 Section "Project Record Documents."
- F. Comply with Division 1 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017820

SECTION 018200 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
 - 3. Demonstration and training videotapes.
- B. See Divisions 2 through 16 Sections for specific requirements for demonstration and training for products in those Sections.

1.2 SUBMITTALS

- A. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
- B. Demonstration and Training USB: Submit two USB copies of video training within seven days of end of each training module.

1.3 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 1 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification

Sections, and as follows:

1. New HVAC System.
 2. Lighting System.
 3. Security System.
 4. Fire Detection System.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:
1. Basis of System Design, Operational Requirements, and Criteria: Include system and equipment descriptions, operating standards, regulatory requirements, equipment function, operating characteristics, limiting conditions, and performance curves.
 2. Documentation: Review emergency, operations, and maintenance manuals; Project Record Documents; identification systems; warranties and bonds; and maintenance service agreements.
 3. Emergencies: Include instructions on stopping; shutdown instructions; operating instructions for conditions outside normal operating limits; instructions on meaning of warnings, trouble indications, and error messages; and required sequences for electric or electronic systems.
 4. Operations: Include startup, break-in, control, and safety procedures; stopping and normal shutdown instructions; routine, normal, seasonal, and weekend operating instructions; operating procedures for emergencies and equipment failure; and required sequences for electric or electronic systems.
 5. Adjustments: Include alignments and checking, noise, vibration, economy, and efficiency adjustments.
 6. Troubleshooting: Include diagnostic instructions and test and inspection procedures.
 7. Maintenance: Include inspection procedures, types of cleaning agents, methods of cleaning, procedures for preventive and routine maintenance, and instruction on use of special tools.
 8. Repairs: Include diagnosis, repair, and disassembly instructions; instructions for identifying parts; and review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 INSTRUCTION

- A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
- B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 1. Schedule training with Owner, through Architect, with at least seven days' advance notice.
- C. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.

3.2 DEMONSTRATION AND TRAINING USB DRIVES

- A. General: Engage a qualified commercial photographer to record demonstration and training videos. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
 - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Video Format: Provide USB Drives.
- C. Narration: Describe scenes by audio narration by microphone while session is recorded.

END OF SECTION 018200

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Some utility services are shared with other buildings on the site and shutoff needs to be coordinated with Owner.

1.2 SUMMARY

- A. Section Includes:
 - a. Remove historic basement fabric such as wood trim for restoration and reinstallation.
 - b. Remove existing mechanical, select existing electrical, and existing plumbing systems. See MEP.
 - c. Selective removal of basement floor slab for new footings. SSD
 - d. Remove sump pump from basement and modify floor opening as necessary for new sump pump.
 - e. Remove existing lighting as shown in the lighting schedule. See drawings.
 - f. Remove and/or salvage doors as noted in door schedule.
 - g. Remove basement plaster ceiling.
 - h. Remove existing drop ceilings and modern materials applied to historic ceilings.
 - i. Remove all associated attachments including furring strips. Inspect historic plaster ceiling after removal of other contemporary materials.
 - j. Selectively remove failing plaster to sound material at ceilings and walls as noted on drawings.
 - k. Remove and salvage wood floor at cut out location of new lift.
 - l. Remove plaster and tile at first floor bathroom.
 - m. Remove all carpeting including at stairs and all associated nails and mastic.
 - n. Partially remove partition wall in second floor bathroom.
 - o. Strip interior paint finishes as noted on drawings.
 - 1. Strip exterior paint from all exterior woodwork down to bare wood.
- B. Related Requirements:
 - 1. Section 011000 "Summary of Work" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
 - 2. Section 017000 "Execution" for cutting and patching procedures.
 - 3. Section 314100 "Shoring and Bracing" for temporary shoring during structural framing repairs.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated

to be salvaged, reinstalled, or to remain in the Owner's property.

- B. Remove and Salvage: Items indicated to be removed and salvaged remain the Owner's property. Remove, clean and pack or crate items to protect against damage. Identify contents of containers and deliver to Owner's designated storage area.
- C. Remove and Reinstall: Remove items indicated; clean, service and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations or in locations indicated. Mark each item with location from which removed on a plan.
- D. Existing to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the Architect, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations. Mark each item with location from which removed on a plan.
- 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.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor. Demolished materials shall be removed from the site by the contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.
 - 2. Mark each item with location from which removed on a plan.

1.5 PREINSTALLATION MEETINGS

- A. Pre-demolition Conference: Conduct conference on site.
 - 1. Inspect and discuss condition of construction to be selectively removed.
 - 2. Review structural load limitations of existing structure.
 - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review areas where existing construction is to remain and requires protection.
 - 5. Review all necessary shoring and bracing to allow for selective removal and reinstallation.

1.6 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures

proposed for protecting individuals and property for dust control. Indicate proposed locations and construction of barriers.

B. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
2. Coordination of Owner's continuing occupancy of existing building.
3. Walk through with Architect to review schedule and procedures.
4. Document and number all items for removal and reinstallation and provide a schedule of items recording location and condition of removed item.

C. Pre-demolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 013233 "Photographic Documentation." Submit before Work begins.

D. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.7 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.8 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Engage an experienced firm that has successfully completed selective demolition Work similar to that indicated for this Project performing similar operations with historic buildings.

B. Regulatory Requirements: Comply with governing EPA notification regulations before starting selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.9 FIELD CONDITIONS

A. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials:

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.10 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

2.2 REPAIR MATERIALS

- A. Except as indicated, use repair materials identical to existing materials.
 - 1. Where identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible. Submit sample of substituted materials to Architect for review and acceptance.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- B. Photograph or videotape, inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- C. When unanticipated mechanical, electrical or structural elements that conflict with the intended function or design are encountered, investigate and measure the nature and extent of the conflict. Submit an RFI to the Architect.
- D. Survey the condition of the building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during selective demolition.

- E. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- F. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
 - 1. Comply with requirements specified in Section 013233 "Photographic Documentation."
 - 2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
 - 3. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.
- G. Document all materials to be removed and reinstalled. Provide a Key Plan with all items numbered and recorded.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain all existing services/systems and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor. Shut off to be coordinated with Owner for systems serving other structures on site.
 - 2. Arrange to shut off utilities with utility companies.
 - 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. 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.
 - 2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 3. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."
- 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. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
 2. Keep all roads, public and private, free of dirt, mud, snow, ice and debris resulting from this work or as a result of natural forces.
- D. Remove temporary barricades and protections where hazards no longer exist.
- E. Submit Dust Protection Plan for Architect review.

3.4 SELECTIVE DEMOLITION, GENERAL

- 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. Proceed with selective demolition systematically, from higher to lower level.
 2. 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. Temporarily cover openings to remain.
 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 4. Use of cutting torches will not be permitted.
 5. Where applicable, remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 6. Where applicable, remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 8. Dispose of demolished items and materials promptly.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area designated by Owner.
 5. Protect items from damage during transport and storage.
- D. 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.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition, cleaned, and reinstalled in their original locations after selective demolition operations are complete.

3.5 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. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 4. Transport demolished materials off Owner's property and legally dispose of them.
- B. Burning: Do not burn demolished materials.

3.6 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.
- B. Remove all debris adjacent to the building perimeter daily.

END OF SECTION 024119

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes at, but not limited to:
 - 1. Foundation walls.
 - 2. Footings.
 - 3. Slabs on Grade.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Concrete Subcontractor.
 - d. Special concrete finish Subcontractor.
 - 2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, steel reinforcement installation, methods for achieving specified floor and slab flatness and levelness floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Submit data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, joint systems, curing compounds, and others as requested by Architect/Engineer.
- B. Design Mixtures: For each concrete mixture.
 - 1. Mixture identification.
 - 2. Minimum 28-day compressive strength.
 - 3. Durability exposure class.
 - 4. Maximum w/cm.
 - 5. Slump limit.
 - 6. Air content.
 - 7. Nominal maximum aggregate size.

8. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
 9. Intended placement method.
 10. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement.
- D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer, detailing fabrication, assembly, and support of formwork.
1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.
- E. Samples: For vapor retarder and all other specified materials, and as requested by Architect Engineer, including names, sources, and descriptions.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates.
- B. Material Test Reports.
- C. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer, detailing fabrication, assembly, and support of formwork.
- D. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
- E. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94/C94M and ACI 301 (ACI 301M).

1.7 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 306.1.
 - 1. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 (ACI 301M).

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301 (ACI 301M).
 - 2. ACI 117 (ACI 117M).

2.2 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

2.3 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- B. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.
- C. Deformed-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, flat sheet.
- D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

2.4 CONCRETE MATERIALS

- A. Cementitious Materials:
 - 1. Portland Cement: ASTM C 150/C 150M, Type I.
 - 2. Fly Ash: ASTM C 618, Class F.
 - 3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.

- B. Normal-Weight Aggregates: ASTM C 33/C 33M, graded.
 - 1. Maximum Coarse-Aggregate Size: 3/4 inch (19 mm) nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Air-Entraining Admixture: ASTM C 260/C 260M.
- D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- E. Water: ASTM C 94/C 94M and potable.

2.5 VAPOR RETARDERS

- A. Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.
- B. Sheet Vapor Retarder: ASTM E 1745, Class B. Include manufacturer's recommended adhesive or pressure-sensitive tape.
- C. Sheet Vapor Retarder: ASTM E 1745, Class C. Include manufacturer's recommended adhesive or pressure-sensitive joint tape.
- D. Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils (0.25 mm) thick.

2.6 CURING MATERIALS

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

- F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.
- G. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 18 to 25 percent solids, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.
- H. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- I. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.7 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301 (ACI 301M).
- B. Cementitious Materials: Use fly ash, pozzolan, slag cement, and silica fume as needed to reduce the total amount of Portland cement, which would otherwise be used, by not less than 40 percent.
- C. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.

2.8 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Normal-Weight Concrete:
 - 1. Minimum Compressive Strength: 3000 psi or as indicated on plans at 28 days.
 - 2. Maximum W/C Ratio: 0.5.
 - 3. Slump Limit: 5 inches (125 mm) or 8 inches (200 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
 - 4. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch (38-mm) nominal maximum aggregate size.
 - 5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch (19-mm) nominal maximum aggregate size.
 - 6. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

2.9 FABRICATING REINFORCEMENT

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

2.10 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
 - 1. When air temperature is between 85° and 90° F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90° F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301 (ACI 301M), to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M).
- C. Chamfer exterior corners and edges of permanently exposed concrete.

3.2 EMBEDDED ITEM INSTALLATION

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR-RETARDER INSTALLATION

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

3.4 STEEL REINFORCEMENT INSTALLATION

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
 1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.
- D. Place reinforcement to obtain at least minimum coverage's for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations.
- E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.
- B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301 (ACI 301M).

3.7 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces exposed to public view and as indicated by Architect.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch (6 mm) in one direction.
 - 1. Apply scratch finish to surfaces indicated by Architect.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
 - 1. Apply float finish to surfaces indicated by Architect.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Apply a trowel finish to surfaces indicated by Architect.
 - 2. Finish and measure surface, so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch (6 mm).
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated by Architect. While concrete is still plastic, slightly scarify surface with a fine broom.
 - 1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.9 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 (ACI 301M) for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb./sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.
- D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.
 - 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.11 FIELD QUALITY CONTROL

- A. Inspections: Contractor will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

- B. Inspections:

1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Verification of use of required design mixture.
4. Concrete placement, including conveying and depositing.
5. Curing procedures and maintenance of curing temperature.
6. Verification of concrete strength before removal of shores and forms from beams and slabs.

- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. Yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
3. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
6. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C 31.
 - a. Cast and laboratory cure one set of five standard cylinder specimens for each composite sample.
 - b. Cast and field cure one set of five standard cylinder specimens for each composite sample.

8. Compressive-Strength Tests: ASTM C 39; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - a. Test one set of two field-cured specimens at 7 days, one set of three specimens at 28 days, and one specimen retained in reserve for later testing, if required.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
 9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
 10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
 11. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 24 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
 12. Non-Compliance: All test reports indicating non-compliance shall be faxed immediately to all parties on the test report distribution list and the hard copies submitted on different colored paper.
 13. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
 14. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect/Engineer. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect/Engineer. Contractor shall pay for such tests when unacceptable concrete is verified.
 15. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 16. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- D. Measure floor and slab flatness and levelness according to ASTM E 1155 within 24 hours of finishing.

END OF SECTION 033000

SECTION 040140.91 - HISTORIC MASONRY RESTORATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Extent of masonry restoration work is indicated on drawings.
- B. House masonry restoration work:
 - 1. Clean interior basement masonry walls.
 - 2. Selectively rake out and repoint basement walls as shown on drawings.
 - 3. Selectively rake out and repoint interior brick piers.
 - 4. Provide historic replacement brick at brick piers and brick foundation walls.
- C. Related Sections: The following sections contain requirements that relate to this section:
 - 1. Section 013510 "Special Procedures for Historic Treatment" for general historic treatment requirements.
 - 2. Section 099113 "Painting and Lead Safe Practices"
- D. Unit Prices: Unit prices for stone rebuilding and brick replacement are specified in Division 1 Section "Unit Prices."
 - 1. Unit prices apply to authorized work covered by quantity allowances.
 - 2. Unit prices apply to additions to and deletions from Work as authorized by Change Orders.

1.3 DEFINITIONS

- A. Low-Pressure Spray: 100 to 300 psi pressure meters must be installed on equipment at all times.
- B. Repointing: The process of raking out (removing) mortar and replacing it with new mortar.
- C. Pointing: The process of placing new mortar in existing joint spaces that have previously been raked out. The term does not include the raking out process.
- D. Dutchman: Partial stone replacement. Installation of a new stone into an existing stone.
- E. Control Sample: A sample of the quality of work representing the minimum quality required of the contractor.
- F. Stone or Brick Resetting: Careful removal of unstable stone or brick units such as caps, sills and headers; and severely spalled bricks. Rebuilding or reinstallation and setting of masonry units with anchors.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.
- B. Shop Drawings: For the following:

1. Drawings showing the location of all areas of masonry work.
- C. Samples for Initial Selection: Before erecting mockup, submit samples of the following:
1. Pointing Mortar: Submit sets of mortar for pointing in the form of sample mortar strips, 6 inches long by 1/4 inch wide, set in aluminum or plastic channels.
 - a. Have each set contain a close color range of at least six Samples of different mixes of colored sands and cements that produce a mortar matching existing, cleaned mortar when cured and dry.
 - b. Submit with precise measurements on ingredients, proportions, gradations, and sources, both supplier and quarry, of each sands and brand names and type of cementitious materials and pigments if any from which each Sample was made.
 2. Each type of sand used for pointing mortar; minimum 8 oz. of each in plastic Ziplock bags or screw-top jars.
 - a. For blended sands, provide Samples of each component and blend. Identify blend ratio.
 - b. Identify sources, both supplier and quarry, of each type of sand.
 3. Sample of Portland Cement and Lime; minimum 8 oz. each in plastic Ziplock bags or screw-top jars. Include picture of manufacturer's bag from which the sample was taken.
 4. Brick samples to match existing for replacement.
 5. Include all samples of accessories involving color selection.
- D. Samples for Verification: Before erecting mockup, submit samples of the following:
1. Each type of sand used for pointing mortar.
 - a. For blended sands, provide Samples of each component and blend.
 - b. Identify sources, both supplier and quarry, of each type of sand.
 2. Each type of pointing mortar in form of sample mortar strips, 6 inches long by 1/2 inch wide, set in aluminum or masonry channels.
 - a. Include with each sample a list of ingredients with proportions of each. Identify sources, both supplier and quarry, of each type of sand and brand names of cementitious materials and pigments if any.
 3. Brick Samples
 4. Product data and MSDS for all restoration materials used.
 5. Product data and MSDS for each type of cleaning product used.
 6. Accessories: Each type of accessory and miscellaneous support, if any.
- E. Qualification Data: For restoration specialists including field supervisors, chemical cleaner manufacturer.
- F. Restoration Program: For each phase of restoration process, provide detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of restoration work including protection of surrounding materials on building and Project site.
1. Include methods for keeping pointing mortar damp during curing period.
 2. If materials and methods other than those indicated are proposed for any phase of restoration work, provide a written description, including evidence of successful use on comparable projects, and a testing program to demonstrate their effectiveness for this Project.
- G. Cleaning Program: Describe cleaning process in detail, including materials, methods, and equipment to be used and protection of surrounding materials on building and Project site, and control of runoff during operations.
1. Cleaning tests to be completed for each type of masonry. Testing to begin with mildest products. Test sample areas are to be approximately 36 inches high by 36 inches wide.

Testing is to be in consultation with the Architect and is to be completed until satisfactory product is deemed acceptable to the Architect.

2. If materials and methods other than those indicated are proposed for cleaning work, provide a written description, including evidence of successful use on comparable projects, and a testing program to demonstrate their effectiveness for this Project.

H. FIELD-CONSTRUCTED MOCK-UPS

Prior to start of general masonry restoration, prepare the following sample panels on the building as directed by the Architect. Obtain Architect's review of visual qualities before proceeding with the work. Retain acceptable panels in undisturbed condition, suitably marked on the building and noted on drawings submitted to the Preservation Architect, during construction as a standard for judging completed work.

1. Cleaning: Demonstrate materials and methods to be used for cleaning each type of masonry surface and condition on sample panels of approximately 25 sq. ft. in area. Test adjacent non-masonry materials for possible reaction with cleaning materials. Allow waiting period of duration indicated, but not less than 7 calendar days, after completion of sample cleaning to permit study of sample panels for negative reactions.
2. Repointing: Prepare 2 separate sample areas of approximately 3' high by 3' wide for each type of repointing mortar required, at least one for demonstrating methods and quality of workmanship expected in removal of mortar from joints at both brick and stone and the other for demonstrating quality of materials and workmanship expected in pointing mortar joints.
3. Brick Restoration Mockup:
 - a. Brick Restoration: All personnel proposed for work on the project shall prepare 3x3 ft. samples demonstrating brick restoration techniques, including mortar removal, repointing, brick turnaround, and brick replacement. Mockups will be reviewed after the mortar removal and again after completion of repointing. Mockups shall display the full range of materials and workmanship required for completion of the project for approval by the Architect.
 - b. Mortar Color Matching: The project requires matching of the existing mortar color(s) for brick masonry. The Contractor shall place the initial sample panel using the mix from the approved sample. The sample panel must be cured in the same manner as is expected for the work based on expected temperatures.
 - c. Brick Matching: The contractor will be responsible for identifying potential matches to the existing brick for use as replacement units, subject to being accepted by the Architect.
4. The Contractor shall prepare up to three additional mockups of each mortar, joint type, and mortar color without further compensation. Approved test panel(s) shall become part of the work and shall serve as the quality standard for all subsequent work.
5. Source of Materials: Identify the source of each appropriate material for repointing and surface cleaning. Maintain the same products throughout for consistency of work.
6. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
7. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 QUALITY ASSURANCE

- A. Restoration Specialist Qualifications: Engage an experienced preapproved masonry restoration

and cleaning firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. A minimum of 5 years successful experience in comparable masonry restoration projects and employing personnel skilled in the restoration processes and operations indicated.

1. At Contractor's option, work may be divided between two specialist firms: one for cleaning work and one for repair work. Subcontractor qualifications forms are required for all masonry work.
 2. Field Supervision: Restoration specialist firm shall maintain experienced full-time supervisors on Project site during times that stone restoration and cleaning are in progress. Supervisors shall not be changed during Project except for causes beyond control of restoration specialist firm.
 3. Restoration Worker Qualifications: Persons who are experienced and specialize in restoration work of types they will be performing. A mechanic who obtained a Training Workshop Certificate from the repair mortar manufacturer must perform all stone composite patch repairs. Contractor shall maintain proof of this credential for each installer at the site at all times. The mechanic must have a record of successful masonry patching for at least five years.
- B. Quality-Control Program: Prepare a written quality-control program for this Project to systematically demonstrate the ability of personnel to properly follow methods and use materials and tools without damaging masonry. Include provisions for supervising worker performance and preventing damage.
- C. Chemical Cleaner Manufacturer Qualifications: A firm regularly engaged in producing masonry cleaners that have been used for similar applications with successful results, and with factory-trained representatives who are available for consultation and Project-site inspection and assistance at no additional cost.
- D. Source Limitations: Obtain each type of material for masonry restoration (brick, cement, sand, etc.) from one source with resources to provide materials of consistent quality in appearance and physical properties.
- E. MSDS: Maintain file of all material safety data sheets for products brought onto site.
- F. Work Hazards: Strict compliance with all applicable OSHA requirements is essential.
- G. Mockups: Prepare mockups of restoration and cleaning as follows to demonstrate aesthetic effects and qualities of materials and execution. Prepare mockups on existing walls under same weather conditions to be expected during remainder of the Work.
1. Rake out joints in two separate areas approximately 36 inches high by 48 inches wide for each type of repointing required and repoint one of two areas.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Deliver masonry units to Project site strapped together in suitable packs or pallets or in heavy-duty crates. Unload and handle to prevent chipping and breakage.
 - B. Deliver materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products. Protect from freezing, moisture, and contamination.
 - C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

- D. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.
- E. Store sand where grading and other required characteristics can be maintained and contamination avoided.

1.7 PROJECT CONDITIONS

- A. Repoint mortar joints and repair stone only when air temperature and the substrate is between and 40 and 85 deg F and is predicted to remain so for at least 7 days after completion of work.
- B. Do not work in temperatures below 40 deg F when the substrate is colder than 40 deg F or when the temperature is expected to fall below 40 deg F for 48 hours after installation of repair mortars. Building an enclosure and heating areas to maintain this temperature may only be done with the written approval of the material manufacturer. Remove work exposed to lower temperatures as directed by the Architect. Protect repaired mortar from direct sunlight and wind using protection measures reviewed when the ambient air temperature exceeds 70 deg F. Do not use or prepare mortar when ambient air temperature is above 90° F at the location of the work.
- C. Hot Weather Requirements: Protect masonry repair and mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 85 deg F and above.
- D. Patch stone only when air and surface temperatures are between and 55 and 90 deg F and are predicted to remain above 55 deg F for at least 7 days after completion of work. On days when air temperature is predicted to go above 90 deg F, schedule patching work to coincide with time that surface being patched will be in shade or during cooler morning hours.
- E. Clean stone and brick surfaces only when air temperature is between 40 deg F and 90 deg F and is predicted to remain so for at least 7 days after completion of cleaning.
- F. Protect adjacent areas and surfaces not being cleaned with barriers suitable for the chemical cleaners being used. Cover air intakes, air conditioning vents, and similar openings that may come in contact with the chemical cleaners, residues, and their fumes. Leave covers in place throughout the cleaning process.
- G. Protect adjacent areas and surfaces not being cleaned with barriers suitable for the chemical cleaners being used. Cover air intakes, air conditioning vents, and similar openings that may come in contact with the chemical cleaners, residues, and their fumes. Leave covers in place throughout the cleaning process.
- H. Prevent mortar used in repointing and repair work from staining face of surrounding masonry and other surfaces. Remove immediately grout and mortar in contact with exposed masonry and other surfaces.
- I. Protect sills, ledges, projects, and all surfaces from mortar droppings.
- J. Use all means necessary to protect the materials of this section before, during, and after installation and to protect the work and material of other trades, the building, and the public.

1.8 SEQUENCING AND SCHEDULING

- A. Order replacement materials at earliest possible date, to avoid delaying completion of the Work.

- B. Order sand for repointing mortar immediately after approval of Tray Samples. Take delivery of and store at Project site a sufficient quantity of sand to complete Project. Additional orders of sand are not permitted without resubmittal of samples.
- C. Perform stone restoration work in the following sequence:
 - 1. Remove plant growth.
 - 2. Repair existing brickwork, including replacing existing brick with new, as noted.
 - 3. Rake out joints that are to be repointed.
 - 4. Point mortar joints.
 - 5. Inspect for open mortar joints and repair before cleaning to prevent intrusion of water and other cleaning materials into the wall.
 - 6. Clean masonry surfaces, including removal of any remaining biological growth.
- D. Perform brick restoration work in the following sequence:
 - 1. Remove plant growth.
 - 2. Clean brick surfaces of efflorescence.
 - 3. Rake out joints that are to be repointed.
 - 4. Rebuild brick foundation walls, as indicated in the drawings.
 - 5. Turn around or replace brick at foundation walls.
 - 6. Point mortar joints.
 - 7. Inspect for open mortar joints and repair before cleaning to prevent intrusion of water and other cleaning materials into the wall.
 - 8. Clean brick surfaces, including removal of any remaining biological growth.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products Materials below introduce lists, the following requirements apply for product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
 - 2. Products: Subject to compliance with requirements, provide one of the products specified.
 - 3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 - 4. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 CLAY MASONRY MATERIALS - REPLACEMENT BRICK FOR FOUNDATION WALLS

- A. Building (Common) Brick: ASTM C 62, Grade SW. Use only for areas not exposed to view.
 - 1. Unit Compressive Strength: same as face brick.
 - 2. Size: Match size of face brick, or if not adjacent to face brick, match existing brick plus or minus 1/8" for width and height and plus or minus 1/4 inch for length.
- B. Face Brick: ASTM C 216 Grade SW, Type FBX Provide units with surface texture, size, and shape to match existing brickwork.
 - 1. Initial Rate of Absorption: Less than 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67.
 - 2. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."

3. Size: Provide new brick of same dimensions as existing brick.
4. Color: Match existing.
5. Only historic face brick is to be used on exposed wall surfaces.
6. Source of salvage brick must be identified and salvaged brick must have been tested for the following by an independent testing company paid for by the contractor:
 - a. Test to include compressive strength, 24 hour cold water absorption, 5 hour boil absorption saturation coefficient and initial rate of absorption. The test should be compared to an existing brick.

C. Salvaged Brick Suppliers:

1. Gavin Historical Bricks, Tel 319-354-5251, info@historicalbricks.com.
2. Triangle Brick, 6523 NC Hwy 55, Durham, NC 27713, Tel 800-672-8547.
3. Morris Brick and Stone Co., 108 Ridgedale Avenue, Building 6, Morristown, NJ 07960, Tel 973-539-1176.
4. Or Approved Equal.

- D. The Contractor shall have the option of providing clean, sound, salvaged bricks from other sites, subject to the acceptance of the Architect for color, size, porosity, and texture match.

2.3 MORTAR MATERIALS FOR FOUNDATION MASONRY AND BRICK PIERS

- A. Portland Cement: ASTM C 150, Type I for Brick and Fieldstone Foundation walls and Brick Piers.

1. Provide white cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.
 - a. Federal White Portland Cement. Supplier: Cava Building Supplies, 2007 Washington Avenue, Philadelphia, PA 19146, Tel 215-732-0907.
 - b. Or Approved equal.

- B. High Calcium Hydrated Lime.

1. Manufacturer/Supplier: Limeworks.US 3145 State Road, Telford, PA 18969 Tel 215 536 6706
Product: Carmeuse High Calcium (N) Normal Hydrated Lime
2. Or Approved Equal (Dolomitic Limes are Not Permitted)

- C. Mortar Sand: ASTM C 144 except for joints less than ¼” use aggregate graded with 100% passing the No.4 sieve for the fieldstone walls and No.8 sieve for the brick.

1. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.
2. Color: Provide natural sand of color necessary to produce required mortar color.
3. Provide sand with rounded edges, assume two types of sand needed.
 - a. Manufacturer: George Schofield Co. Inc., 831 E. Main Street, Bridgewater, NJ 08807, Tel 800-827-6257. No substitutions.

- D. Water: ASTM C 270, potable, pH neutral.

2.4 MORTAR REPLICATION

- A. Repointing Mortar: Match the strength and color of the existing mortar.

1. 1 Part Federal White Portland Cement Type 1
1 Part High Calcium Hydrated Lime
3 parts Schofield #107 sand and 3 parts Schofield #125 sand

2.5 MORTAR MIXES

- A. Follow specifications for all work.
- B. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.
 - 1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.
 - 2. All cement and lime must be sieved prior to use.
 - 3. Only one person is permitted to mix mortar, to ensure consistent quality control. Name of mixer and experience must be submitted to architect.
 - 4. A small control sample of the accepted mortar must be submitted to the architect and another sample kept on site. To verify color and texture consistency.
- C. Do not use admixtures of any kind in mortar.

2.6 CLEANING MATERIALS

Use only the surface cleaning materials and techniques identified as acceptable by the Architect after appropriate testing on the masonry surfaces.

- A. Water for Cleaning: Clean, potable, free of oils, acids, alkalis and organic matter.
- B. Brushes: Soft, nylon-bristle brushes only. Chemical cleaners must only be applied by hand with a soft bristle brush or plastic trowel.
- C. Masonry Cleaning:
 - 1. Light soiling's: non-ionic detergent, Orvus manufactured by Proctor & Gamble, Tel 800-332-7787, or approved equal.
 - 2. Medium to heavy soiling: Enviro Klean 2010 All-purpose Surface Cleaner. Manufacturer: Prosoco Inc. Tel 800-332-7787, or approved equal
- D. Blasting Medium: Not permitted.
- E. Tar Removal Product: must be tested and accepted by architect.
 - 1. Chemical: Sure Klean Asphalt & Tar remover. Manufacturer: Prosoco, Inc. P.O. Box 17167, Kansas City, KS 66117, Tel 913-281-2700, or approved equal.
 - 2. Dry Ice Blast Cleaning.

Note: Cleaning tests should be prepared by contractor prior to full-scale cleaning. Test mildest method first.

2.7 MISCELLANEOUS MATERIALS

- A. Masking Tape: Non-staining, nonabsorbent material; compatible with mortar, joint primers, sealants, and surfaces adjacent to joints; and that easily comes off entirely, including adhesive.

- B. Other Products: Select materials and methods of use based on the following, subject to approval of a mockup:
 - 1. Previous effectiveness in performing work involved.
 - 2. Minimal possibility of damaging exposed surfaces.
 - 3. Consistency of each application.
 - 4. Uniformity of the resulting overall appearance.
 - 5. Do not use products or tools that could do the following:
 - a. Remove, alter, or harm the present condition or future preservation of existing surfaces, including surrounding surfaces not in contract.
 - b. Leave residue on surfaces.

PART 3 - EXECUTION

3.1 PROTECTION

- A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from stone restoration work.
 - 1. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of restoration and cleaning work.
- B. Comply with chemical cleaner manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent chemical cleaning solutions from coming into contact with pedestrians, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.
 - 1. Cover adjacent surfaces with materials that are proven to resist chemical cleaners used unless chemical cleaners being used will not damage adjacent surfaces. Use materials that contain only waterproof, UV-resistant adhesives. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.
 - 2. Keep wall wet below area being cleaned to prevent streaking from runoff.
 - 3. Clean from bottom to top of wall.
 - 4. Do not clean stone during winds of sufficient force to spread cleaning solutions to unprotected surfaces.
 - 5. Neutralize and collect alkaline and acid wastes for disposal off Owner's property.
 - 6. Dispose of runoff from cleaning operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.
- C. Prevent mortar from staining face of surrounding masonry and other surfaces.
 - 1. Cover sills, ledges, and projections to protect from mortar droppings.
 - 2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
 - 3. Immediately remove mortar in contact with exposed masonry and other surfaces.
 - 4. Clean mortar splatters from scaffolding at end of each day.
- D. Remove gutters and downspouts adjacent to stone and store where directed by owner during stone restoration and cleaning. Reinstall when stone restoration and cleaning is complete.
 - 1. Provide temporary rain drainage during work to direct water away from building.

3.2 CLEANING, GENERAL

- A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other.
- B. Use only those cleaning methods indicated for each material and location.
 - 1. Do not use wire brushes or brushes that are not resistant to chemical cleaner being used. Do not use plastic-bristle brushes if natural-fiber brushes will resist chemical cleaner being used.
 - 2. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that cleaning methods do not damage stone.
 - a. Equip units with pressure gages – Pressure meters must be installed on all equipment at all times.
 - 3. For chemical cleaner spray application, use low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray tip.
 - 4. For water spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.
 - 5. No high pressure allowed on this project.
- C. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging stone surfaces.
- D. Removing Plant Growth: Completely remove plant, moss, and shrub growth from stone surfaces. Carefully remove plants, creepers, and vegetation by cutting at roots and allowing to dry as long as possible before removal. Remove loose soil or debris from open joints to whatever depth they occur.
- E. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to cleaning methods being used. Extraneous substances include paint, caulking, asphalt, and tar.
 - 1. Carefully remove heavy accumulations of material from surface of masonry with sharp chisel. Do not scratch or chip masonry surface.
- F. Chemical Cleaner Application Methods: Apply chemical cleaners to masonry surfaces to comply with chemical cleaner manufacturer's written instructions; use brush or spray application methods, at Contractor's option. Do not spray apply at pressures exceeding 50 psi. Do not allow chemicals to remain on surface for periods longer than those indicated or recommended by manufacturer.
 - 1. Rinse off chemical residue and soil by working upward from bottom to top of each treated area at each stage or scaffold setting. Periodically during each rinse, test pH of rinse water running off of cleaned area to determine that chemical cleaner is completely removed.
 - 2. Apply neutralizing agent and repeat rinse, if necessary, to produce tested pH of between 6.7 and 7.5.

3.3 CLEANING MASONRY

- A. General: Dry Cleaning Methods:

1. No airborne cleaning particulate methods permitted.

B. Wet Cleaning Methods:

1. When testing cleaning methods, begin with gentlest methods:
 - a. Dry Brush
 - b. Non-ionic Detergent with Water
 - c. Chemical Cleaners
2. Proceed with cleaning in an orderly manner, work bottom to top of each scaffold width and from one end of each elevation to the other.
3. Use only those cleaning methods indicated for each masonry material and location.
4. Perform each cleaning method indicated in a manner which results in uniform coverage of all surfaces, including corners and moldings and which produces an even effect without streaking or damage to masonry surfaces.
5. Remove all residue and soil by working upward from bottom to top of each treated area at each stage or scaffold setting.
6. Keep wall surfaces immediately below area being cleaned wet and free of cleaner rundown and residues to avoid streaking.

C. Water Application Methods:

1. Spray Applications: Spray-apply water to masonry surfaces to comply with requirements indicated for location, purpose, water temperature, pressure, volume and equipment. Unless otherwise indicated, hold spray nozzle not less than 6" from surface of masonry and apply water from side to side in overlapping bands to produce uniform coverage and even effect.
2. Low Pressure Spray: 100-300 psi; 3-6 gallons per minute. Pressure meters must be installed near nozzle on all equipment at all times.

D. Chemical Cleaners:

1. General: Unless otherwise indicated, dilute chemical cleaning materials with water to produce solutions of concentration indicated but not greater than that recommended by chemical cleaner manufacturer.
 - a. Follow conservator's specifications and where necessary, manufacturer's instructions and standards for materials or equipment.
 - b. Remove plant, creepers, vegetation and soil from masonry surfaces and joints by cutting roots and allowing to dry as long as possible prior to removal. Destroy as little masonry as possible in removing vines, creepers and tentacles.
 - c. Use of metal scrapers or metal brushes will not be permitted.

3.4 BRICK BACKUP REMOVAL FOR REBUILD OR REPLACEMENT

- A. This section applies to locations where the brick backup is removed and rebuilt using new brick.
- B. At locations indicated or where directed by Architect, remove brick backup. Carefully removed entire units from joint to joint, without damaging surrounding units, in a manner that permits replacement with full-size units.
- C. Remove in an undamaged condition as many whole stone units as possible.
 1. Remove mortar, loose particles, and soil from stone by cleaning with hand chisels, brushes,

- and water.
- 2. Remove sealants by cutting close to stone with utility knife or chisel and removing remaining sealant by grinding.
- D. Clean masonry surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.
- E. Install replacement back-up brick into bonding and coursing pattern of existing brick.

3.5 REPOINTING EXISTING MASONRY

- A. Rake out and repoint mortar joints to the following extent:
 - 1. All joints in areas indicated.
 - 2. Joints where mortar is missing or where they contain holes.
 - 3. Cracked joints where cracks can be penetrated at least 1/4 inch by a knife blade 0.027 inch thick.
 - 4. Cracked joints where cracks are 1/8 inch or more in width and of any depth.
 - 5. Joints where they sound hollow when tapped by metal object.
 - 6. Joints where they are worn back 1/4 inch or more from surface.
 - 7. Joints where they are deteriorated to point that mortar can be easily removed by hand.
 - 8. Joints, other than those indicated as sealant-filled joints, where they have been filled with substances other than mortar.
 - 9. Joints in areas marked for heavy retooling on the drawings.
- B. Do not rake out and repoint joints where not required.
- C. Rake out joints as follows:
 - 1. Remove mortar from joints to depth of joint width plus 2-1/2 times joint width, but not less than 1/2 inch or not less than that required to expose sound, unweathered mortar.
 - 2. Remove mortar from stonework and brick surfaces within raked-out joints to provide reveals with square backs and to expose stone for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
 - 3. Do not spall edges of stone units or widen joints. Replace or patch damaged stone or brick units as directed by Architect.
 - a. Cut out mortar by hand with chisel and mallet. Do not use power-operated grinders without Architect's written approval based on submission by Contractor of a satisfactory quality-control program and demonstrated ability of operators to use tools without damaging stone. Quality-control program shall include provisions for supervising performance and preventing damage due to worker fatigue.
 - b. Cut out center of mortar joints using angle grinders with diamond-impregnated metal blades. Remove remaining mortar by hand with chisel and mallet. Strictly adhere to written quality-control program. Quality-control program shall include provisions for demonstrating ability of operators to use tools without damaging stone, supervising performance, and preventing damage due to worker fatigue.
- D. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose stone, rotted wood, rusted metal, and other deteriorated items.
- E. Point joints as follows:
 - 1. Rinse stonework-joint surfaces with water to remove dust and mortar particles. Time

- rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen stonework-joint surfaces before pointing.
2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
 3. After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 3/8 inch. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing stone has worn or rounded edges, slightly recess finished mortar surface below face of stone to avoid widened joint faces. Take care not to spread mortar over edges onto exposed stone surfaces or to featheredge mortar.
 4. When mortar is thumbprint hard, tool joints to match original appearance of joints. Remove excess mortar from edge of joint by brushing.
- F. Cure mortar by maintaining in thoroughly damp condition for at least 72 hours, including weekends and holidays.
1. Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.
 2. Adjust curing methods to ensure that pointing mortar is damp throughout its depth without eroding surface mortar.
- G. Where repointing work precedes cleaning of existing stone, allow mortar to harden at least 30 days before beginning cleaning work.

3.6 FINAL CLEANING

- A. After mortar has fully hardened, thoroughly clean exposed brick or stone surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.
1. Do not use metal scrapers or brushes.
 2. Do not use acidic or alkaline cleaners.
- B. During the work, remove from the site discarded cleaning and coating materials, rubbish, cans and rags at the end of each workday.
- C. Wash adjacent woodwork and other non-masonry surfaces. Use detergent and soft brushes or cloths.
- D. Clean mortar and debris from roof; remove debris from gutters and downspouts. Rinse off roof and flush gutters and downspouts.
- E. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, pressure wash surfaces to remove mortar, dust, dirt, and stains.
- F. Test masonry surface to confirm pH neutral range 6-8 and submit results to Architect as part of closeout.

3.7 FIELD QUALITY CONTROL

- G. Notify Preservation Architect representatives in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until Architect's Project representatives have had reasonable opportunity to make inspections and observations of work areas at lift device or scaffold location.

END OF SECTION 040140

SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

- A. For new construction and includes:
 - 1. Concrete masonry units (CMU) reinforced.
 - 2. See drawings for locations.
 - 3. The new lift requires this wall type construction.

1.2 DEFINITIONS

- A. CMU: Concrete masonry unit.
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For reinforcing steel. Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.
- C. Samples for Verification: For each type and color of exposed masonry unit and colored mortar.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type and size of product. For masonry units, include data on material properties and material test reports substantiating compliance with requirements.
- B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
 - 1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
 - 2. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.

1.5 QUALITY ASSURANCE

- A. Sample Panels: Build sample panels to verify selections made under and to demonstrate aesthetic effects. Comply with requirements in Section 01 40 00 "Quality Requirements" for mockups.
 - 1. Build sample panels for each type of exposed unit masonry construction in sizes approximately 60 inches long by high by full thickness.

1.6 FIELD CONDITIONS

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

2.2 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
- B. Integral Water Repellent: Provide units made with integral water repellent for exposed units.
- C. CMUs: ASTM C90.
 - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
 - 2. Density Classification: Normal weight.

2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, 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 C207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of Portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C91/C91M.
- E. Aggregate for Mortar: ASTM C144.
 - 1. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
 - 2. White-Mortar Aggregates: Natural white sand or crushed white stone.
 - 3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- F. Aggregate for Grout: ASTM C404.
- G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- H. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.
- I. Water: Potable.

2.4 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60 (Grade 420).
- B. Masonry-Joint Reinforcement, General: ASTM A951/A951M.
 - 1. Interior Walls: Hot-dip galvanized carbon steel.
 - 2. Exterior Walls: Hot-dip galvanized carbon steel.
 - 3. Wire Size for Side Rods: 0.148-inch (3.77-mm) diameter.
 - 4. Wire Size for Cross Rods: 0.148-inch (3.77-mm) diameter.
 - 5. Wire Size for Veneer Ties: 0.148-inch (3.77-mm) diameter.
 - 6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches (407 mm) o.c.
 - 7. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units.
- C. Masonry-Joint Reinforcement for Single-Wythe Masonry: truss type with single pair of side rods.

2.5 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.

2.6 MORTAR AND GROUT 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. Use Portland cement-lime mortar unless otherwise indicated.
 - 3. For exterior masonry, use Portland cement-lime mortar.
 - 4. For reinforced masonry, use Portland cement-lime mortar.
 - 5. 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. 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.
- C. Mortar for Unit Masonry: Comply with ASTM C270. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
 - 1. For masonry below grade or in contact with earth, use Type M.
 - 2. For reinforced masonry, use Type N.
 - 3. For mortar parge coats, use Type N.
 - 4. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
 - 5. For interior nonload-bearing partitions, Type O may be used instead of Type N.
- D. Grout for Unit Masonry: Comply with ASTM C476.
 - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
 - 2. Proportion grout in accordance with ASTM C476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi (14 MPa).
 - 3. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C143/C143M.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. 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.
- B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

3.2 TOLERANCES

A. Dimensions and Locations of Elements:

- 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
- 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
- 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.

B. Lines and Levels:

- 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
- 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
- 3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
- 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
- 5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.

C. Joints:

- 1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
- 2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
- 3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm).

3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- C. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- D. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- E. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.4 MORTAR BEDDING AND JOINTING

- A. Lay CMUs as follows:
 - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 - 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 - 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 - 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Lay solid masonry units and hollow brick with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Rake out mortar joints at pre-faced CMUs to a uniform depth of 1/4 inch (6 mm) and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.
- D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.5 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
 - 1. Space reinforcement not more than 16 inches (406 mm) o.c.

2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
 3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
 - C. Provide continuity at wall intersections by using prefabricated T-shaped units.
 - D. Provide continuity at corners by using prefabricated L-shaped units.

3.6 REINFORCED UNIT MASONRY

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 2. Limit height of vertical grout pours to not more than 12.67 ft. (3.86 m).

3.7 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Contractor will engage inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Testing Prior to Construction: One set of tests.
- C. Testing Frequency: One set of tests for each 5000 sq. ft. (464 sq. m) of wall area or portion thereof.
- D. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C67 for compressive strength.

- E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C780.
- G. Mortar Test (Property Specification): For each mix provided, according to ASTM C780. Test mortar for mortar air content and compressive strength.
- H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C1019.

3.8 REPAIRING, POINTING, AND CLEANING

- A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. 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. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
 - 3. Protect adjacent surfaces from contact with cleaner.
 - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 - 5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
 - 6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

3.9 MASONRY WASTE DISPOSAL

- A. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 - 1. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.
- B. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

SECTION 051200 – STRUCTURAL STEEL FRAMING

1.1 SUMMARY

- A. Section Includes:
 - 1. Structural steel.
 - 2. Misc. structural repairs to wood framing members

1.2 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site, to be coordinated with regularly scheduled project meetings.

1.4 ACTION SUBMITTALS

- A. Product Data:
 - 1. Structural-steel materials.
 - 2. High-strength, bolt-nut-washer assemblies.
 - 3. Shop primer.
 - 4. Shrinkage resistant grout.
- B. Shop Drawings: Show fabrication of structural-steel components.
- C. Delegated-Design Submittal: For structural-steel connections indicated on Drawings to comply with design loads, include analysis data.

1.5 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Mill test reports for structural-steel materials, including chemical and physical properties.
- C. Source quality-control reports.
- D. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU or is accredited by the IAS Fabricator Inspection Program for Structural Steel (Acceptance Criteria 172).
- B. Installer Qualifications: A qualified Installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.
- C. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with applicable provisions of the following specifications and documents:
 - 1. ANSI/AISC 303.
 - 2. ANSI/AISC 360.
 - 3. RCSC's "Specification for Structural Joints Using High-Strength Bolts."
- B. Connection Design Information:
 - 1. Fabricator's experienced steel detailer shall select or complete connections in accordance with ANSI/AISC 303.
 - a. Select and complete connections using schematic details indicated and ANSI/AISC 360.

2.2 STRUCTURAL-STEEL MATERIALS

- A. Steel Pipe: ASTM A53/A53M, Type E or Type S, Grade B.
- B. Plate: ASTM A36/A36M.
- C. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS AND CONNECTORS

- A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325 (Grade A325M), Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH (ASTM A563M, Class 10S), heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.
 - 1. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1 (Type 8.8-1), compressible-washer type with plain finish.

2.4 PRIMER

- A. Steel Primer:
 - 1. SSPC-Paint 23, latex primer.

2. Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

2.5 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.

2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

2.7 SHOP PRIMING

- A. Shop prime steel surfaces, except the following:

1. Surfaces to Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
2. Surfaces to be field welded.
3. Surfaces of high-strength bolted, slip-critical connections.
4. Galvanized surfaces.
5. Surfaces enclosed in interior construction.

- B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:

1. SSPC-SP 2.
2. SSPC-SP 3.
3. SSPC-SP 7 (WAB)/NACE WAB-4.
4. SSPC-SP 6 (WAB)/NACE WAB-3.

- C. Surface Preparation of Galvanized Steel: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner or in accordance with SSPC-SP 16.

- D. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

- 1.

- E. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.8 SOURCE QUALITY CONTROL

- A. Testing Agency: Contractor to engage a qualified testing agency to perform shop tests and inspections.
 - 1. Allow testing agency access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
 - 2. Bolted Connections: Inspect shop-bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
 - 3. Welded Connections: Visually inspect shop-welded connections in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - a. Liquid Penetrant Inspection: ASTM E165/E165M.
 - b. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - c. Ultrasonic Inspection: ASTM E164.
 - d. Radiographic Inspection: ASTM E94/E94M.
 - 4. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.
- B. Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.
- C. Maintain erection tolerances of structural steel within ANSI/AISC 303.

3.3 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.
 - 1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Contractor to engage a qualified testing agency to perform tests and inspections.

1. Bolted Connections: Inspect bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
2. Welded Connections: Visually inspect field welds in accordance with AWS D1.1/D1.1M.
 - a. In addition to visual inspection, test and inspect field welds in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - 1) Liquid Penetrant Inspection: ASTM E165/E165M.
 - 2) Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - 3) Ultrasonic Inspection: ASTM E164.
 - 4) Radiographic Inspection: ASTM E94/E94M.

END OF SECTION 051200

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Framing with engineered wood products.
3. Wood blocking and nailers.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of process and factory-fabricated product.
2. For preservative-treated wood products.

1.3 INFORMATIONAL SUBMITTALS

A. Material Certificates:

1. For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
2. For preservative-treated wood products. Indicate type of preservative used and net amount of preservative retained.

B. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Engineered wood products.
3. Post-installed anchors.

1.4 QUALITY ASSURANCE

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- ##### A. Lumber: Comply with DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency

certified by the ALSC Board of Review. Grade lumber 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. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content:

1. Dimension Lumber: 19 percent unless otherwise indicated.
2. Timber: 19 percent.

C. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

1. Allowable design stresses, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 PRESERVATIVE TREATMENT

A. Preservative Treatment by Pressure Process: AWWPA U1; Use Category UC2.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that 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 items indicated on Drawings, and the following:

1. Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.
2. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
3. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
4. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 DIMENSION LUMBER FRAMING

A. Framing Other Than Non-Load-Bearing Partitions by Grade: No. 2 grade.

1. Application: Framing other than interior partitions.
2. Species:
 - a. Douglas fir-larch; WCLIB or WWPA.

- B. Framing Other Than Non-Load-Bearing Partitions by Performance: Any species and grade with a modulus of elasticity of at least 1,600,000 psi and an extreme fiber stress in bending of at least 900 psi for 2-inch nominal (38-mm actual) thickness and 12-inch nominal (286-mm actual) width for single-member use.

- 1. Application: Framing other than interior partitions.

2.4 ENGINEERED WOOD PRODUCTS

- A. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D5456 and manufactured with an exterior-type adhesive complying with ASTM D2559.
 - 1. Extreme Fiber Stress in Bending, Edgewise: 2600 psi (17.9 MPa) for 12-inch nominal-(286-mm actual-) depth members.
 - 2. Modulus of Elasticity, Edgewise: 2,000,000 psi (13 700 MPa).

2.5 MISCELLANEOUS LUMBER

- A. Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
- B. Dimension Lumber Items: Construction or No. 2 grade lumber of any species.

2.6 FASTENERS

- A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.
 - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M of Type 304 stainless steel.
- B. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC58, ICC-ES AC193 or ICC-ES AC308 as appropriate for the substrate.

2.7 METAL FRAMING ANCHORS

- A. Allowable design loads, as published by manufacturer, shall meet or exceed those of basis-of-design products. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a

qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

- B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G60 (Z180) coating designation.
 - 1. Use for interior locations unless otherwise indicated.
- C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A653/A653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.
 - 1. Use for wood-preserved-treated lumber and where indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- C. Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- D. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- E. Do not splice structural members between supports unless otherwise indicated.
- F. Comply with AWPAM4 for applying field treatment to cut surfaces of preservative-treated lumber.
- G. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
 - 2. ICC-ES evaluation report for fastener.

3.2 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

SECTION 062013 - FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Restoration and repair of all existing interior and exterior woodwork.
2. Exterior wood cornices, trim, soffits, columns and all other exterior wood repairs.
3. Various wood trim and sill repairs at openings on both the interior and exterior.
4. Wood clapboard (also referred to as siding) restoration and replacement. See Section 099000 "Painting and Lead Safe Practices." for removal of all paint to bare wood.
5. Custom milled railings and balusters.
6. Exterior and Interior bead board and trim.
7. Finished woodwork on interior including paneling, baseboard, and stair elements to be repaired.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.
2. Section 064023 – Interior Architectural Woodwork.
3. Section 080314 – Historic Treatment of Wood Doors.
4. Section 080352 – Historic Treatment of Wood Windows.
5. Section 099000 "Painting and Lead Safe Practices." This includes removal of all paint to bare wood.
6. Section 099300 – Staining and Transparent Finish Restoration. This includes where noted removal of all clear coat finishes.
7. Section 090364 – Wood Floor Restoration and Replacement.
8. Drawings provide schedules of quantities of wood trim and clapboard replacement to be included in project.
9. Unit prices provide an add or deduct for unit quantities of replacement.

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 ACTION SUBMITTALS

- A. Provide a wood species identification by a wood scientist for interior wood. The attached schedule of wood species is for exterior only.

- B. 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.
- C. Shop Drawings:
1. **After paint removal to bare wood** provide detailed photographs of each deteriorated wood element indicating scope of repairs.
 2. Submit a schedule showing the scope of repair work and quantities of work annotated on elevations and on room schedules, for review on site with architect. Do not assume the locations indicated on the Drawings are the exact locations of wood repairs, full assessment can only be made after paint removal.
 3. Provide detailed drawings clearly indicating scope of repair to existing woodwork. Drawings and details at 6"= 1'-0". Full scale drawings of all replacement profiles including jointing methods.
- D. Submit samples of BOTH existing wood element and proposed replacement wood element to match. Provide information on species and cut of trim. Quality and grade to match existing.
1. Wood Clapboard.
 2. Roof Trim including but not limited Soffit, rake board and eaves board/cornice.
 3. Trim – corner boards.
 4. Opening – window and door trim.
 5. Beadboard trim
 6. Interior wood trim.
 7. Miscellaneous trim and woodwork as deemed necessary by architect in 12” lengths.
- E. Samples for Verification:
1. For each species and cut of trim, with half of exposed surface finished; 50 sq. in for lumber and 8 by 10 inches for trim lengths.
- F. Mockups: Prepare mockups of historic treatment repair processes to demonstrate aesthetic effects and to set quality standards for materials and execution, and for fabrication and installation. Prepare mockups so they are as inconspicuous as practicable.
1. Locate mockups on existing surfaces where directed by Architect.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 3. Retain subparagraph below if the intention is to make an exception to the default requirement in Section 014000 "Quality Requirements" for demolishing and removing mockups. These mockups are typically installed as part of existing building rather than erected separately.
 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 INFORMATIONAL SUBMITTALS

- A. Compliance Certificates: For wood that is not marked with grade stamp.
- B. Wood historic treatment Program to be submitted prior to beginning work.
- C. Wood species identification report.

- D. Qualification Data: For historic treatment specialist.
- E. Wood source suppliers.

1.6 PREINSTALLATION MEETING

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review minutes of Preliminary Historic Treatment Conference that pertain to historic wood repair.
 - 2. Review methods and procedures related to historic wood repair, including, but not limited to, the following:
 - a. Historic treatment specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Materials, material application, sequencing, tolerances, and required clearances.
 - c. Fire-protection plan.
 - d. Wood historic treatment program.
 - e. Coordination with building occupants and other trades.

1.7 SEQUENCING AND SCHEDULEING

- A. Perform historic wood repair in the following sequence, which includes work specified in this and other Sections:
 - 1. Before removing wood components for on-site or off-site repair, tag each component with location-identification numbers. Indicate on tags and building plans the locations of each component, such as "Paneling on West Side of Room 101." or "wood siding row XX east elevation" ..
 - 2. Sort units by condition, separating those that need extensive repair.
 - 3. General Wood-Repair Sequence:
 - a. Clean surface
 - b. Remove paint to bare wood.
 - c. Repair wood by replacement, partial replacement (dutchman repair), and linseed oil putty patching.
 - d. Sand, prime, fill, sand again, and prime surfaces again for refinishing.
 - e. Reinstall using linseed oil putty for open joints and counter sunk stainless steel attachments
 - f. Repair and refinish (and replace hardware if required).
 - g. Touch up finishes.

1.8 QUALITY ASSURANCE

- A. Historic Treatment Specialist Qualifications: A qualified historic wood-repair specialist, experienced in repairing, refinishing, and replacing wood in whole and in part. Experience only in fabricating and installing new woodwork is insufficient experience for wood historic treatment work.

- B. Wood Historic Treatment Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for historic treatment work, including protection of surrounding materials and Project site.
 - 1. If materials and methods other than those indicated are proposed for any phase of historic treatment work, add a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation.
 - 1. Protect materials from weather by covering with waterproof sheeting, securely anchored.
 - 2. Provide for air circulation around stacks and under coverings.
- B. Pack, deliver, and store products in suitable packs, heavy-duty cartons, or wooden crates; surround with sufficient packing material to ensure that products will not be deformed, broken, or otherwise damaged.
- C. Until installed or re-installed, store products inside a well-ventilated area and protect from weather, moisture, soiling, abrasion, extreme temperatures, and humidity, and where environmental conditions comply with manufacturer's requirements.
- D. Perform wood restoration work only when ambient weather conditions are within the recommended limits by the epoxy and finish manufactures.

1.10 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.

1.11 WARRANTY

- A. Installer's Warranty for all woodwork: Installer agrees to repair or replace components that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, deformation or deterioration beyond normal weathering.

PART 2 - PRODUCTS

2.1 HISTORIC WOOD REPAIR GENERAL

- A. Quality Standard: Comply with applicable requirements in Section 12, “Historic Restoration Work”, and related requirements in AWI/AWMAC/WI’s “Architectural Woodwork Standards” for construction, finishes, grade rules, and other requirements unless otherwise indicated.
 - 1. Exception: Industry practices cited in Section 12, Article 1.5 “Industry Practices”, of the Architectural Woodwork Standards do not apply to the work of this Section.
- B. Lumber: To comply with NIST PS 20 and approved grading rules and inspection agencies.
- C. Provide grade stamps or written certification for all lumber unless salvaged. Certification of species and grade from independent qualified inspector for all salvaged/reclaimed wood.

2.2 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of inspection agency, indicating grade, species, moisture content at time of surfacing, and mill.
 - 2. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by inspection agency.
- B. All material to be maximum density wood.

2.3 WOOD REPLACEMENT

- A. Wood, General: Clear fine-grained lumber; kiln dried to a moisture content of 6 to 12 percent at time of fabrication; free of visible finger joints, blue stain, knots, pitch pockets, and surface checks larger than 1/32 inch deep by 2 inches wide.
 - 1. Species: Match species of each existing type of wood component or assembly unless otherwise indicated.
 - 2. Match existing species based on scientific wood identification. The Contractor will be required to use wood species and grades that match the existing wood to be repaired or replaced within an existing wood run. Wood must also have a matched ring count and equal or better grade of wood.
 - 3. The Contractor will be required to arrange and pay for at least 15 additional samples to verify for wood species type and grade.
 - 4. It is important that the wood grain and pattern is replicated. Replacement wood matches should not be submitted until finish has been completed to allow the Architect to compare proposed repair wood and existing woods.
 - 5. It is important that the wood grain and pattern is replicated especially where replacement wood will have a clear finish. Replacement wood matches should not be submitted until opaque finish removal has been completed to allow the Architect to compare proposed new wood with existing wood to be repaired.

6. Salvage Woods: The owner requires the use of high quality salvaged woods for this project. All wood should be visually inspected by the Architect, prior to installation. Wood to be free from significant splits, cracks and stakes, and have a minimum of 12 growth rings per inch. Wood must be free from all rot and fungus. Maximum moisture content 8%-12%.

2.4 WOOD

- A. Only for wood not associated with spliced in wood repairs:
 1. Species and Grade: C Grade F.A.S (Quality) ALASKAN YELLOW CEDAR (*chamaecyparis nootkatensis*), NLGA.
 2. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
 3. Ring Count: All replacement wood whether new or salvages to have a minimum ring count of 12 rings per inch or more to match existing wood to be replaced. Wood to be free from significant splits, cracks and stakes and from all rot and fungus. Salvaged wood from a reputable source will be acceptable but will require inspection by a certified inspector.
 4. Face Surface: 100% Edge grain. Surface smooth and clear of all knots on exposed exterior face.
- B. Exterior Replacement Clapboards (Siding) and Associated Trim:
 1. Species and Grade: C Select Grade F.A.S (Quality) ALASKAN YELLOW CEDAR (*chamaecyparis nootkatensis*), NLGA.
 2. Clapboard Size: Custom size to replicate existing clapboard.
 3. Trim Size: As noted on drawings and field verified from existing samples removed from replication.
 4. Maximum moisture content: 15 percent with at least 85 percent of shipment of 12 percent or less.
 5. Lumber Clapboard: Kiln-dried lumber siding complying with DOC PS 20.
 6. Surface: 100% Edge Grain.
- C. Exterior wood decking at porch floor:
 1. Species and Grade: C Grade F.A.S (Quality) ALASKAN YELLOW CEDAR (*chamaecyparis nootkatensis*), NLGA.
 2. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
 3. Ring Count: Old growth salvaged wood with a minimum ring count of 12 rings per inch or more. Wood to be free from significant splits, cracks, warps and stakes and from all rot and fungus. Salvaged wood from a reputable source will be acceptable but will require inspection by a certified inspector.
 4. Face Surface: 100% Edge grain. Surface smooth and clear of all knots on exposed exterior face.
 5. Joints: Butt. Tongue and groove not acceptable.
 6. Size: 3-1/2" width, thickness per drawings.
 7. Finish: Sand Painted. See paint specification.

2.5 WOOD REPAIR REPLACEMENT SPECIES

- A. Provide wood for repairs to existing wood including dutchman, and splice in trim repairs: Where possible use salvaged old growth wood to match existing wood used in original construction based on scientific wood identification by a wood inspector deemed qualified by the Architect. All wood to have a minimum of 12 growth rings/inch

- A. Wood Species Identification: The wood species were identified in the previous phase of work. All existing wood is clear, knot free with at least 12 growth rings per inch and 100% edge grain. The samples identified are included in the attached report and include:
1. Eastern White Pine to be matched with existing Eastern White Pine
 2. Northern White and Atlantic White Cedar to be matched with Alaskan Yellow Cedar
 3. Southern Pine to be matched with Eastern White Pine
- B. Lumber for Painted Finish
1. Species and Grade: Atlantic white cedar. Clear Select (Quality); NeLMA, NLGA.
 2. Species and Grade: Eastern white pine, Clear Select; NeLMA or NLGA.
 3. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
 4. Ring Count: Old growth wood with a minimum ring count of 12 rings per inch or more to match existing wood to be replaced. Wood to be free from significant knots, splits, cracks and stakes and from all rot and fungus. Salvaged wood from a reputable source will be acceptable but will require inspection by architect.
 5. Face Surface: Surface (smooth) for painting and clear of knots on exposed exterior face. To be 100% edge grain.
 6. Finger jointing not permitted.

2.6 WOOD SUPPLIERS

- A. Wood suppliers:
1. Medford Cedar, 59 Old Red Lion Road, Southampton, NJ 08088, Tel 609-859-1400, Fax 609-859-2778; email: kyle@medfordcedar.com
 2. Cedar Specialties, 617 Stokes Road, Suite 4-199, Medford, NJ 08055, Tel 609-678-0134, email: customerservice@cedarspecialties.com
 3. Schairer Bros. Saw Mill, 254 S. Bremen Avenue, Egg Harbor City, NJ 08215, Tel 609-965-0996, Fax 609-965-4040, email: schairerbros@verizon.net
 4. Rex Lumber Company, Englishtown, NJ, Tel 800-631-2108
 5. Maibec, 202-1984, 5^e Rue, Levis QC G6W 5M6, Tel 418-659-3323, Toll Free 800-363-1930, Fax 418-653-4354, www.maibec.com
 6. Or approved equal.

2.7 SALVAGED WOOD SUPPLIERS

- A. Salvaged wood suppliers:
1. Tindalls Virgin Timber, 700 Nottingham Rd., Peach Bottom, PA 17563, Phone: 717-548-2435, <http://tindallstimbers.com>
 2. Vintage Wood & Forged Iron, 8 Township Drive, Paradise, PA 17562, Phone: 717-844-2270, <http://vintagewoodandforgediron.com>
 3. Or approved equal.

2.8 PAINT REMOVAL

- A. See Specification Section 099113 Painting & Lead Safe Practices for all paint removal.

2.9 MISCELLANEOUS MATERIALS

- A. Fasteners for Exterior Finish Carpentry: Provide nails or screws, in sufficient length to penetrate not less than 1-1/2 inches into wood substrate.
 - 1. For face-fastening siding, provide wood ringed-shank siding nails in Type 316 stainless steel.
 - 2. For applications not otherwise indicated, provide Type 316 stainless steel fasteners.
- B. Flashing: Comply with requirements in Section 076200 "Sheet Metal Flashing and Trim" (Lead Coated Copper) for flashing materials installed in exterior finish carpentry.
- C. Minor Wood Repairs use 100% Linseed Oil Putty and Oakum to fill larger gaps in wood.
- D. Fill of Counter sunk nails use 100% Linseed Oil Putty.

2.10 FABRICATION

- A. Back out or kerf backs of standing and running trim wider than 5 inches, except members with ends exposed in finished work.
- B. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius and edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- 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.

3.2 PAINT REMOVAL

- A. Remove all paint using a pH neutral process. Follow manufacturer's instructions and comply with all VOC requirements and Lead Paint Removal Safe Practices.
- B. Properly test all wood after paint removal for pH neutrality. A minimum of 5 random core tests will be requested to be provided by the contractor during the work, in order to maintain quality control. These tests are to be included as part of the base contract.

3.3 WOOD REPAIR/DUTCHMAN

- A. Severely rotten, cracked, warped or split wood: Install new wood dutchman spliced in to match profile of member being repaired. Cut back existing wood 1" beyond rot. Spliced repair should

be tight and flush with the existing profile and not visible after painting.

- B. Surface wood deterioration: Treat wood with a fungicide. Apply paste of putty filler to eroded voids. Fill interior voids by saturating the wood with putty.
- C. Loose joints between stiles and rails: Secure loose joints by installing a blind wood dowels. Straighten the sash frame by setting it on a jig and using pipe clamps.
- D. Sand all surfaces in preparation for repainting.
- E. Install restored sash plumb, level and true to line, without warp to frame or sash. Provide proper support and anchor securely in place.
- F. Salvaged woods: The owner prefers the use of high quality salvaged woods for wood dutchman repair. All wood should be visually inspected by the County Representative, prior to installation. Wood is to be free from significant splits, cracks and stakes, with a minimum of 12 growth rings per inch. Wood must be free from all knots, rot and fungus.

3.4 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Finishes
 1. Cut to required lengths and prime ends, for opaque finishes apply to all six sides of wood to be finished
 2. Comply with requirements in Section 099113 Painting & Lead Safe Practices and Section 099300 Staining and Transparent Finish Restoration

3.5 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.
- B. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials.
 1. Use concealed shims where necessary for alignment.
 2. Scribe and cut exterior finish carpentry to fit adjoining work.
 3. Refinish and seal cuts as recommended by manufacturer.
 4. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining exterior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
 5. Coordinate exterior finish carpentry with materials and systems in or adjacent to it.
 6. Provide cutouts for mechanical and electrical items that penetrate exterior finish carpentry.

3.6 STANDING AND RUNNING TRIM INSTALLATION

- A. Install to match existing running trim.

Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long, except where necessary for repairs to existing wood.

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.
1. Cope at returns and miter at corners to produce tight-fitting joints, with full-surface contact throughout length of joint.
 2. Plane backs of casings to provide uniform thickness across joints, where necessary for alignment.
- C. Where face fastening is unavoidable, countersink fasteners, fill surface flush with linseed oil putty, and sand unless otherwise indicated.

3.7 ADJUSTING

- A. Replace exterior finish carpentry that is damaged or does not comply with requirements.
1. Finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.
 2. The repair should not be discernible from 10 feet away.
- B. Adjust joinery for uniform appearance.
- C. Use linseed oil putty to fill any gaps.

3.8 CLAPBOARD/SIDING

- A. Reinstall existing clapboard in same location.
- B. Install edge grain lumber.
- C. Install courses of horizontal siding to be spaced so that a single board runs continuously above and below windows and above doors without notching. Siding that is 6" wide should have at least 1" overlap between courses. Siding that is 8" or wider should overlap 1" to 1 1/2", depending on spacing required between window heights.
- D. Install siding butted snugly and squarely against door and window casings, corner boards, and adjoining boards. Miter corners to avoid leaving a hollow space under the corner where water can collect. End prime all cut edges.
- E. All siding to have stainless steel Type 316 counter sunk finish siding nails, fill surface flush with linseed oil putty allow for necessary curing times before painting, sand , prime and paint. No siding to be penetrated by more than one fastener. Space attachments accordingly to avoid double nailing siding. Install siding nails to align with wood framing members.

3.9 CLEANING

- A. Clean exterior finish carpentry on exposed and semi-exposed surfaces.

- B. Clean exposed surfaces immediately after historic wood repair. Avoid damage to coatings and finishes. Remove excess putty, dirt, and other substances.
- C. Touch up factory-applied finishes to restore damaged or soiled areas.
- D. Do not leave any wood surfaces exposed for more than 24 hours in dry weather and never during wet or humid weather.

3.10 PROTECTION

- A. Protect wood surfaces from contact with contaminating substances resulting from construction operations. Monitor wood surfaces adjacent to and below exterior concrete and masonry during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances contact wood surfaces, remove contaminants immediately.
- 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 062013

Wood Sample Locations:

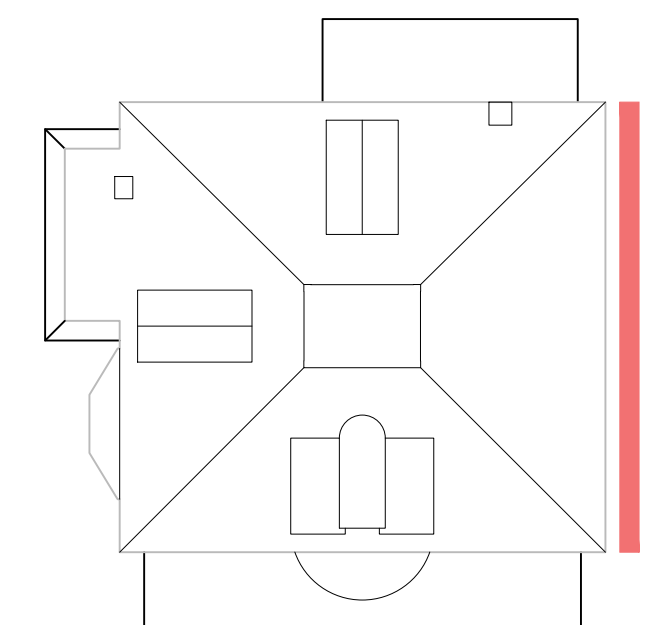
Historic Building Architects, LLC

312 WEST STATE ST. TRENTON, NJ 08618
TEL 609 393 3999 FAX 609 393 4333

CERTIFICATE OF AUTHORIZATION # AC 245
EXPIRES 01/31/2024

OUTBUILDING REHABILITATION & EXTERIOR REPAIRS AT THE MARY ETTA COX HOUSE
OCEAN COUNTY PARKS & RECREATION
353 NORTH MAIN STREET
BARNEGAT, NJ 08005
BLOCK 168, LOT 5

ANNABELLE RADCLIFFE-TRENNER R.A. NJ# AI 13776
KEY:



SEE HE-A200 FOR EXTERIOR RESTORATION LEGEND & GENERAL NOTES.

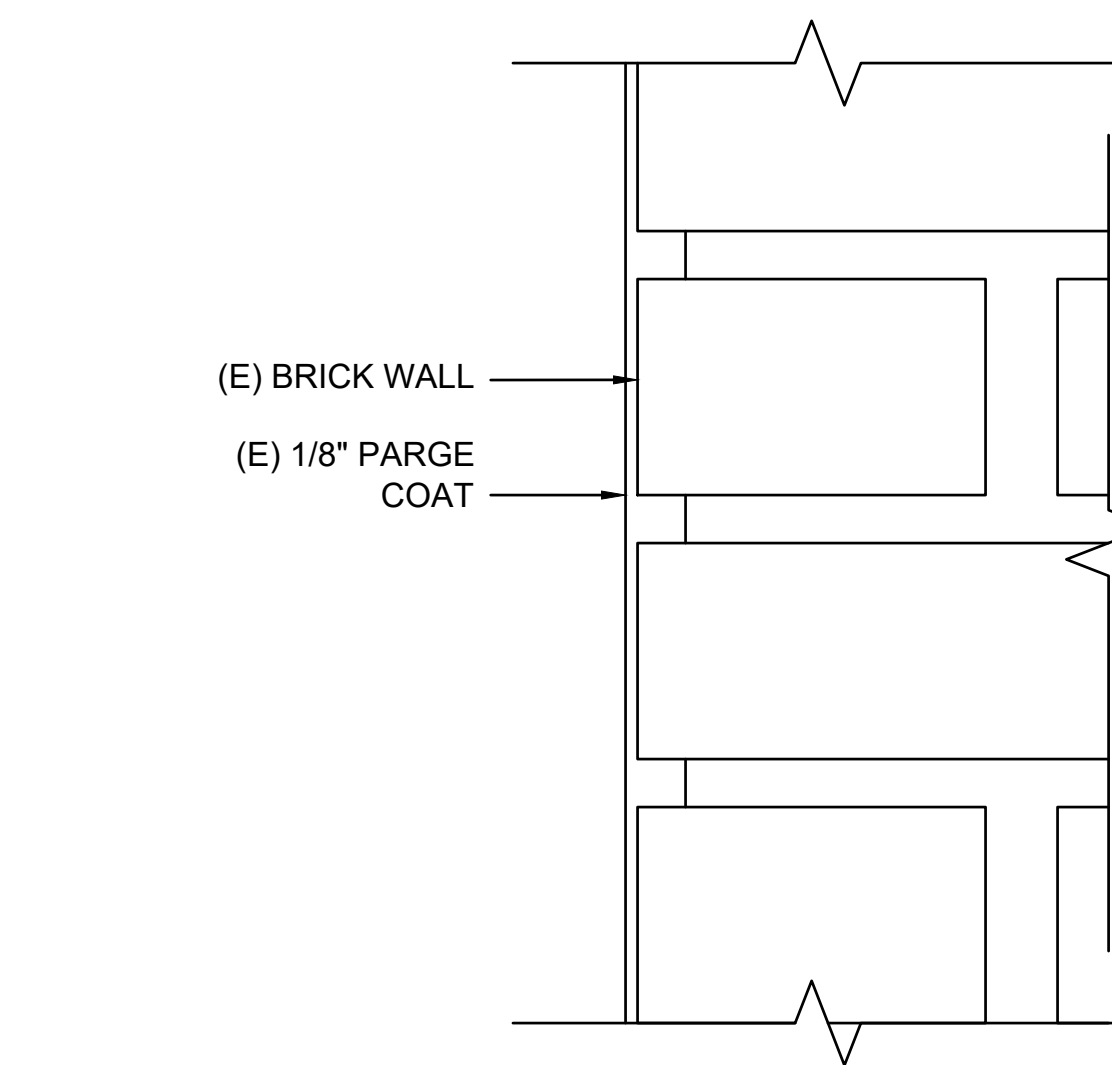
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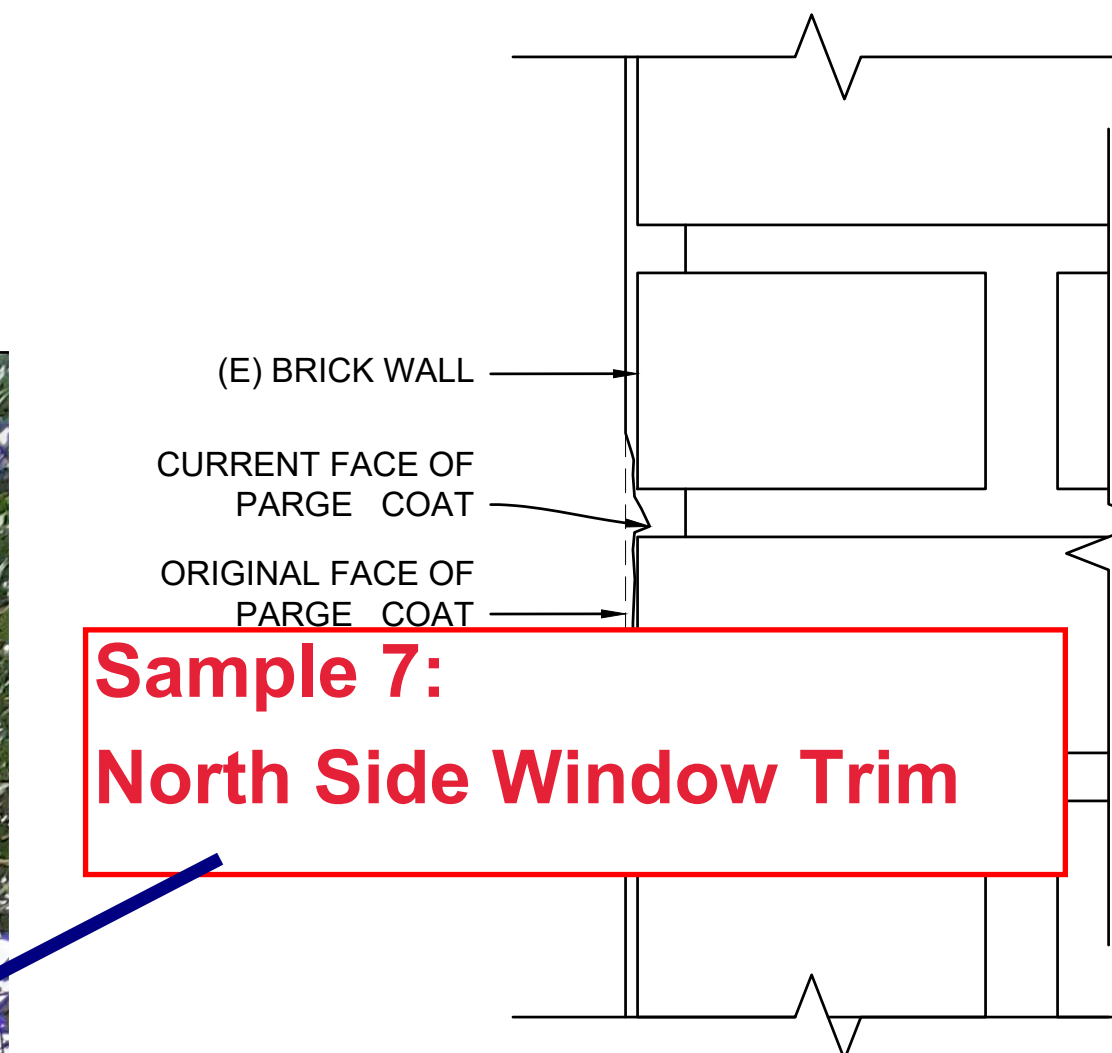
DATE: 07/01/2022
SCALE: As Noted
DRAWN BY: RC
ISSUANCE:
REVISIONS & SUBMISSIONS: DATE:

North Elevation & Stucco Repair

HE-A201

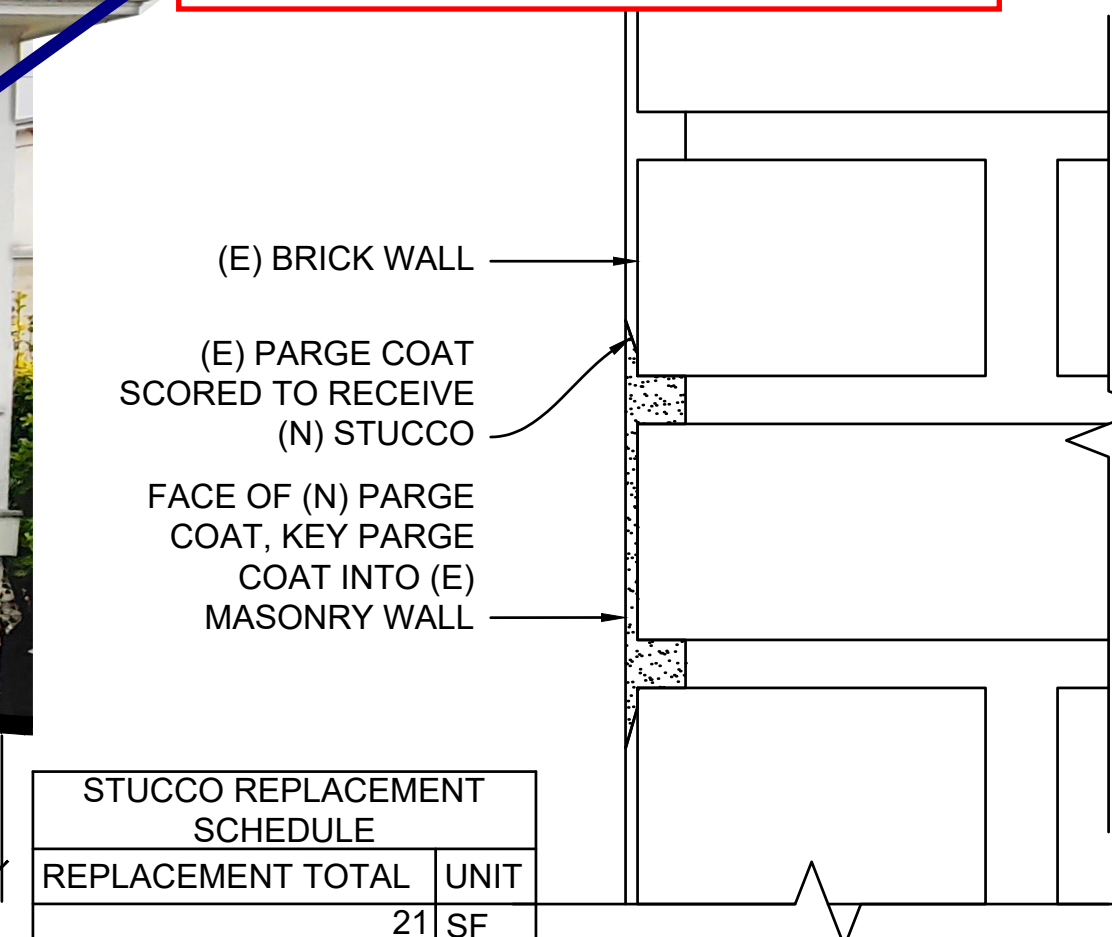


2 TYP (E) PARGING SECTION
HE-A201 SCALE: 6" = 1'



Sample 7:
North Side Window Trim

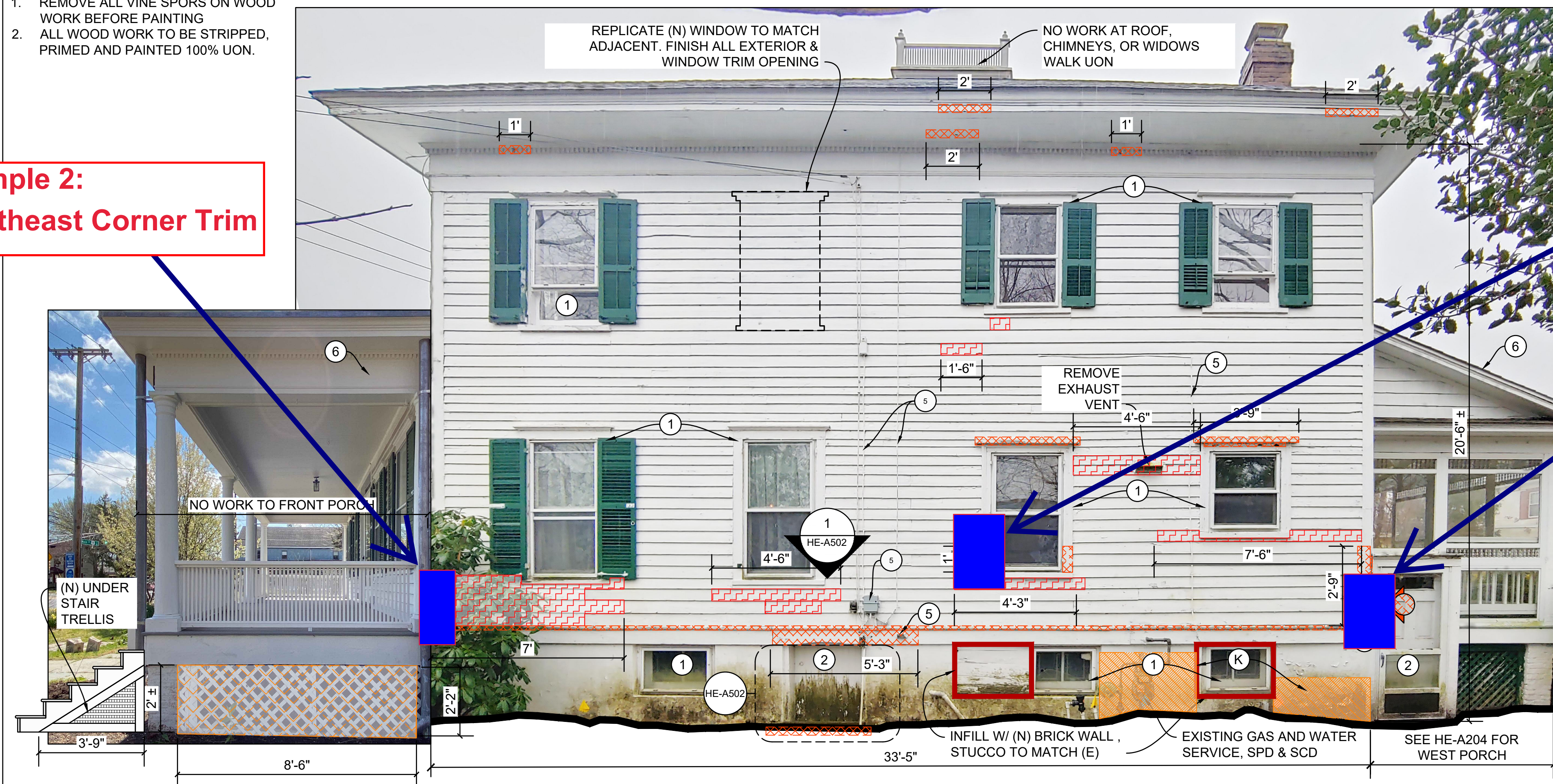
3 Sample 3:
North Corner Trim



4 PARGING REPAIR DETAIL
HE-A201 SCALE: 6" = 1'

- NOTE:
1. REMOVE ALL VINE SPORS ON WOOD WORK BEFORE PAINTING
 2. ALL WOOD WORK TO BE STRIPPED, PRIMED AND PAINTED 100% UON.

Sample 2:
Northeast Corner Trim



1 NORTH ELEVATION
HE-A201 SCALE: 3/8" = 1'

Wood Sample Locations:

Historic Building Architects, LLC

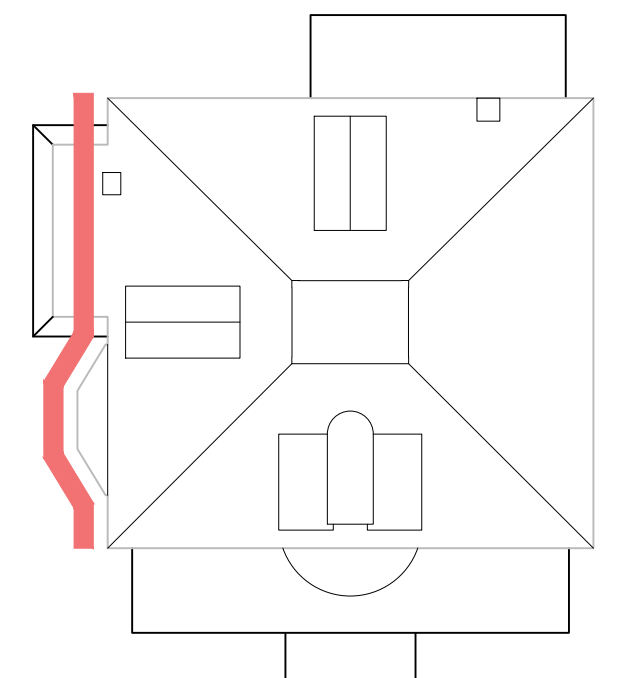
312 WEST STATE ST. TRENTON, NJ 08618
TEL 609 393 3999 FAX 609 393 4333

CERTIFICATE OF AUTHORIZATION # AC 245
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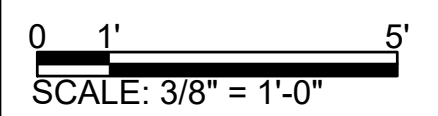
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KEY:



SEE HE-A200 FOR EXTERIOR RESTORATION LEGEND & GENERAL NOTES.



DATE:	07/01/2022
SCALE:	As Noted
DRAWN BY:	RC
ISSUANCE:	
REVISIONS & SUBMISSIONS:	DATE:

South Elevation

HE-A203



**SAMPLE 4:
South Porch Trim**

**SAMPLE 5:
South Side Clapboard**

**SAMPLE 6:
South Side Shingle**

**SAMPLE 1:
South Window Sill**

1 SOUTH ELEVATION
HE-A203 SCALE: 3/8" = 1'

NOTE:
1. REMOVE ALL VINE SPORS ON WOOD WORK BEFORE PAINTING
2. ALL WOOD WORK TO BE STRIPPED, PRIMED AND PAINTED 100% UON.

WOOD SPECIES IDENTIFICATION SUMMARY:**Sample #1: South Window Sill**

Submitted Sample ID: 1: South Window Sill House Sample
Source: Mary Etta Cox House
Component: Window Sill
Geographic Location: Barnegat, NJ
Construction Date: c. 1829 (stage 1), c. 1948 (stage 2), 1904 (renovation)
Wood Species: Atlantic white cedar (*Chamaecyparis thyoides*)

Sample #2: Northeast Corner Trim

Submitted Sample ID: 2: North House Corner Trim Sample
Source: Mary Etta Cox House
Component: Trim
Geographic Location: Barnegat, NJ
Construction Date: c. 1829 (stage 1), c. 1948 (stage 2), 1904 (renovation)
Wood Species: Southern Pine group (*Pinus* spp.)
Alternative Species: Lodgepole pine (*P. contorta*), Jeffrey pine (*P. jeffreyi*), and Jack pine (*P. banksiana*)

Sample #3: North Corner Trim

Submitted Sample ID: 3: North Corner Trim Sample
Source: Mary Etta Cox House
Component: Trim
Geographic Location: Barnegat, NJ
Construction Date: c. 1829 (stage 1), c. 1948 (stage 2), 1904 (renovation)
Wood Species: Atlantic white cedar (*Chamaecyparis thyoides*)

Sample #4: South Porch Trim

Submitted Sample ID: 4: South Porch Trim Sample
Source: Mary Etta Cox House
Component: Trim
Geographic Location: Barnegat, NJ
Construction Date: c. 1829 (stage 1), c. 1948 (stage 2), 1904 (renovation)
Wood Species: Eastern white pine (*Pinus strobus* L.)

Sample #5: South side Clapboard

Submitted Sample ID: 5: House South Clapboard
Source: Mary Etta Cox House
Component: Clapboard
Geographic Location: Barnegat, NJ
Construction Date: c. 1829 (stage 1), c. 1948 (stage 2), 1904 (renovation)
Wood Species: Atlantic white cedar (*Chamaecyparis thyoides*)

Sample #6: South side Shingle

Submitted Sample ID: 6: South Side House Shingle
Source: Mary Etta Cox House
Component: Shingle
Geographic Location: Barnegat, NJ
Construction Date: c. 1829 (stage 1), c. 1948 (stage 2), 1904 (renovation)
Wood Species: Northern white cedar (*Thuja occidentalis*)

Sample #7: North side window Trim

Submitted Sample ID: 7: North House Window Trim
Source: Mary Etta Cox House
Component: Trim
Geographic Location: Barnegat, NJ
Construction Date: c. 1829 (stage 1), c. 1948 (stage 2), 1904 (renovation)
Wood Species: Eastern white pine (*Pinus strobus* L.)

~~**Sample #8: Garage Clapboard**~~~~Submitted Sample ID: 8: North Barn Clapboard
Source: Mary Etta Cox House
Component: Clapboard
Geographic Location: Barnegat, NJ
Construction Date: c. 1829 (stage 1), c. 1948 (stage 2), 1904 (renovation)
Wood Species: Northern white cedar (*Thuja occidentalis*)~~

NOTES:

Thank you for submitting your samples for wood identification. Eight samples were examined for macroscopic anatomical features and microscopically using standard wood identification techniques:

Sample #1: South Window Sill House Sample

Sample description: One sample measuring approximately 1 ½" x 2" x 4 ½". Sample weathered on exterior surfaces. Growth rate eight tree rings per inch, measured over two inches.

Macroscopic features: Color brown. No odor. Grain straight. Wood moderately light and moderately soft. Growth rings distinct, medium wide to wide, and delineated by darker latewood zone. Earlywood/latewood transition gradual. Resin canals absent.

Microscopic features: Bordered pits in one row and infrequently paired on the radial walls. Cross-field pitting cupressoid, small, uniform in size, 1-4 per cross-field. Longitudinal parenchyma apotracheal-diffuse and banded. End walls smooth. Rays uniseriate, 1-14 cells in height. Ray tracheids wanting.

Conclusions: The sample is identified as Atlantic white-cedar (*Chamaecyparis thyoides*), based on macroscopic and microscopic anatomical features.

Sample #2: North House Corner Trim Sample

Sample description: One sample measuring approximately ½" x 1" x 8". Wood decay present. Sample of sufficient integrity for analysis. Growth rate not determined due to insufficient cross section.

Macroscopic features: Color brown. No odor. Grain straight. Hardness unavailable due to decay. Growth rings distinct, of medium width to wide, and delineated by darker latewood zone. Earlywood/latewood transition abrupt with distinct wide latewood zones. Resin canals present.

Microscopic features: Tracheids with bordered pits in one row and frequently paired, pitting opposite. Cross-field pitting pinoid, variable in shape and size, with generally 2-5 pits per cross-field. Rays uniseriate and fusiform. Ray tracheids present in both types of rays, marginal and interspersed, prominently dentate, forming a reticulate pattern. Ray parenchyma thin-walled. Microscopic features generally distorted and obscured due to fungal decay.

Conclusions: The sample is identified as the Southern Pine group of hard pines based on the microscopic anatomical features. Southern pines include several economically important species such as loblolly (*Pinus taeda* L.), longleaf (*P. palustris* Mill.), shortleaf (*P. echinata* Mill.), and slash pine (*P. elliottii* Engelm.). Southern pines cannot be separated into species based on the wood anatomy and are marketed and known in the trade as

Southern Yellow Pine (SYP)¹. Alternative wood species of hard pines other than the Southern pine group are proposed due to high level of decay of diagnostic anatomical features precluding separation of similar wood species. Alternative species include lodgepole pine (*P. contorta*), Jeffrey pine (*P. jeffreyi*), and Jack pine (*P. banksiana*).

Sample #3: North Corner Trim Sample

Sample description: One sample measuring approximately 1" x 1" x 6". Sample weathered on exterior surfaces. Growth rate approximately nine tree rings per inch, measured across one inch.

Macroscopic features: See notes for Sample #1.

Microscopic features: See notes for Sample #1.

Conclusions: The sample is identified as Atlantic white-cedar (*Chamaecyparis thyoides*), based on macroscopic and microscopic anatomical features.

Sample #4: South Porch Trim Sample

Sample description: One sample measuring approximately 1" x 1 ½" x 8". Sample painted on exterior surfaces. Growth rate approximately 36 tree rings per inch, measured across 1 5/16".

Macroscopic features: Color brown to reddish brown. No odor. Grain straight. Wood moderately light and moderately soft. Growth rings distinct, delineated by darker narrow latewood zone. Earlywood/latewood transition gradual. Resin canals present. Longitudinal resin canals solitary, conspicuous, fairly numerous, appearing as whitish flacks and evenly distributed in the central and outer part of the ring.

Microscopic features: Bordered pits in one row and frequently paired on the radial walls. Cross-field pitting fenestriform to pinoid, 1-2 per cross-field. Rays uniseriate and fusiform. Nondentate ray tracheids present in both types of rays, marginal and interspersed. Resin canals with thin-walled epithelium. Maximum diameter of longitudinal resin canals 150 µm. Transverse resin canals with a diameter of 30-60 µm.

Conclusions: Based on macroscopic and microscopic anatomical features, the sample is identified as eastern white pine (*Pinus strobus* L.).

Sample #5: House South Clapboard

Sample description: One sample measuring approximately ¾" x 3" x 3". Sample weathered on exterior surfaces. Growth rate approximately 18 tree rings per inch, measured across 1 ½".

Macroscopic features: See notes for Sample #1.

Microscopic features: See notes for Sample #1.

¹ Gaby, L.I. 1985. The Southern Pines. U.S. Department of Agriculture, Forest Service, FS-256.

Conclusions: The sample is identified as Atlantic white-cedar (*Chamaecyparis thyoides*), based on macroscopic and microscopic anatomical features.

Sample #6: South Side House Shingle

Sample description: One sample measuring approximately $\frac{3}{4}$ " x 3" x 3". Sample weathered on exterior surfaces. Growth rate approximately 12 tree rings per inch, measured across 1".

Macroscopic features: Wood light brown. Noncharacteristic faint odor. Grain straight. Wood fine textured, light and soft. Growth rings distinct, delineated by a narrow band of latewood. Earlywood to latewood transition gradual. Resin canals absent.

Microscopic features: Bordered pits in one row and rarely paired on the radial walls. Cross-field pitting taxodioid, small, uniform in size, 1-4 per cross-field. Longitudinal parenchyma apotracheal. End walls nodular. Rays uniseriate, 1-8 cells in height. Ray tracheids wanting.

Conclusions: Based on the macroscopic and microscopic anatomical features, the sample is identified as a Northern white cedar (*Thuja occidentalis*).

Sample #7: North House Window Trim

Sample description: One sample measuring approximately 1" x 3" x 2". Sample weathered on exterior surfaces. Growth rate approximately 23 tree rings per inch, measured across $\frac{1}{2}$ ".

Macroscopic features: See notes for Sample #4.

Microscopic features: See notes for Sample #4.

Conclusions: Based on macroscopic and microscopic anatomical features, the sample is identified as eastern white pine (*Pinus strobus* L.).

Sample #8: North Barn Clapboard

Sample description: One sample measuring approximately $\frac{1}{2}$ " x 4" x 4". Sample weathered on exterior surfaces. Growth rate approximately 11 tree rings per inch, measured across $\frac{1}{4}$ ".

Macroscopic features: See notes for Sample #6.

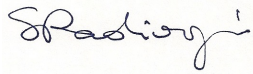
Microscopic features: See notes for Sample #6.

Conclusions: Based on the macroscopic and microscopic anatomical features, the sample is identified as a Northern white cedar (*Thuja occidentalis*).

RECOMMENDATIONS:

All wood species identified in the samples are native to North America and are not endangered or subject to trade regulations. Lumber of all species is commercially available and in-kind replacement with wood of the same species is recommended.

Sincerely,



Suzana Radivojevic, PhD

Wood scientist

Disclaimer

Ligno Logic LLC disclaims any liability of any kind arising out of use or misuse of the information contained and referenced in this report. All information in this report is provided to the best of our knowledge and believed by Ligno Logic LLC to be accurate at the time of analysis and based on sources believed to be reliable; it may however not be regarded as legally binding.

SECTION 064023 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Replacement of interior running trim, including but not limited to base board and door and window trim.
 - 2. Replacement of interior frames and jambs.
 - 3. Trim at openings.
 - 4. Installation of new thresholds.
 - 5. Interior wood cabinets and casework.
 - 6. Shop finishing or priming of interior woodwork.
- B. Related Sections include the following:
 - 1. Section 060140.91 – Architectural Woodwork Restoration.
 - 2. Section 061000 – Rough Carpentry.
 - 3. Section 079200 – Joint Sealants.
 - 4. Section 099113 - Painting and Lead Safe Practices.
 - 5. Section 099300 – Staining and Transparent Finishes.

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 each type of product indicated, including running trim, cabinet hardware and accessories handrail brackets and finishing materials and processes.
- B. Product Data: For panel products solid-surfacing material cabinet hardware and accessories handrail brackets and finishing materials and processes.
- C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Show details full size.
 - 2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 - 3. Show locations and sizes of cutouts and holes for plumbing fixtures and other items installed in architectural woodwork.

4. Apply WI-certified compliance label to first page of Shop Drawings.

D. Samples for Initial Selection:

1. Molding profiles and trim.
2. Miscellaneous wood rim as deemed necessary by Architect in 1' lengths.
3. Shop-applied transparent finishes.
4. Shop-applied opaque finishes.
5. Hardware.

E. Samples for Verification:

1. Lumber with or for transparent finish, not less than 50 sq. in. 5 inches wide by 24 inches long, for each species and cut, finished on 1 side and 1 edge.
2. Lumber and panel products with shop-applied opaque finish, 50 sq. in. for lumber and 8 by 10 inches for panels, for each finish system and color, with 1/2 of exposed surface finished.
3. Solid-surfacing materials, 6 inches square.
4. Corner pieces as follows:
 - a. Cabinet-front frame joints between stiles and rails, as well as exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.
 - b. Miter joints for standing trim.
5. Exposed cabinet hardware and accessories, one unit for each type.

F. Product Certificates: For each type of product, signed by product manufacturer.

G. Qualification Data: For Installer and fabricator.

1.5 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.
- B. Installer Qualifications: Certified participation in AWI's Quality Certification Program.
- C. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of interior architectural woodwork with sequence-matched wood with face veneers that are sequence matched with woodwork.
- D. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" Custom Grade of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
 1. Provide AWI Quality Certification Program labels and certificates indicating that woodwork, including installation complies with requirements of grades specified.
- E. Fire-Test-Response Characteristics: Where fire-retardant materials or products are indicated, provide materials and products with specified fire-test-response characteristics as determined by testing identical products per test method indicated by UL, ITS, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify with appropriate

markings of applicable testing and inspecting agency in the form of separable paper label or, where required by authorities having jurisdiction, imprint on surfaces of materials that will be concealed from view after installation.

- F. Forest Certification: Provide interior architectural woodwork produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria."
- G. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 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.

1.7 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 between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 43 and 70 percent during the remainder of the 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 measurements on Shop Drawings.
 - 2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 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.
- B. Hardware Coordination: Distribute copies of approved hardware schedule specified in Division 8 Section 087100 "Door Hardware" to fabricator of architectural woodwork;

coordinate Shop Drawings and fabrication with hardware requirements.

- C. See drawings for Cabinet Hardware.

PART 2 - PRODUCTS

2.1 WOODWORK FABRICATORS

- A. Available Fabricators: Subject to compliance with requirements, fabricators offering interior architectural woodwork that may be incorporated into the Work include, but are not limited to, the following or approved equal:

Cabinetry (Basis of Design)

1. Crown Point Cabinetry, 462 River Road, Claremont, NH 03743, Tel 603-504-6872 contact: Joshua Watkins, Jwatkins@crownpoint.com Designer: David Messier.

Millwork

1. Starke Millwork, 671 Bangor Road, Nazareth, PA 18064, Tel 610-216-3151
2. Collingswood Architectural Millworking, Inc., 715 Taylor Avenue, Collingswood, NJ 08107, 856-854-0440
3. The Whalen Berez Group, 9 Wellington Court, Colts Neck, NJ 07722, 732-946-1078
4. Or Approved Equal

2.2 MATERIALS

- A. General: Provide materials that comply with requirements of quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.
- B. Wood Species: Must all comply with FAS NHLA Grade.
- C. Cabinets: Quartersawn white oak with a maple interior, chestnut stained.
 1. Doors: Barnstead doors
- D. Drawers: Walnut dovetail, flat finish.
- E. Wood Products: Comply with the following:
 1. Hardboard: AHA A135.4.

2.3 CABINET HARDWARE, ACCESSORIES AND COUNTERTOPS

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets.
- B. Cabinet Hinges (Basis of Design): 110” soft and self-close concealed hinges. manufactured by Julius Blum.
- C. Double basket waste receptacle
- D. Cabinet Pull Hardware (Basis of Design):

1. 8" Arts and Crafts Cabinet Pulls for drawers manufactured by House of Antique Hardware
 2. 4" Arts and Crafts Cabinet Pulls for cabinets manufactured by House of Antique Hardware Paragraphs and subparagraphs below describing hardware items are examples only; edit to suit Project. Delete if schedule is included on Drawings.
- E. Cabinet Countertops Black Soapstone. Finish Honed, Thickness 1", Shade Variation M-Medium.

2.4 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Hardwood lumber, kiln dried to less than 15 percent 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. 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. Contact Adhesive: 250 g/L.

2.5 FABRICATION, GENERAL

- A. Interior Woodwork Grade: Unless otherwise indicated, provide select 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. Sand wood lightly to remove raised grain on exposed surfaces before fabrication.
- D. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
1. Corners of Cabinets and Edges of Solid-Wood Members 1" Thick.
 2. Edges of Rails and Similar Members 1" Thick.
 3. Corners of Cabinets and Edges of Solid-Wood Members and Rails 1/16".
- E. Complete fabrication, including assembly, finishing, 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. Notify Architect seven days in advance of the dates and times woodwork fabrication

- will be complete.
2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be 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.
- F. 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.
- G. Install glass to comply with applicable requirements in Division 8 Section "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.

2.6 INTERIOR RUNNING TRIM FOR TRANSPARENT AND OPAQUE FINISH

- A. Grade: Select
- B. Wood Species: Match existing wood species.
- C. 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.
- D. Shop assemble except where limitations of access to place of installation require field assembly.
- E. Assemble moldings in plant to maximum extent possible. Miter corners in plant and prepare for field assembly with bolted fittings designed to pull connections together.

2.7 EXISTING TRIM

- A. Grade: FAS
- B. Match existing wood species identified.
- C. Assume old growth wood with 20 rings in each inch of wood.

2.8 SHOP PRIMING

- A. Shop Priming: Shop apply the prime coat including backpriming, if any, for transparent-finished items specified to be field finished. Refer to Division 9 painting Sections for material and application requirements.
- B. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.
 1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling and to end-grain surfaces. Concealed surfaces of plastic-laminate-clad woodwork do not require

backpriming when surfaced with plastic laminate, backing paper, or thermoset decorative panels.

C. Transparent Finish:

1. Grade: Premium.
2. Staining: Match approved sample for color.
3. Wash Coat for Stained Finish: Apply wash-coat sealer to woodwork made from closed-grain wood before staining and finishing.
4. Open Finish for Open-Grain Woods: Do not apply filler to open-grain woods.
5. Filled Finish for Open-Grain Woods: After staining (if any), apply paste wood filler to open-grain woods and wipe off excess. Tint filler to match stained wood.
 - a. Apply wash-coat sealer after staining and before filling.
6. Sheen: match sheen of existing woodwork

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.
- C. 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 inch in 96 inches.
- D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions, including those for adhesives used to install woodwork.
- F. 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 or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- G. 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 less than 36 inches 60 inches 96 inches long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.

1. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base if finished.
 2. Install wall railings on indicated metal brackets securely fastened to wall framing.
 3. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches.
- H. 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 no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
 2. Maintain veneer sequence matching of cabinets with transparent finish, where applicable.
 3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head screws sized for 1-inch penetration into wood framing, blocking, or hanging strips.
- I. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
1. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
 2. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
 3. Secure backsplashes to tops with concealed metal brackets at 16 inches o.c.
 4. Calk space between backsplash and wall with sealant specified in Division 7 Section "Joint Sealants."
- J. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.
- K. Refer to Division 9 Sections for final finishing of installed architectural woodwork.

3.3 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.
- C. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 064023

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Concealed building insulation.
 - 2. Air barriers.
 - 3. Sound attenuation insulation.
 - 4. Pipe insulation.
- B. Extruded Polystyrene
 - 1. Rigid insulation.
 - 2. Foam sealer.
 - 3. Refer to Schedule of Insulation Locations at end of Section.

1.2 PERFORMANCE REQUIREMENTS

- A. Plenum Rating: Provide glass fiber insulation where indicated in ceiling plenums whose test performance is rated as follows for use in plenums as determined by testing identical products per "Erosion Test" and "Mold Growth and Humidity Test" described in UL 181, or on comparable tests from another standard acceptable to authorities having jurisdiction.
 - 1. Erosion Test Results: Insulation shows no visible evidence of cracking, flaking, peeling, or delamination of interior surface of duct assembly, after testing for 4 hours at 2500-fpm air velocity.
 - 2. Mold Growth and Humidity Test Results: Insulation shows no evidence of mold growth, delamination, or other deterioration due to the effects of high humidity, after inoculation with *Chaetomium globosium* on all surfaces and storing for 60 days at 100 percent relative humidity in the dark.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product test reports.
- C. Research/Evaluation Reports: For foam-plastic insulation.

1.4 QUALITY ASSURANCE

- A. Retain ASTM test method below based on product and kind of fire-resistance characteristic specified for each product in Part 2. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84 for surface-burning characteristics, by UL or another testing

and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified as basis of design.
 2. Use one of the following manufacturers:
 - a. Owens Corning
 - b. Kingspan Group
 - c. Johns Manville
 - d. Or Approved Equal

2.2 FOAM-PLASTIC BOARD INSULATION

- A. Extruded-Polystyrene Board Insulation: ASTM C 578, Type X 15 psi min, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively. Product to be free of toxins and formaldehyde.
1. Basis of Design:
 - a. Manufacturer Owens Corning. Product: Foamular 150 Rigid Polystyrene Insulation.
 - b. Or approved equal.

2.3 GLASS-FIBER INSULATION

- A. Basis of Design:
1. Manufacturer Owens Corning. Fiberglas Batt Insulation: ASTM C 665. Product: Owens Corning EcoTouch PINK Fiberglas Batt Insulation with PureFiber Technology, or approved equal.
 2. Refer to Schedule for thickness variations and for Unfaced and Foil Faced Locations.

2.4 ACOUSTIC BATT INSULATION

- A. Basis of Design:
1. Manufacturer Owens Corning. EcoTouch QuietZone Acoustic Batt Insulation, or approved equal.

2. Refer to Schedule for thickness variations and for Unfaced and Kraft Faced locations.

2.5 PIPE INSULATION

A. Basis of Design:

1. Manufacturer Owens Corning. Product: ASJ Max Fiberglas Pipe Insulation or approved equal.

2.6 AIR INFILTRATION BARRIER

- ### A. Woven polyolefin fabric engineered to be a weather resistant barrier designed to help reduce air leaks but allow vapor to escape.

Thickness: 5 mils Nominal

- ### B. Basis of Design: Manufacturer Owens Corning, TruWRAP Housewrap, or approved equal.

2.7 VAPOR RETARDERS

- ### A. Polyethylene Vapor Retarders: ASTM D 4397, 12 mils thick, with maximum permeance rating of 0.13 perm.

2.8 AUXILIARY INSULATING MATERIALS

- ### A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by insulation manufacturers for sealing joints and penetrations in vapor-retarder facings.

- ### B. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.

- ### C. Foam Sealer: Basis of Design: PROPINK Manufactured by Owens Corning, or approved equal.

PART 3 - EXECUTION

3.1 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. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

- E. 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.

3.2 INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION

- A. On vertical surfaces, set insulation units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.
 - 1. If not otherwise indicated, extend insulation a minimum of 24 inches exterior grade line.
- B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
- C. Protect below-grade insulation on vertical surfaces from damage during backfilling by applying protection course with joints butted. Set in adhesive according to insulation manufacturer's written instructions.
- D. Protect top surface of horizontal insulation from damage during concrete work by applying protection course with joints butted.

3.3 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Seal joints between foam-plastic insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. Set vapor-retarder-faced units with vapor retarder to warm-in-winter side of construction, unless otherwise indicated.
 - 1. Tape joints and ruptures in vapor retarder and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
- D. Install mineral-fiber insulation in cavities formed by framing members 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-inch clearance of insulation around recessed lighting fixtures.
 - 4. For wood-framed construction, install mineral-fiber blankets according to ASTM C 1320 and as follows:
 - a. With faced blankets having stapling flanges, secure insulation by inset, stapling flanges to sides of framing members.

- b. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

3.4 INSTALLATION OF INSULATION IN CEILINGS FOR SOUND ATTENUATION

- A. Install unfaced glass fiber blanket insulation in a width that fits tightly between existing joists or partitions.

3.5 PIPE INSULATION

- A. Install pipe insulation properly sized for all piping. Tape all joints.

3.6 INSTALLATION OF VAPOR RETARDERS AND AIR INFILTRATION BARRIER

- A. General: Extend to extremities of areas to be protected from vapor or air transmission. Secure in place with adhesives or other anchorage system as indicated. Extend to cover miscellaneous voids in insulated substrates.
- B. Seal vertical joints over framing by lapping not less than two wall studs. Fasten retarders to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches o.c.
- C. Firmly attach retarders to wood framing with manufacturer's specified fasteners.
- D. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating retarders with retarder tape to create an airtight seal between penetrating objects and retarder.
- E. Repair tears or punctures in retarders immediately before concealment by other work. Cover with tape or another layer of retarder.

SCHEDULE OF INSULATION LOCATIONS - See Drawings for location information for each insulation Type below.

Type 1: Location: Under new concrete slab on grade and at face of concrete foundations.
Size: 2" thick 4'x8'
Basis of Design: Foamular 150 Rigid Polystyrene, unfaced, manufactured by Owens Corning, or approved equal. Extruded Polystyrene (XPS) with no toxins or formaldehyde.

Type 2: Location: Exterior stud walls as noted on drawings.
Size: 3 ½" thick
Basis of Design: EcoTouch Fiberglas insulation, foil faced, manufactured by Owens Corning, or approved equal. GREENGUARD CERTIFIED 100% inorganic fibers, 50% recycled material.

- Type 3: Location: Sound Insulation in 2x4 interior partition walls between rooms. Exterior wall wood framing, 2 x 4 studs, installed as furring over interior face of exterior wall.
Size: 3 ½” thick
Basis of Design: EcoTouch Fiberglas insulation, foil faced, manufactured by Owens Corning, or approved equal. GREENGUARD CERTIFIED 100% inorganic fibers, 50% recycled material.
- Type 4: Location: Acoustic insulation in wood framed ceilings.
Size: Varies
Basis of Design: QuietZone Acoustic Batts Fiberglas insulation, unfaced, manufactured by Owens Corning, or approved equal. GREENGUARD certified 100% inorganic fibers, 50% recycled material.
- Type 5: Location: Pipe insulation
Basis of Design: ASJ Max Fiberglas, Manufactured by Owens Corning, or approved equal. Pipe insulation. See MEP Drawings and Specifications. or approved equal.
- Other Products: Air Barrier - Basis of Design: Housewrap, Manufactured by Owens Corning, or approved equal.
Foam Sealer - Basis of Design: PROPINK, Manufactured by Owens Corning, or approved equal.

END OF SECTION 072100

SECTION 073129 - WOOD SHINGLES AND SHAKES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Alaskan Yellow Cedar fire pressure treated wood shingles for wall installation as noted on drawings.
 - 2. Installation accessories including underlayment materials, slip sheets, fasteners and other items required.
- B. Related Requirements:
 - 1. Section 024119 "Selective Demolition" for existing shingle removal.
 - 2. Section 061000 "Rough Carpentry" for wood furring.
 - 3. Section 076200 "Sheet Metal Flashings and Trim" for flashing associated with wood shingles.
 - 4. Section 099113 "Painting and Lead Safe Practices" for finishing of wood shingles.

1.3 PREINSTALLATION MEETINGS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include manufacturers' product specifications, standard details, dimensions, and general recommendations, as applicable to materials and installation.
- B. Samples for Verification: For each product in sizes indicated. Submit full-size samples of new shingle materials, representative of color, shapes, and texture range.
 - 1. Wood Wall Shingles: Full size unit (with Cedar Shake and Shingle Bureau label).
 - 2. Grade: Blue label #1 Alaskan Yellow Cedar Shingles, 100% end grain and certified by the Cedar Shake and Shingle Bureau Certi Blue Label.
- C. Shop Drawings: Submit layout drawings showing details. All shop drawings require field dimension verification of existing field conditions and dimensions. Contractor must stamp all shop drawing details with the following: *"I, "Insert Contractor Name", certify that field dimensions have been verified and all details have been prepared and adjusted in accordance to my field verified dimensions."*
 - 1. Show relationships with adjacent construction and flashing details including sidewall penetrations and relationship with adjacent roofs, trim and other nearby construction.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, including Cedar Shakes and Shingle Certification.
- B. Evaluation Reports: For wood products, from ICC-ES.
- C. Research/Evaluation Reports: Evidence of shake manufacturer's and grading agency's compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
- D. Sample Warranty: For Special warranties specified in this Section.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For wood products to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Wood Shingles: Furnish shingles equal to 2 percent of amount installed, but not less than 100 sq. ft. identical to each type, in unbroken bundles.

1.8 QUALITY ASSURANCE

- A. Contractor must have experience in wood shingle installation and demonstrate experience in completing wood shingle installation projects of similar scope, complexity and size in accordance with the Cedar Shake and Shingle Bureau (CSSB) installation guidelines. Cedar shingle installer is required to submit prequalification forms for review and must include at least two projects of similar size and complexity which have been completed within the last 5 years must be submitted.
- B. Installer Qualifications: In addition to the experience above in 1.9A the shingle installer must currently be Certified and Approved by the Cedar Shake and Shingle Bureau (CSSB).
- C. Grading Agency Qualifications: An independent testing and inspecting agency recognized by authorities having jurisdiction as qualified to label wood products for compliance with referenced grading rules.
- D. Source Limitations: Obtain shakes through one source from a single manufacturer.
- E. Fire Rating:
 - 1. The shingles are to have a Class B Certi-Guard pressure impregnated, fire retardant treatment which will provide a minimum 30-year warranty.
- F. Mockups: Before installing, construct mockups for each form of construction and finish required to verify selections made under Sample submittals and to demonstrate aesthetic effects and qualities of materials, workmanship, and execution. Build mockups to comply with the following requirements, using materials indicated for completed Work.
 - 1. Install a wood shingle installation at location indicated by Architect with a minimum

- area of 4 square feet.
2. Locate mockups in accessible location of the size indicated.
 3. Notify Architect 7 days in advance of the dates and times when mockups will be constructed. No mockups should be prepared until all shop drawings and material submittals have been accepted.
 4. Acceptance 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.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Store materials in a dry, well-ventilated location protected from weather and moisture according to manufacturer's written instructions. Labels must be intact.
- B. Store underlayment rolls on end, on pallets or other raised surfaces. Do not double stack rolls. Protect from sunlight until installation.
- C. Protect unused materials from weather and moisture when left overnight or when work is not in progress.
- D. Handle, store, and place materials in a manner to prevent damage to structural supporting members.
- E. Retain all necessary labels for fire treatment and shake CSSB labels to obtain all necessary warranties and to allow architect to verify products are in compliance with specified products.

1.10 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit product installation and related work to be performed according to manufacturer's written instructions and warranty requirements.
 1. Install underlayment within the range of ambient and substrate temperatures recommended by manufacturer.
- B. Proceed with installation only after substrate construction, and surrounding construction has been completed.
- C. Substrate shall be smooth, dry, securely anchored, and free of construction debris.

1.11 WARRANTY

- A. General Warranty: The special warranties specified in this Article shall not deprive the owner of other rights the owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the contractor under requirements of the Contract Documents.
- B. Special Materials Warranty: Manufacturer's warranty administered by CSSB and on CSSB's standard form in which the Manufacturer agrees to repair or replace CSSB-labeled products

that fail in materials within specified warranty period. Material failures include manufacturing defects that result in leaks.

- C. Special Product-Defect Warranty: Submit a written warranty, signed by shake manufacturer, ensuring that shakes, when installed according to manufacturer's written instructions, will remain free of leaks and agreeing to furnish replacement shakes or refund a pro-rata portion of the amount originally paid for the defective shakes due to original product defects, for the specified warranty period.
 - 1. Wall shingle warranty period 50 years against wood rot.
- D. Special Installer's Warranty: Installer's warranty, on warranty form at end of this Section, signed by Installer, in which Installer agrees to repair or replace components of custom Cedar Shingles for wall installation that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures.
 - b. Loose parts.
 - c. Wrinkling or buckling.
 - d. Failure to remain weathertight, including uncontrolled water leakage.
 - e. Deterioration of other materials beyond normal weathering, including non-uniformity of color or finish.
 - 2. Installer's Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Exterior Fire-Test Exposure: Provide materials identical to those of assemblies tested for fire resistance according to ASTM E 108 or UL 790 by Underwriters Laboratory or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.
 - 1. Wood Products: Class B
 - a. Fire-Retardant Treatment: Exterior-type pressure treatment complying with AWPA U1.
 - b. Accelerated Weathering: Subject test specimens to ASTM D 2898 Method A before testing.
 - c. Identification: Attach a label to each bundle of wood products; include identification mark of testing agency acceptable to authorities having jurisdiction and identify manufacturer, chemical treatment, method of application, purpose of treatment, and warranties available.
- B. Grading Rules: Provide wood products that comply with Cedar Shake & Shingle Bureau's (CSSB) grading rules for products indicated.
 - 1. Identification: Attach a label to each bundle of wood products that identifies manufacturer, type of product, grade, dimensions, and identification mark of grading agency acceptable to authorities having jurisdiction.

2.2 PRODUCTS, GENERAL

- A. Grading Standards for Wood Shakes: Comply with the following:
 - 1. IRC & UBC/CSA Grade Rule & Inspection Label Requirements:

- i. Sections R905.7.4 (Shingles) R905.8.5 (Shakes) of the international Residential Code (IRC) state that “Wood shingles and shakes shall be of natural durability and copy with the applicable grade rules from the “Cedar Shake and Shingle Bureau” (See attached Grade Rules CSSB 97*). All Shingles must comply with the grade rule requirements of IRC Tables R905.7.4 (shingles).
 - ii. NOTE: Shingle grade rules must conform to International Building Code (IBC) 1507.8.
- 2. The ICBO “Acceptance Criteria for Quality Control Agencies for Wood Shake and Shingle Grading” states in:
 - i. SECTION 1.2.3 ICBO ES reference document “Acceptance Criteria for Product Specific Wood Shake and Shingle Roof Systems.”
 - ii. SECTION 2.2.1.2 Product evaluation report number
 - iii. **SECTION 2.2.1.3 Uniform Building Code standard or approved grading rules applicable to the product**
 - iv. SECTION 2.2.1.4 Name, address and telephone number of the mill
 - v. SECTION 2.2.1.5 Name and evaluation report number of the quality control agency.
 - vi. SECTION 2.2.1.6 Grade number for shakes and shingles including hip and ridge units.
 - vii. SECTION 2.2.1.7 Product dimensions (thickness and length)
 - viii. SECTION 2.2.1.8 Coverage and exposure information
 - ix. SECTION 2.2.1.9 Installation instructions must comply with the Uniform Building Code or applicable acceptance criteria

- * Re SECTION 2.1: The Cedar Shake and Shingle Bureau labels display the third-party inspection agency on the left-center side of each label. Every label will state “INTERTEK” as the third-party inspection agency (NOTE: See attached “How to Read a CERTI Label”).
- ** Re Section 2.2.1.3: The Cedar Shake and Shingle Bureau display all grading and code conformance (not “...in accordance) on the right-center side of each label.

- B. Identification: Attach a label to each bundle of shakes; identify manufacturer, references to model code approval, type of product, grade, dimensions, and approved grading agency.
 - 1. Where applicable, include chemical treatment, method of application, purpose of treatment, and warranties available.

2.3 WALL SHINGLES

- A. Wall Shingles: Smooth-sawn Alaskan Yellow cedar shingles. 100% clear 100% heartwood Yellow cedar, 100% edge grain with no defects.
 - 1. Grade: No. 1 CSSB Blue Label with starter courses of same.
 - 2. Size: 18 inches long; 1/2” thick at butt.
 - 3. Installed with maximum 5 1/2” exposure (triple lap)
- B. Suppliers: See above.

2.4 UNDERLAYMENT MATERIALS

- A. Felt: No 30 ASTM D 226/D 226M, Type II, asphalt-saturated organic felts, non-perforated.
 - 1. Use as underlayment.

- B. Self-Adhering Underlayment: High-Temperature Sheet: 30 to 40 mils thick minimum, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer. 100% Butyl Based Underlayment.
 - 1. Thermal Stability: Stable after testing at 300 deg F; ASTM D 1970.
 - 2. Low Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D 1970.
 - 3. Products:
 - a. GCP Applied Technologies: Grace Ultra (a 100% Butyl based underlayment).
 - b. Protecto Wrap : Jiffy Seal Ice & Water Guard HT Butyl.
 - c. Chase Corporation : 4EvaSeal HT Butyl Underlayment
 - d. Or approved equal.

2.5 ACCESSORIES

- A. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.
- B. Slip Sheet: Rosin-sized paper, 3 lb/100 sq. ft. minimum.
- C. Air Infiltration Barrier:
 - 1. Woven polyolefin fabric engineered to be a weather resistant barrier. Thickness: 5 mils nominal.
 - 2. Basis of Design: Manufacturer Owens Corning. TruWRAP Housewrap, or approved equal.
 - 3. Or approved equal.

2.6 FASTENERS

- A. Roofing Nails: ASTM F 1667, stainless-steel, Type 316 box-type wire ring shank nails, sharp pointed, and of sufficient length to penetrate a minimum of 3/4 inch into sheathing.
 - 1. No Pressure-driven nails permitted.
- B. Roofing Staples: Not permitted
- C. Felt-Underlayment Nails: stainless-steel Type 316 with 1-inch minimum diameter, low-profile capped heads or disc caps.
 - 1. Provide with minimum 0.0134-inch- thick cap and with minimum 0.105-inch thick shank of length to penetrate at least 3/4 inch into sheathing.

2.7 METAL FLASHING AND TRIM

- A. General: Comply with requirements in Section 076200 "Sheet Metal Flashing and Trim."
- B. Lead-Coated Copper Sheet: ASTM B 101, Temper H00 and H01 32 oz, cold-rolled copper sheet, of weight indicated below, coated both sides with lead weighing not less than 12 lb/100 sq. ft. nor more than 15 lb/100 sq. ft. of copper sheet (total weight of lead applied equally to both sides).
 - 1. Manufacturers:
 - a. Lamb & Ritchie Company, Inc., Tel 888-802-2700
 - b. Riverside Sheet Metal, Tel 781-396-0070
 - c. Unimet Metal Supply Inc., Tel 973-526-4004
 - d. Or approved equal.

- C. Fabricate sheet metal flashing and trim to comply with recommendations in Copper Development Association Manual that apply to design, dimensions, metal, and other characteristics of the item.

2.8 FIRE TREATMENT SPECIALTIES

- A. To comply with Cedar Shake & Shingle Bureau certified and approved manufacturer and warranty requirements. Fire pressure impregnated system.
 - 1. Must have UL certification for fire retardant.
 - 2. Supplier: F.S.R. Treatment, Inc., Contact: Ed Watkins 9486 288th St., Maple Ridge, BC V2W K1. Tel: 604-642-0640
 - 3. Or approved equal.

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.
 - 1. Examine sheathing/battens to verify that sheathing joints are supported by framing and blocking and that installation is within flatness tolerances.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored and that provisions have been made for flashings and penetrations.
 - 3. Replace all rotten and deteriorated sheathing boards. Record quantities with photographs daily.
 - 4. Clean substrates of projections and substances detrimental to application.
- B. 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. Comply with manufacturer's written installation instructions and the following:
 - 1. Cedar Shake and Shingle Bureau Installation Guidelines.

3.3 UNDERLAYMENT INSTALLATION

- A. General: Comply with underlayment manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
- B. Install No 30 felt per CSSB guidelines.

3.4 METAL FLASHING INSTALLATION

- A. General: Install metal flashings and other sheet metal to comply with requirements in

Section 076200 "Sheet Metal Flashing and Trim."

1. Install metal flashings according to recommendations for wood roofing in NRCA's "NRCA Roofing and Waterproofing Manual."
 2. Coordinate shingle installation with flashing and other adjoining work to entire proper sequencing. Do not install materials until all penetrations through sheathing have been installed and are securely fastened against movement.
- B. Edges: Cut and fit shingles and edges to provide maximum weather protection. Install fasteners at ridges of sufficient length to penetrate sheathing as specified. Maintain minimum widths permitted.

3.5 WALL SHINGLE INSTALLATION

- A. Install felt underlayment over wood sheathing prior to installing wood shakes.
- B. Install wood shingles, beginning at lower end, with a double-layer starter course, projecting shakes 1-1/2 inches beyond fascia. Space adjoining shakes 3/16" to 5/16" apart, attach each shake with 2 fasteners spaced 3/4 to 1 inch from edge of shake and 1-1/2 to 2 inches above butt line of subsequent course. Achieve a triple lap installation. Stagger edge joints a minimum of 1-1/2 inches in succeeding courses. Prevent alignment of vertical joints in every third course. Drive fasteners tight to top surface of shakes without crushing wood.
1. Weather Exposure: Match existing
 2. Corners and Edges: Cut and fit shingles at corners to align with trim and edges to provide maximum weather protection. Install fasteners at ridges of sufficient length to penetrate sheathing as specified. Corners shall be "weaved" or staggered (alternating courses).

3.6 CLEAN UP

- A. All debris to be removed from inside of the attic. Clean all areas around the building perimeter to include removal of all nails.

3.7 INSTALLER'S WARRANTY (TEMPLATE)

- A. WHEREAS <Insert name> of <Insert address>, herein called the " Installer," has performed shingle installation and associated work ("the work") on the following project:
1. Owner: <Insert name of Owner>.
 2. Address: <Insert address>.
 3. Building Name/Type: <Insert information>.
 4. Address: <Insert address>.
 5. Area of the Work: <Insert information>.
 6. Acceptance Date: <Insert date>.
 7. Warranty Period: 2 years
 8. Expiration Date: <Insert date>.
- B. AND WHEREAS Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant the work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of the work as are necessary to correct faulty and defective work and as are necessary to maintain the work in a watertight condition.

- D. This Warranty is made subject to the following terms and conditions:
1. Specifically excluded from this Warranty are damages to the work and other parts of the building, and to building contents, caused by:
 - a. Lightning.
 - b. Peak gust wind speed exceeding 120 mph.
 - c. Fire.
 - d. Failure of shingle sidewall system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition.
 - e. Faulty construction of parapet walls, copings, chimneys, vents, equipment supports, and other edge conditions and penetrations of the work.
 - f. Vapor condensation on inside of sidewall.
 - g. Activity on sidewall by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
 2. When the work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
 3. Installer is responsible for damage to the work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of the work.
 4. During Warranty Period, if Owner allows alteration of the work by anyone other than Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on the sidewall, this Warranty shall become null and void on date of the alterations, but only to the extent the alterations affect the work covered by this Warranty. If Owner engages Installer to perform the alterations, Warranty shall not become null and void unless Installer, before starting the alterations, notified Owner in writing, showing reasonable cause for claim, that the alterations would likely damage or deteriorate the work, thereby reasonably justifying a limitation or termination of this Warranty.
 5. During Warranty Period, if original use of sidewall is changed and it becomes used for, but was not originally specified for, a use or service more severe than originally specified, this Warranty shall become null and void on date of the change, but only to the extent the change affects the work covered by this Warranty.
 6. Owner shall promptly notify Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Installer to inspect the work and to examine evidence of such leaks, defects, or deterioration.
 7. This Warranty is recognized to be the only warranty of Installer on the work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of shingle sidewall failure. Specifically, this Warranty shall not operate to relieve Installer of responsibility for performance of the work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.
- E. IN WITNESS THEREOF, this instrument has been duly executed this **<Insert day>** day of **<Insert month>**, **<Insert year>**.
1. Authorized Signature: **<Insert signature>**.
 2. Name: **<Insert name>**.
 3. Title: **<Insert title>**.

END OF SECTION 073129

SECTION 075600 - COLD FLUID APPLIED ROOF MEMBRANE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Cold Fluid Applied Roofing.
- B. Products in the Section are specified as the “Basis of Design”. Contractor must provide comprehensive proof for any alternative product, which must be equal to specified “Basis of Design” product.
- C. Owner notes that all existing flat roofs have used Kemper and would prefer to keep the same system for this very small roof.
- D. Location of Work Includes:
 - 1. Roofs, as noted on drawings.
- E. Related Sections:
 - 1. Section 061000 “Rough Carpentry”
 - 2. Section 076200 “Sheet Metal Flashing and Trim”

1.2 REFERENCES

- A. ASTM D 41 - Standard Specification for Asphalt Primer Used in Roofing, Damp proofing, and Waterproofing
- B. ASTM D 1037 - Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials
- C. ASTM D 5602 - Standard Test Method for Static Puncture Resistance of Roofing Membrane Specimens
- D. ASTM E 96 - Tests for Water Vapor Transmission of Materials in Sheet Form
- E. ASTM E 108, ANSI/UL 790 for fire resistance.
- F. ASTM E 661 - Standard Test Method for Performance of Wood and Wood-Based Floor and Roof Sheathing Under Concentrated Static and Impact Loads
- G. ASTM E 831 - Standard Test Method for Linear Thermal Expansion of Solid Materials by Thermomechanical Analysis
- H. SSPC - Steel Structures Painting Council painting standards.
- I. CRRC (Cool Roof Rating Council) - Standard 1
- J. FM - Approvals Guide
- K. FM Loss Prevention Bulletin 1-49
- L. SMACNA - Architectural Sheet Metal Manual

1.3 PERFORMANCE

- A. System assembly shall comply with FM / UL testing data showing that the system meets the

local wind uplift requirements and provides a Class A fire-rated roof assembly.

- B. System assembly shall be listed on the CRRC website coolroofs.org showing that the initial solar reflectance, thermal emittance, and SRI values comply with LEED requirements, local building code requirements, and any specific project requirements.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Product Literature.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods.
 - 5. Safety Data Sheets (SDS) for all components.
- B. Shop Drawings: Show including plans and details of cold fluid-applied polymethyl methacrylate liquid resin membrane system including membrane, penetration flashings, base flashings, and expansion joints size, flashing details, and attachment.
- C. Verification Samples: For each product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, thickness, color.
- D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- E. Field Quality Control: Submit the following:
 - 1. Daily inspection and testing reports
 - 2. Substrate and Bond Testing Reports
 - 3. Completed Membrane Inspection Reports
- F. Closeout Submittals: Submit roofing/waterproofing manufacturer and applicator's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing reinforced liquid resin roofing/waterproofing membranes with a minimum of 5 years of documented experience with applications in the United States.
- B. Installer Qualifications: Company specializing in performing the work of this section with a minimum of 3 years documented experience and approved by system manufacturer for warranted membrane installation.
- C. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress
- D. Manufacturer's Field Service: Membrane manufacturer shall provide the services of a competent field representative on-site to provide the following inspections:
 - 1. Job start inspection at the beginning of each phase of the project, to review special detailing conditions and substrate preparation.
 - 2. Periodic in-progress inspections throughout duration of the project to evaluate membrane and flashing application.
 - 3. Observe field quality control testing.
 - 4. Final punch-list inspection at the completion of each phase of the project prior to installation of any surfacing or overburden materials.

5. Warranty inspection to confirm completion of all punch list items, surfacing, and overburden application.

1.6 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-roofing conference approximately two weeks before scheduled commencement of roofing/waterproofing system installation and associated work.
- B. Require attendance of installers of substrate construction to receive roofing/waterproofing, installers of work in and around roofing/waterproofing which must precede or follow roofing/waterproofing work including mechanical and electrical penetration, equipment openings, subsequent finish work, and the County Representative, and roofing/waterproofing system manufacturer's representative.
- C. Objectives include:
 1. Review foreseeable methods and procedures related to roofing/waterproofing work, including set up and mobilization areas for stored material and work area.
 2. Tour representative areas of roofing/waterproofing substrates, inspect and discuss condition of substrate, penetrations and other preparatory work.
 3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.
 4. Review roofing/waterproofing system requirements, Drawings, Specifications and other Contract Documents.
 5. Review and finalize schedule related to roofing/waterproofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
 6. Review required inspection, testing, certifying procedures.
 7. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing.
 8. Record conference including decisions and agreements reached. Furnish a copy of records to each party attending.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging with labels intact until ready for installation.
- B. Store materials off the ground or on pallets, under cover and in a cool, dry location, out of direct sunlight, in accordance with manufacturer's recommendations. Store roll goods horizontally on platforms sufficiently elevated to prevent contact with water and other contaminants. Do not use rolls that are wet, dirty or have damaged ends. Materials must be kept dry at all times. Plastic wrapping installed at the factory should not be used as outside storage covers.
- C. Do not store materials in quantities that exceed design loads, damage substrate materials, hinder installation or drainage.
- D. Follow manufacturer's directions for protection of materials prior to and during installation. Do not use materials that have been damaged to the point that they will not perform as specified. Fleece reinforcing materials must be clean, dry and free of all contaminants.
- E. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of the MSDS and local authorities having

jurisdiction. After partial use of materials replace lids promptly and tightly to prevent contamination.

- F. Maintain copies of all current MSDS for all components on site. Provide personnel with appropriate safety data information and training as it relates to the specific chemical compounds to be utilized.

1.8 SEQUENCING

- A. Apply roofing in a timely manner in conjunction with work of other trades. Coordinate with other trades to avoid traffic over or against completed membrane surfaces.
- B. Coordinate with installation of drains as shown on Drawings, including flashing, and associated roofing work.
- C. Field Quality Control:
 - 1. Regular tests of substrates shall be successfully completed prior to installation of roofing/waterproofing membrane.
 - 2. Tests of completed sections of roofing/waterproofing membrane shall be successfully completed before proceeding with protection layers and overburden. Schedule field quality control tests promptly to allow timely installation of protection layers.

1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Do not apply roofing/roofing/waterproofing membrane during or with the threat of inclement weather.
- C. Application of roofing/waterproofing membrane may proceed while air temperature is between 23 degrees F (minus 5 degrees C) and 95 degrees F (40 degrees C) and providing the substrate is a minimum of 5 degrees F above the dew point.
- D. Ensure that substrate materials are dry and free of contaminants. Do not commence with the application unless substrate conditions are suitable. Contractor shall demonstrate that substrate conditions are suitable for the application of the materials.
- E. Where required by the County Representative, implement odor control and elimination measures prior to and during the application of the roofing/roofing/waterproofing materials. Control/elimination measures shall be field tested at off-hours and typically consists of 1 or a multiple of the following measures
 - 1. Sealing of air intakes with activated carbon filters. Install filters in accordance with requirements and recommendations of the filter manufacturer. Seal filters at joints and against building exterior walls to prevent leakage of unfiltered air.
 - 2. Sealing of doorways, windows, and skylights with duct tape and polyethylene sheeting to prevent leakage of air into the building.
 - 3. Erection and use of moveable enclosure(s) sized to accommodate work area(s) and stationary enclosure for resin mixing station. Enclosure shall be field constructed or pre-manufactured of fire retardant materials in compliance with local requirements in accordance with requirements of the Owner or his designated Representative. Provide enclosure(s) with mechanical air intake/ exhaust openings and Odor Control Air Cleaners, as required to clean enclosed air volume and to prevent odor migration outside the enclosure. Exhaust opening shall be sealed with activated carbon filter.

4. Protection of Contractor personnel and occupants of the structure and surrounding buildings as necessary to comply with requirements of OSHA, NIOSH and/or governing local authority.
- F. General System & Component Description - "Basis of Design":
1. Construction: Roof
 2. Deck Type: Plywood with existing roofing membrane/system
 3. Deck Surface Prep: Removal of existing roofing system/new 3/4" T&G plywood APA SP1 grade.
 4. Flashing Membrane: Kemperol AC Speed FR Gray Resin/120 fleece
 5. Field Membrane: Kemperol AC Speed FR Gray Resin/120 fleece
 6. Overburden Assembly: Adhesion Key Kempertec AC Primer/0.5 silica surfacing sand/stone balustrade or where visible on browstone.

1.10 WARRANTY

- A. Manufacturer's Premier Warranty: Provide 20 year manufacturer's premier warranty that provides for cost of labor and materials for loss of watertightness, limited to amounts necessary to effect repairs necessitated by either defective material or defects in related installation workmanship, with no dollar limitation ("NDL").
- B. Roofing/waterproofing applicator's Warranty: Provide 5 year "Applicator Maintenance Warranty" covering workmanship for all work of this section including installation of membrane, flashings, metal work, and roofing/waterproofing accessories.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Kemper System America, Inc., which is located at: 1200 North America Dr.; West Seneca, NY 14224; Toll Free Tel: 800-541-5455; Fax: 201-833-2873; Email: [request info \(inquiry@kempersystem.net\)](mailto:request_info(inquiry@kempersystem.net)); Web: www.kempersystem.net, National Project Design & Spec Manager, Kemper System, Inc. is Brian Kelly, Tel 201-835-5290, Email: bkelly@kempersystem.com
- B. Requests for substitutions will be considered in accordance with provisions of Section 011000 General Requirements.

2.2 PRODUCTS, GENERAL

- A. Materials shall be products of a single manufacturer or items standard with manufacturer of membrane roofing/waterproofing system. Provide secondary materials that are produced or are specifically recommended by manufacturer of membrane roofing/waterproofing system to ensure compatibility.

2.3 ACCESSORIES

- A. Solvent-Based Cleaner for Tools and Membrane Tie-Ins: Methyl Ethyl Ketone (MEK) or acetone.
- B. Water-Based Cleaner for Membrane: Simple Green HD.
- C. Backer Rod: Expanded, closed-cell polyethylene foam designed for use with cold-applied joint sealant.

- D. Caulking: Single component, non-sag elastomeric polyurethane sealant meeting ASTM C 920, Type S, Grade NS, Class 35 for use in sealing cracks and joints, and making watertight seals where required.
- E. Expansion Joints in Excess of 2 Inches: Provide flat, vulcanized waterproofing joint integral with the waterproofing membrane to accommodate movements over 2 inches (50 mm) and capable of 500 percent elongation at minus 40 degrees F (minus 40 degrees C) across its length and at all vulcanized points.
 - 1. Basis of Design Product: Joint material SITURA INC. RedLINE.
 - 2. Connections: All connections factory fabricated by vulcanization.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared and conditions are suitable to proceed with the Work of this specification.
 - 1. Substrates shall be inspected and repaired as needed to provide a proper surface to receive roofing/waterproofing system.
 - 2. Verify substrate surface slopes to drain for horizontal roofing/waterproofing applications.
 - 3. Identify incompatible or unsatisfactory substrates, if any.
- B. Verify substrate openings, curbs, and protrusions through deck/substrate, wood cant strips and reglets are in place and solidly set.
- C. If substrate preparation is the responsibility of another installer, notify County Representative of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. General: Surfaces to be prepared as a substrate for the new roofing/waterproofing system as follows:
 - 1. Determine the condition of the existing structural deck/substrate. All defects in the deck or substrate shall be corrected before new roofing/waterproofing work commences. Areas of deteriorated deck/substrate, porous or other affected materials shall be removed and replaced with new to match existing.
 - 2. Prepare flashing substrates as required for application of new roofing/waterproofing membrane flashings.
 - 3. Inspect substrates, and correct defects before application of new roofing/waterproofing. Fill all surface voids greater than 1/8 inch wide with an acceptable fill material.
 - 4. Remove all ponded water, snow, frost and/or ice from the work substrate prior to installing new roofing/waterproofing materials.
 - 5. Substrate for roofing/waterproofing shall be clean, dry, free of loose, spalled or weak material including coatings, mineral aggregate, and flood coat/gravel surfacing, oil, grease, contaminants, abrupt changes in level, roofing/waterproofing agents, curing compounds, and free of projections which could damage membrane materials.
- B. Existing Asphaltic Bituminous Roofing:
 - 1. Remove existing flashings down to the structural substrate/penetration at all flashing areas.

- C. Existing Coal Tar Pitch Bituminous Roofing:
1. Remove existing flashings down to the structural substrate/penetration at all flashing areas.
- D. Masonry:
1. Masonry walls hard kiln dried brick or stone construction.
 2. Areas of soft or scaling brick or stone, faulty mortar joints, or walls with broken, damaged or leaking coping shall be repaired in accordance with the requirements of the County Representative and Roofing Manufacturer.
- E. Steel/Metal:
1. Clean and prepare metal surfaces to near white metal in accordance with SSPC - SP3, Power Tool Cleaning, or as required by Roofing/waterproofing Manufacturer. Extend preparation a minimum of 1 inch beyond the termination of the membrane flashing materials.
 2. In addition to cleaning, all metal surfaces shall be abraded to provide a rough open surface. A wire brush finish is not acceptable.
- F. Wood/Plywood:
1. Install 5/8" plywood per specification requirements. Plywood shall be identified with American Plywood Association (APA) grade trademarks and meet the requirements of Product Standard PS1. As needed, strip plywood joints with 4 inch wide strips of flashing membrane. Cover knot holes or cracks with strips of flashing membrane.
- G. Other Flashing Surfaces:
1. Remove all contaminants as required by membrane manufacturer. Surface preparation shall be performed by means approved by County Representative and Roofing Manufacturer.
- H. Finish Leveling, Patching and Crack Preparation:
1. General: Polymethyl methacrylate primer/sand mix is the preferred material for all concrete and masonry substrate finish leveling, crack and wall/deck preparation and patching. Polymethyl methacrylate primer/sand patching mix provides a set time of approximately 12 hours and does not require surface grinding. Kemperol primer/sand mix is typically applied in conjunction with general surface priming.
 2. Stone and Masonry Substrate Leveling and Patching: Substrate conditions are to be evaluated by the installer, the County Representative, and Membrane manufacturer. Perform leveling and patching operations as follows:
 - a. Level uneven surfaces with a leveling mixture of primer and approved kiln-dried silica sand in a 1:2 primer to sand ratio by volume. Spread and plane this compound with a squeegee and trowel to achieve a flat surface.
 - b. Fill cavities with a patching mixture of primer and approved kiln-dried sand in a 1:4 primer to sand ratio by volume.
 - c. Silica sand must be kept absolutely dry during storage and handling.
 - d. Any surface to be leveled or filled must first be primed with a polymethyl methacrylate primer.
 3. Joint and Crack Preparation: Joints, cracks and fractures in the structural deck/substrate shall be prepared as prior to installation of the roofing/waterproofing membrane to prevent telegraphing through the roofing/waterproofing membrane.
 - a. Non-Moving Cracks, Joints, and Voids: Clean out crack/ joint by brushing and oil-free compressed air. Fill crack/joint with polyurethane sealant. Voids require the installation of backer rod or other backing material prior to

- application of the polyurethane sealant. Allow for a minimum of 12 hours cure or as required by sealant manufacturer.
- b. Moving Cracks: Clean out crack by brushing and oil-free compressed air. Fill crack with polyurethane sealant. Allow for a minimum of 12 hours cure or as required by sealant manufacturer. Following full curing of primer, apply roofing/waterproofing resin and a 4 inch (10 cm) wide strip of membrane (resin and fleece) in strict accordance with Membrane manufacturer's written instructions.

3.3 WOOD NAILER INSTALLATION

- A. Install pressure-treated wood nailers as indicated, and as required by the Membrane manufacturer. Wood nailers are required to match the thickness of insulation and cover board, and are to be secured directly to the structural deck. Wood nailers shall be installed at all roof edges and on either side of expansion joints, as well as beneath any equipment flanges.
- B. Wood nailers shall be firmly fastened to the deck. Mechanically fasten wood nailers as required to resist a force of 200 lbs per lineal foot, but with no less than 5 fasteners per 8 foot or 6 fasteners per 10 foot length of nailer. Refer to current FM Loss Prevention Bulletin 1-49 for additional attachment recommendations.

3.4 PRIMER APPLICATION

- A. General:
 - 1. Mix and apply two-component primer in strict accordance with written instructions of Membrane Manufacturer.
 - 2. Substrate surface must be dry, with any remaining dust or loose particles removed using clean, dry, oil-free compressed air, industrial vacuum, cloth wipe or a combination of methods.
 - 3. Do not apply primer on any substrate containing asphalt, coal-tar pitch, creosote or penta-based materials unless approved in writing by Membrane Manufacturer. Some substrates may require additional preparation before applying primer.
- B. Mixing of Kempertec AC Primer:
 - 1. Premix primer Component A thoroughly with a spiral agitator or stir stick.
 - 2. Determine the correct amount of catalyst Component B based upon ambient temperature in accordance with written instructions of Membrane Manufacturer.
 - 3. Add primer catalyst Component B into Component A and mix the components for approximately 2 minutes with a clean spiral agitator on slow speed or stir stick without creating any bubbles or streaks.
 - 4. Do not aerate. Primer solution should be a uniform color, with no light or dark streaks present.
 - 5. Allow primer to dry 1 hour.
- C. Application:
 - 1. After mixing, apply the primer with a roller or brush evenly onto the surface in a cross directional method, or utilizing the pour and spread method to fully cover the substrate.
 - 2. Porous substrates may require an adjustment to the primer application rate or multiple coats to achieve proper pore saturation.
 - 3. Exposure of the primer in excess of 48 hours or premature exposure to moisture may require removal and reapplication of primer. DO NOT apply new primer over primer

prematurely exposed to moisture, or primer used as temporary roofing/waterproofing, unless approved in writing by the Membrane Manufacturer.

3.5 MEMBRANE APPLICATION

A. General:

1. Apply the roofing/waterproofing membrane immediately following full curing of the primer in order to obtain the best bond between primer and membrane.
2. Mix and apply cold fluid-applied reinforced polymethyl methacrylate roofing/waterproofing membrane in strict accordance with written instructions of Membrane Manufacturer.
3. Primed substrate surface shall be dry, with any remaining dust or loose particles removed using clean, dry, oil-free compressed air, industrial vacuum, cloth-wipe or a combination.
4. Protect all areas where membrane has been installed. Do not work off installed membrane during application of remaining work before 24 hours of curing. Movement of materials and equipment across installed membrane is not acceptable. If movement is necessary, provide complete protection of affected areas.
5. Follow the Membrane Manufacturer's recommendation for hot and cold weather application. Monitor surface and ambient temperatures, including the effects of wind chill.

B. Mixing of Kemperol AC Speed FR Resin:

1. Premix resin Component A thoroughly with a spiral agitator or stir stick.
2. Determine the correct amount of catalyst Component B based upon ambient temperature in accordance with written instructions of Membrane Manufacturer.
3. Add resin catalyst Component B into Component A and mix the components for approximately 2 minutes with a clean spiral agitator on slow speed or stir stick without creating any bubbles or streaks. Do not aerate. Resin solution should be a uniform color, with no light or dark streaks present.

C. Application of Resin/Fleece:

1. After the Resin is mixed, using a Kemperol roller nap or brush, apply 2/3 of the resin liberally and evenly onto the surface. Covering one working area at a time, between 10 - 15 sq.ft.
2. Roll the Kemperol Fleece directly into the Resin, making sure the SMOOTH SIDE IS FACING UP (natural unrolling procedure), avoiding folds and wrinkles. The fleece will begin to rapidly saturate with the liquid resin mix. Use the roller or brush to work the resin into the fleece, saturating from the bottom up, and eliminating air bubbles, wrinkles, etc. It is important to correct these faults before the resin cures.
3. Apply the remaining 1/3 of the resin to the top of fleece to complete the saturation. Rolling the final coat of resin onto the fleece should result in a glossy appearance. The fleece can only hold so much resin and all excess should be rolled forward to the unsaturated portion of the fleece. The correct amount of resin will completely saturate the fleece and no white color will be visible. Work wet membrane to avoid any blisters, openings, or lifting at corners, junctions, and transitions. Always assure full resin saturation of fleece.
4. Prevent contact between mixed/unmixed resin and new/existing membrane. If any unmixed resin contacts membrane surface remove immediately and clean thoroughly with a cloth rag.
5. At all fleece seams, allow a 2 inch (5 cm) overlap for all side joints and a 4 inch (10 cm) overlap for all end joints.
6. At membrane tie-offs, clean in-place membrane with MEK when resin has cured.

Allow solvents to fully evaporate before application of new resin. DO NOT APPLY PRIMER TO EXISTING KEMPEROL MEMBRANE.

3.6 FLASHING APPLICATION

A. General:

1. Install flashing system in accordance with the requirements/recommendations of the Membrane manufacturer and as indicated on the manufacturer's standard drawings. Provide system with base flashing, edge flashing, penetration flashing, counter flashing, and all other flashings required for a complete watertight system.
2. Wherever possible, install the flashings before installing the field membrane to minimize foot traffic over newly installed field membrane.
3. All membrane flashings shall be installed concurrently with the roofing/waterproofing membrane as the job progresses. Temporary flashings are not allowed without prior written approval from the Membrane manufacturer. Should any water penetrate the new roofing/waterproofing membrane because of incomplete flashings, the affected area shall be removed and replaced at the Contractor's expense.
4. Provide a minimum vertical height of 8 inches for all flashing terminations. Flashing height shall be at least as high as the potential water level that could be reached as a result of a deluging rain and/or poor slope. Do not flash over existing through-wall flashings, weep holes and overflow scuppers.
5. All flashings shall be terminated as required by the Membrane Manufacturer.

B. Metal Flashing - General:

1. Metal flashings shall be fabricated in accordance with the current recommendations of SMACNA and in accordance with the Manufacturer's standard drawings.
2. Metal flashing flanges to which membrane is to be bonded shall be a minimum of 4 inches in width, and secured to the substrate or wood nailers 6 inches on center staggered with fasteners appropriate to the substrate type. Flanges shall be provided with a roughened surface that has been cleaned of all oil and other residue.
3. Metal edges that will be overlaid with membrane shall be provided with a 1/4 inch minimum hemmed edge.
4. Apply primer, resin and fleece to metal flange, extending membrane to outside face of metal edging, and to vertical face of metal base/curb flashing.
5. Install new flashings consisting of PMMA base Kemperol AC Speed FR Gray Color and 120 gram weight fleece in accordance with Kemper Systems, Inc.

C. Membrane Flashing - General:

1. Membrane flashings shall be fabricated with primer appropriate for the substrate surface, resin of the same base chemical type as the field membrane, and fleece of the same weight as the field membrane unless specified otherwise.
2. Primer, resin, and fleece mixing and application methods as specified for field membranes are also suitable for membrane flashing.
3. Fleece shall overlap 2 inches (5 cm) minimum for all joints. Fleece shall be cut neatly to fit all flashing conditions without a buildup of multiple fleece layers. Work wet membrane with a brush or roller to eliminate blisters, openings, or lifting at corners, junctions, and transitions.
4. Install field membrane consisting of PMMA base Kemperol AC Speed FR Gray Color and 120 gram weight fleece in accordance with Kemper Systems, Inc.

D. Pipes, Conduits, and Unusually Shaped Penetrations:

1. Flashing is typically constructed as a two part assembly consisting of a vertical wrap and a horizontal target patch. Provide a minimum of a 2 inch (5 cm) overlap between vertical and horizontal flashing components.

- E. Drains and Scuppers:
1. Acceptable drain and scupper materials are galvanized, galvalum, cast iron, cast aluminum, copper, hard PVC, and ABS.
 2. Flashing material shall extend 4 inches minimum onto drain or scupper flange and into drain/ scupper body.
 3. Install clamping ring if provided as part of the drain or scupper design. Install a strainer basket to prevent debris from clogging the drainage line.
- F. Hot Stacks:
1. Protect the membrane components from direct contact with steam or heat sources when the in-service temperature exceeds 170 degrees F. In all such cases flash to an intermediate "cool" sleeve.
 2. Fabricate "cool" sleeve in the form of a flanged metal cone using galvanized metal, mechanically attached to the structure or wood nailers.
 3. Flashing is typically constructed as a two part assembly consisting of a vertical wrap and a horizontal target patch. There must be a minimum of a 2 inch (5 cm) overlap between vertical and horizontal flashing components.
- G. Flexible Penetrations:
1. Provide a weathertight gooseneck of round cross-section for each penetration or group of penetrations. Set in water cut-off mastic and secure to the structural substrate.
 2. Flashing is typically constructed as a two part assembly consisting of a vertical wrap and a horizontal target patch. There must be a minimum of a 2 inch (5 cm) overlap between vertical and horizontal flashing components.
- H. Walls, Curbs and Base Flashings:
1. Wall, curb and base flashings shall be installed to solid substrate surfaces only. Adhering to gypsum-based panels, cementitious stucco, synthetic stucco, wood or metal siding, and other similar materials is not acceptable.
 2. Reinforce all transition locations and other potential wear areas with a 4 inch wide membrane strip evenly positioned over the transition prior to installing the exposed flashing layer.
 3. Reinforce all inside and outside corners with a 4 inch diameter conical piece of membrane prior to installing the exposed flashing layer.
 4. All pins, dowels and other fixation elements shall be flashed separately with a vertical flashing component prior to installing the exposed flashing layer.
 5. Extend flashing a minimum of 4 inches onto the field substrate surface.
- I. Drip Edges and Gravel Stops:
1. Metal drip edges and gravel stops shall be installed to solid substrate surfaces or wood nailers only. Securement to gypsum-based panels, cementitious stucco, synthetic stucco, wood or metal siding or coping, and other similar materials is not acceptable.
 2. Flash all drip edges and gravel stops by extending the field membrane all the way to the edge of the exposed face prior to installing the metal edging. Strip in the metal flange with a separate 8 inch wide strip of membrane adhered to both the securement flange and to the field membrane.
 3. For conditions where water infiltration behind the exposed drip edge or gravel stop face is possible, install a separate membrane layer positioned behind the face area and extending a minimum of 4 inches past the securement flange onto the field substrate prior to installing the drip edge or gravel stop.
- J. Field Fabricated Control or Expansion Joint Flashing:
1. Control or expansion joints in excess of 2 inches in width and all expansion joints

- subject to vehicular traffic require the use of a separate engineered joint system.
2. For non-vehicular expansion joints in excess of 2 inches apply a minimum 8 inch strip of Kemperol membrane onto the primed field substrate on both sides of the joint. Lay expansion joint into the liquid membrane while wet. Following the initial embedment, cover the top fleece surface of the expansion joint material with a second 13 inch strip of Kemperol membrane, overlapping the fleece portion of the expansion joint, the first layer of Kemperol membrane and terminating on the field substrate.
 3. For expansion joints that are less than 2 inches grind or otherwise bevel the inside edges of the joint opening to provide a smooth transition edge for the fleece.
 4. Flashing typically consists of a fully saturated membrane bottom layer looped into the joint as a cradle, a compressible foam or rubber insert at 25 percent compression fitted into the joint, and a membrane top layer applied over the joint. Extend both fleece layers 4 inches minimum onto the field substrate on both sides of the joint.
 5. Apply the field membrane tying into the entire joint area.

K. Electrical Conduit, Gas Lines and Lightning Protection

1. Supports for electrical conduit and gas lines greater than 1 inch in diameter require the use of a separate engineered support system.
2. Supports for electrical conduit and gas lines 1 inch or less in diameter, and bases for lightning protection rods and cable, can be adhered directly to the membrane surface with a single-component, high quality polyurethane sealant.

3.7 SURFACING AND FINISHES

A. Adhesion Key:

1. Where placement of cementitious materials is required over sections of the roofing/waterproofing membrane or flashing, apply manufacturer's methyl methacrylate primer/coating at the manufacturer's recommended coverage rate, with broadcast to excess of kiln-dried silica sand into wet primer/coating.

- B. Allow the Kemperol AC Speed FR to cure 1 hour and install adhesion key surfacing to include Kempertec AC primer with broadcast of 0.5 silica sand into the primer while still wet prior to balustrade stone overburden.

3.8 TEMPORARY CLOSURES AND WATERSTOPS

- A. Ensure that moisture does not damage any completed section of the new roofing/waterproofing system. Completion of flashings, terminations, and temporary closures shall be completed as required to provide a watertight condition. All temporary closures shall be made as recommended or required by the membrane manufacturer.

3.9 PROTECTION

- A. Upon completion of roofing/waterproofing and flashings and associated work, institute appropriate procedures for surveillance and protection of roofing during remainder of construction period. Protect all areas where membrane has been installed

3.10 FIELD QUALITY CONTROL

A. Substrate and Bond Testing

1. Evaluate moisture content of on-site cementitious substrate materials. Determine substrate moisture content throughout the work and record with Daily Inspection Reports to the Owner or designated Representative, and Membrane Manufacturer. Report the results of the following tests.

- a. Tramex Concrete Moisture Encounter Meter CME4 to determine the moisture content of the top 3/4 inch of the concrete slab. Maximum acceptable reading 5 percent.
 - b. Laboratory Determination Moisture Content. Maximum result 6 percent by weight.
 - c. Relative Humidity (RH) Test. Maximum RH 75 percent.
 - d. Frothing, bubbling, or pinholes within the primer indicates excessive vapor drive from within the substrate. Blistering of membrane may result from excessive vapor drive.
 - e. Where results exceed the maximum acceptable reading contact Membrane Manufacturer for recommendations.
- B. Complete all post installation procedures in accordance with the manufacturer's guidelines for warranty issuance of the specified warrantee.
 - C. Site Condition: Leave all areas around job site free of debris, roofing materials, equipment and related items after job completion.
 - D. Notification of Completion: Notify the membrane manufacturer of job completion and schedule a final inspection date.
 - E. Final Inspection: At the completion of the Work meet with the membrane manufacturer's technical field representative to evaluate the completed installation of the field and flashing membrane. Complete all previously noted punch list items prior to the scheduled meeting.
 - F. Correction of Work: Work that does not conform to specified requirements including tolerances, slopes, and finishes shall be corrected and/or replaced. Any deficiencies of membrane application, termination and/or protection as noted during the Membrane Manufacturer's inspections shall be corrected and/or replaced.

3.11 SOLID ADHERED OVERBURDEN

- A. Stone shall be installed in accordance with the overburden manufacturer's current published specifications and recommendations for use in an above membrane plaza, terrace, fountain, or flooring application
- B. Install adhered overburden to waterproofing membrane that has been provided with adhesion key surfacing. Utilize adhesives/mortars approved by the membrane manufacturer. Tile adhesive shall meet and exceed ANSI requirements for adhesion shear strength.
- C. Install overburden neatly, level and even. Cracked, broken or otherwise damaged overburden materials must be removed and discarded. Fit overburden neatly around all penetrations and projections, and at the perimeter. Ensure that overburden is properly supported to provide even weight distribution to underlying assembly

3.12 CLEANING

- A. Clean-Up: Site cleanup, including both interior and exterior building areas that have been affected by construction, shall be restored to preconstruction condition.
- B. Roofing/waterproofing materials, components and accessories shall be removed from Site and taken to a legal dumping area authorized to receive such materials.
- C. Disposal of Primer and Resin: Cured resin may be disposed of in standard landfills. Uncured resin is considered a hazardous material and must be handled as such, in accordance with local, state and federal regulation

3.13 PROTECTION

- A. Protect building components with tarps or other suitable materials, from soil, stains, or spills at all hoisting points and areas of application.
- B. Any such damage shall be repaired at Contractor's expense to Owner's satisfaction or be restored to original condition.
- C. Provide barricades, retaining ropes, safety elements and any appropriate signage required.
- D. Protect finished roofing/waterproofing membrane from damage by other trades by the use of a cushioning layer such as 1 inch thick expanded polystyrene insulation and an impact layer such as 1/2 inch thick exterior-grade plywood.
- E. Do not allow waste products containing petroleum, grease, acid, solvents, vegetable or mineral oil, animal oil, animal fat, etc. or direct steam venting to come into direct contact with the membrane unless approved by manufacturer's chemical resistance chart.
- F. Eliminate construction traffic on newly tested membrane systems. Do not store construction materials on unprotected membrane surfaces.
- G. Membrane areas that are observed to be trafficked or used as a storage/working platform shall be retested and immediately repaired and covered with insulation and drainage composite.

END OF SECTION 075600

SECTION 076200 - SHEET METAL FLASHING AND TRIM (LEAD COATED COPPER)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes the following work:
 1. Install all new metal flashing, as per the Drawings.
 2. Counter-flashing and base flashing.
 3. Expansion joints.
 4. Wind locks.
 5. Ridge cap flashing.
 6. Downspouts
 7. Miscellaneous accessories.
- B. Related Sections: The following Sections contain requirements that related to this Section:
 1. Section 024119 "Selective Demolition" for existing roof removal.
 2. Section 061053 "Rough Carpentry" for wood nailers, curbs, and blocking.
 3. Section 075600 "Cold Fluid Applied Room Membrane" for flashing intersections
 4. Section 079200 "Joint Sealant" for associated joint sealant.
 5. Section 073129 "Wood Shingles and Shakes" for installation of sheet metal flashing and trim integral with shingle roofing. (Outbuildings)

1.3 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials. Joints and seams to provide leak proof secure, and noncorrosive installation.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project Site.
 1. Review Construction Schedule. Verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
 3. Review sheet metal flashing observation and repair procedures after flashing installation.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For sheet metal flashing and trim. Copying Architects Drawings is not permitted. All shop drawings require field dimension verification of existing field conditions and dimensions. Contractor must stamp all shop drawing details with the following: “I, *“Insert Contractor Name”*, certify that field dimensions have been verified and all details have been prepared and adjusted in accordance with my field verified dimensions.”
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
 - 3. Include identification of material, thickness, weight, and finish for each item and location in Project.
 - 4. Include details for forming, including profiles, shapes, seams, and dimensions.
 - 5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
 - 6. Include details of termination points and assemblies.
 - 7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
 - 8. Include details of roof-penetration flashing.
 - 9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counter flashings as applicable.
 - 10. Include details of special conditions.
 - 11. Include details of connections to adjoining work.
 - 12. Scale:
 - a. Layout drawings: Scale 1/4-inch per foot.
 - b. Detail drawings: Scale half size, minimum.
- C. Samples of sheet metal flashing, trim, and accessory items, in the specified finish.
 - 1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
 - 2. Sample 12” square of sheet metal flashing in specified weights.
 - 3. Submit one mock up or sample of each of the following:
 - a. Soldered seam mockup - 2 FT long.
 - b. Custom ridge flashing - 1 FT long
 - c. Valley flashing - 1 FT long
 - d. All fasteners.

1.6 INFORMATIONAL SUBMITTALS

- A. Installer Qualifications: Engage an experienced Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance; with not less than 7 years documented experience performing similar work with historic buildings; and with sufficient production capacity to produce required fabrications without delaying the Work.
- B. Quality Standard for Materials and Workmanship: Fabricate and install sheet metal flashing and trim work in accordance with Copper Development Association (CDA), "Copper in Architecture Handbook." Note: Manual must be retained on site at all times.
- C. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals

1.8 QUALITY ASSURANCE

- A. Fabricator Qualifications: 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.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Build mockup a typical roof shingle mock up with all associated flashing details including hip, valley, ridge and eaves to be constructed full size at grade for review by Architect. Approximately 10 feet long, including supporting construction cleats, seams, attachments, underlayment and accessories.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations.

1.9 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 extent necessary for period of sheet metal flashing and trim installation.
- C. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.
- D. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.10 PROJECT CONDITIONS

- A. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation. Ensure best possible weather resistance, durability of Work, and protection of materials and finishes.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing.
- B. Design system capable of withstanding building code requirement for negative wind pressure.
- C. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing 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 sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
- D. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

2.2 SHEET METALS

- A. Lead-Coated Copper Sheet: ASTM B 101, Temper H00 and H01, cold-rolled copper sheet of weight indicated below, coated both sides with lead weighing not less than 12 lb/100 sq. ft. or more than 15 lb/100 sq. ft. of copper sheet (total weight of lead applied equally to both sides).
 - 1. Manufacturers:
 - a. Lamb & Ritchie Company, Inc., Tel 888-802-2700
 - b. Riverside Sheet Metal, Tel 781-396-0070
 - c. Unimet Metal Supply Inc., Tel 973-526-4004
 - d. Or approved equal.
- B. Zinc Sheet: Zinc: 99 percent pure, alloyed with 0.08 to 1.00 percent copper. Applied as strips as noted on drawings to allow act as biocide and prevent bio growth on shingles or shakes.

2.3 UNDERLAYMENT MATERIALS

- A. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt; non-perforated.
- B. Self-Adhering, High-Temperature Sheet: 30 to 40 mils thick minimum, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer. 100% Butyl Based Underlayment.
 - 1. Thermal Stability: Stable after testing at 300 deg F; ASTM D 1970.
 - 2. Low Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D 1970.
 - 3. Products:
 - a. GCP Applied Technologies: Grace Ultra.
 - b. Protecto Wrap : Jiffy Seal Ice & Water Guard HT Butyl.

- c. Chase Corporation : 4EvaSeal HT Butyl Underlayment
- d. Or approved equal.

C. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. minimum

2.4 MISCELLANEOUS MATERIALS AND ACCESSORIES

- A. General: Provide materials and types of solder and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.
- B. Fasteners: Self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
 - 1. Nails for Roofing: Series 316 stainless steel, 0.109 inch minimum and not less than 7/8 inch long, barbed with large head.
 - 2. Exposed Fasteners: NOT PERMITTED
 - 3. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed; with hex-washer heads must be in Stainless Steel 316.
 - 4. Blind Fasteners: Rivets NOT PERMITTED
- C. Solder for Lead Coated Copper: ASTM B 32, Grade Sn60, 60 percent tin and 40 percent lead unless otherwise recommended by Sheet Metal flashing manufacturer. No other metal are acceptable.
- D. Flux: For Lead Coated Copper:
 - 1. Products:
 - a. Superior Ruby Fluid Soldering Flux. Manufacturer: Superior Flux & Mfg. Co., 6615 Parkland Blvd., Cleveland, OH 44139, Tel 440-349-3000, Fax 440-349-0003, info@superiorflux.com.
 - b. Premium Soldering Flux for Copper 851E. Manufacturer: Guilbert Express, 60 Broad Street, Ste. 3502, New York, NY 10004, Tel 708-667-7729, E-Fax 866-404-2607.
 - c. Jel-Flux Flux. Manufacturer: HCC Holdings, Inc., 4700 West 160th, Cleveland, OH 44135, Tel 800-321-9532, Fax 800-321-9535
 - d. Or approved equal.
- E. Elastomeric Joint Sealant: ASTM C 920, of base polymer, type, grade, class, and use classifications required to produce joints in sheet metal roofing that will remain weathertight and as recommended by roll-formed sheet metal roofing manufacturer for installation indicated.
- 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. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application. Proposed locations to be reviewed with Architect.
- H. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coat.
- I. Mastic Sealant: Polyisobutylene; nonhardening, nonshrinking, nondrying, nonmigrating sealant.
- J. Adhesives: Type recommended by flashing sheet metal manufacturer for waterproof and weather-

resistant seaming and adhesive application of flashing sheet metal.

K. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work; size and thickness required for performance.

1. Fabricate components from passive stainless steel sheet, unless otherwise indicated.

L. Rivets: Rivets are **NOT** permitted.

2.5 REGLETS

A. General: Lead coated copper sheet units of type and profile indicated, formed to provide secure interlocking of separate reglet and counter-flashing pieces. Use lead bar to secure counter flashing. See drawings for details.

1. Surface mounted types shall not be permitted.

2.6 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in 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 to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners 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 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

D. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

G. Fabricate exposed lead coated copper work true to line and levels indicated, without oil-canning, buckling, and tool marks, and with exposed edges folded back to form 3/4" wide hems.

- H. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be soldered, form seams, and solder. Pre-tin seams and cleats to be placed in the seams. Lock and lap seams in direction of flow of water drainage.
- I. Do not use graphite pencils to mark metal surfaces.

2.7 SHEET METAL FABRICATIONS

- A. General: Fabricate sheet metal items from lead coated copper in thickness or weight needed to comply with performance requirements but not less than that listed below for each application.
- B. Counter-flashing: 20 ounces per square foot
- C. Base Flashing: 20 ounces per square foot
- D. Wall Flashing: 20 ounces per square foot
- E. Flashing Receivers: 20 ounces per square foot
- F. Expansion Joints: 20 ounces per square foot
- G. Built-In Valleys: 20 ounces per square foot
- H. Ridge & Hip Flashing: 20 ounces per square foot
- I. Gutters, including Pole Gutters: 20 ounces per square foot (Outbuildings)
- J. Downspouts: 20 ounces per square foot
 - 1. Straps: 1-1/2 inch size. Minimum of 3 per downspout. 1/8" thick LCC or 316 Stainless steel. (Outbuildings)
- K. Exposed Trim: 20 ounces per square foot
- L. Wind Locks: 32 ounces per square foot
- M. Miscellaneous Accessories: 20 ounces per square foot

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, 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.
 - 3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
 - 4. All deteriorated deck roof boards and battens must be replaced prior to installation of sheet metal flashing.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

- A. Where installation is to be directly on wood substrates, install a slip-sheet of red rosin paper on a course of asphalt saturated felt.
- B. Where installation is to be directly on water and ice underlayment, install a slip-sheet of red rosin paper to prevent contact.

3.3 INSTALLATION, GENERAL

- A. General: Unless otherwise indicated, install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, and with CDA "Copper in Architecture Handbook."
- B. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement as required to complete sheet metal flashing and trim system.
 - 1. Install sheet metal flashing and trim true to line, levels, and slopes. 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 not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 - 4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
 - 5. Torch cutting of sheet metal flashing and trim is not permitted.
 - 6. Do not use graphite pencils to mark metal surfaces.
- C. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
- D. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
 - 1. Form expansion joints of intermeshing hooked flanges.
 - 2. Use lapped expansion joints only where indicated on Drawings.
- E. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
- F. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- G. Seal joints as required for watertight construction. Bed flanges of work in a thick coat of roofing cement where required for waterproof performance. Locations must be submitted on shop drawings and reviewed prior to installation.

- H. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches however, reduce pre-tinning where pre-tinned surface would show in completed Work.
 - 1. Do not use torches for soldering.
 - 2. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
 - 3. Lead Coated Copper Soldering: Tin edges of uncoated sheets, using solder for copper.
- I. Rivets: **NOT PERMITTED**

3.4 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements sheet metal manufacturer's written installation instructions and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous wind lock anchored to substrate at 3-inch on center.
- C. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.
- D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets and fit tightly to base flashing. Extend counterflashing 6 inches over base flashing. Lap counterflashing joints minimum of 6 inches. Secure in waterproof manner by means of lead wedges and interlocking folded seams as indicated on drawings.
- E. Roof-Drainage System: Install drainage items fabricated from lead coated copper, with straps, adhesives, and anchors recommended by CDA to drain roof in the most efficient manner. Coordinate roof-drain flashing installation with roof-drainage system installation. Coordinate flashing and sheet metal items for steep-sloped roofs with roofing installation. (Outbuildings)
- F. Downspouts: Locate straps at top, bottom, seams, and not to exceed 8 foot spacing (maximum). At grade level, attach downspouts with a minimum of 2 straps per section. Attach to walls with passive stainless steel fasteners. Straps to be located at same locations on each downspout. Install basket at each drain. (Outbuildings)
- G. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with butyl sealant and clamp flashing to pipes that penetrate roof.

3.5 MISCELLANEOUS FLASHING INSTALLATION

- A. Secure all flashings with 2" wide cleats 12" o.c. unless otherwise indicated. Secure each cleat with a minimum of two passive stainless steel fasteners.
- B. Attachments: All attachments to be stainless steel.

3.6 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch 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."

3.7 CLEANING AND PROTECTION

- A. Repair or replace work, which is damaged or defaced, as directed by the County Representative.
- B. Clean exposed metal surfaces, removing substances that might cause corrosion of metal, interfere with uniform oxidation and weathering, or cause deterioration or discoloration of finishes.
- C. Provide protection and maintain conditions that protect new sheet metal flashing and trim work during construction without damage or deterioration other than natural weathering at the time of Substantial Completion.
- D. Clean and neutralize flux materials. Clean off excess solder.
- E. 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 sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.
- F. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finishing touchup or similar minor repair procedures.

END OF SECTION 076200

SECTION 078400 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Instructions to Bidders and General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Coordinate work of this section with work of other sections as required to properly execute the work as necessary to maintain satisfactory progress of the work of other sections, including:
 - 1. Section 033000 Cast-In-Place Concrete
 - 2. Section 040140.91 Historic Masonry Restoration
 - 3. Section 042000 Unit Masonry
 - 4. Section 079200 Joint Sealant
 - 5. Section 092116 Gypsum Wallboard Assemblies
 - 6. Section 092613 Gypsum Veneer Plastering
 - 7. Section 144216 Unenclosed Vertical Wheelchair Lifts
 - 8. Section 220000 Plumbing
 - 9. Section 230000 Heating, Ventilating and Air Conditioning
 - 10. Section 260000 Electrical

1.2 SUMMARY

- A. Section Includes:
 - 1. Penetrations in walls.
 - 2. Penetrations in horizontal assemblies.

1.3 PERFORMANCE REQUIREMENTS

- A. General: For penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.
- B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per ASTM E 814:
 - 1. F-Rated Systems: Provide through-penetration firestop systems with ratings not less than that equaling or exceeding fire-resistance rating of existing constructions penetrated.
 - 2. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
 - a. Penetrations located outside wall cavities.
 - b. Penetrations located outside fire-resistance-rated shaft enclosures.
- C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage,

provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.

1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved, either by installing floor plates or by other means.
 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- D. For through-penetration firestop systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.
1. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.
- C. Qualification Data: For qualified Installer.
- D. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.
- F. Firestopping shall not begin until the above submittal scope has been submitted and approved.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FMG according to FMG 4991, "Approval of Firestop Contractors."
- B. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

- C. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:
 - 1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
 - b. Classification markings on penetration firestopping correspond to designations listed by the following:
 - 1) UL in its "Fire Resistance Directory."
 - 2) FM Global in its "Building Materials Approval Guide."
- D. Preinstallation Conference: Conduct conference at Project site.
- E. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- F. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by building inspector, if required by authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, through-penetration firestop systems that may be incorporated into the Work include, but are not limited to, those systems indicated that are produced by one of the following manufacturers.
- B. Manufacturers: Subject to compliance with requirements, provide one of the through-penetration firestop systems indicated for each application that are produced by one of the following manufacturers:
 - 1. Grace, W. R. & Co. - CT
 - 2. Tremco; Sealant/Weatherproofing Division
 - 3. USG Corporation
 - 4. Or approved equal.

2.2 PENETRATION FIRESTOPPING

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
 - 1. Fire-resistance-rated walls include fire walls, fire-barrier walls, smoke-barrier walls, and

2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
1. Horizontal assemblies include floors, floor/ceiling assemblies, and ceiling membranes of roof/ceiling assemblies.
 2. F-Rating: Provide 2-hour fire resistance rating at all new penetrations in horizontal assemblies, as well as openings resulting from the removal of existing equipment.
 3. T-Rating: At least 2 hours, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
- D. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479.
1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at 0.30-inch wg at both ambient and elevated temperatures.
- E. W-Rating: Provide penetration firestopping showing no evidence of water leakage when tested according to UL 1479.
- F. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- G. VOC Content: Provide penetration firestopping that complies with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
1. Architectural Sealants: 250 g/L.
 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 3. Sealant Primers for Porous Substrates: 775 g/L.
- H. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-wool-fiber or rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 2. Temporary forming materials.
 3. Substrate primers.
 4. Collars.
 5. Steel sleeves.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with Part 1 "Performance Requirements" Article and with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.
- D. Identification: Identify through-penetration firestop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of edge

of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. Use mechanical fasteners for metal labels. Include the following information on labels:

1. The words "Warning - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Through-penetration firestop system designation of applicable testing and inspecting agency.
4. Date of installation.
5. Through-penetration firestop system manufacturer's name.
6. Installer's name.

3.4 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage an independent inspecting agency to inspect through-penetration firestops. Independent inspecting agency shall comply with ASTM E 2174 requirements including those related to qualifications, conducting inspections, and preparing test reports.
- B. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.
- C. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued and firestop installations comply with requirements.

3.5 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to alpha-alpha-numeric designations listed in UL's "Fire Resistance Directory" under product Category XHEZ.
- B. Where OPL-classified systems are indicated, they refer to alpha-numeric design numbers in OPL's "Directory of Listed Building Products, Materials, & Assemblies."
- C. Where ITS-listed systems are indicated, they refer to design numbers listed in ITS's "Directory of Listed Products," "Firestop Systems" Section.
- D. Firestop Systems for Metallic Pipes, Conduit, or Tubing and at base of steel posts:
 1. Basis of Design: Tremstop 1A-1 In tumescent Acrylic Sealant
 2. Classified Fire Resistance Rating: 263

END OF SECTION 078400

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Scope of work includes
 1. The sealing of joints indicated on drawings and at junctions between wood trim.
 2. No sealant is to be installed unless location is reviewed with Architect prior to installation. This is an historic building, and all potential applications of sealant are to be reviewed.
 3. Selected sealant at concealed joints in roof flashing.
 4. All exterior sealant to be paintable.
- B. Section Includes:
 1. Non-staining silicone joint sealants.
 2. Butyl joint sealants.
 3. Latex joint sealants.
- C. Related Requirements:
 1. Section 076200 Sheet Metal Flashing and Trim
 2. Section 099113 Painting and Lead Safe Practices

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- 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.
- C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Joint-Sealant Schedule: Include the following information:
 1. Joint-sealant application, joint location, and designation.
 2. Joint-sealant manufacturer and product name.
 3. Joint-sealant formulation.
 4. Joint-sealant color.

1.4 SUBMITTALS

- A. Product Data: Submit for the following:
 - 1. Each joint sealant
 - 2. Joint backing materials.
 - 3. Bond-breaker tapes.
 - 4. Primers.
 - 5. Cleaners.
 - 6. Masking tapes.
- 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.
- C. Samples for Verification: For each type and color of joint sealant required. Install joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Pre-construction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on pre-construction testing specified in "Quality Assurance" Article.
- E. Field Test Report Log: For each elastomeric sealant application. Include information specified in "Field Quality Control" Article.
- F. Compatibility and Adhesion Test Reports: From sealant manufacturer indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- G. Product Test Reports: From a qualified testing agency indicating. Sealants comply with requirements, based on comprehensive testing of current product formulations.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project, with not less than 7 years' documented experience performing similar work with historic buildings, and whose work has resulted in joint-sealant installations with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Pre-construction Compatibility and Adhesion Testing: Submit to joint sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 - 1. Use manufacturers standard test methods to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - a. Perform tests under environmental conditions replicating those that will exist during installation.

2. Submit not fewer than nine pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
 3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 4. For materials failing tests, obtain joint sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.
 5. Testing will not be required if joint sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.
- D. Product Testing: Obtain test results for "Product Test Reports" Paragraph in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period.
1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.
 2. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.
 3. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.
- E. Pre-construction Field-Adhesion Testing: Before installing elastomeric sealants, field-test their adhesion to joint substrates as follows:
1. Locate test joints where indicated or, if not indicated, as directed by Architect.
 2. Conduct field tests for each application indicated below:
 - a. Each type of elastomeric sealant and joint substrate indicated.
 - b. Each type of non-elastomeric sealant and joint substrate indicated.
 3. Notify Architect seven days in advance of dates and times when test joints will be erected.
 4. Arrange for tests to take place with joint sealant manufacturer's technical representative present.
 5. Test Method: Test joint sealants by hand-pull method described below:
 - a. Install joint sealants in 60-inch-long joints using same materials and methods for joint preparation and joint-sealant installation required for the completed Work. Allow sealants to cure fully before testing.
 - b. Make knife cuts from one side of joint to the other, followed by two cuts approximately 2 inches long at sides of joint and meeting cross cut at one end. Place a mark 1 inch from cross-cut end of 2-inch piece.
 - c. Use fingers to grasp 2-inch piece of sealant between cross-cut end and 1-inch mark; pull firmly at a 90-degree angle or more in direction of side cuts while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
 - d. For joints with dissimilar substrates, check adhesion to each substrate separately. Do this by extending cut along one side, checking adhesion to opposite side, and then repeating this procedure for opposite side.

6. Report whether sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
 7. Evaluation of Pre-construction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.
- F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.6 FIELD 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.
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: **Two** years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: **Five** years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 2. Disintegration of joint substrates from causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or other outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multi-component materials.
- B. Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.9 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Installer's Warranty: Written warranty, signed by Installer agreeing 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: Two years from date of Substantial Completion.
- C. Special Manufacturer's Warranty: Written warranty, signed by elastomeric sealant manufacturer agreeing to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: 20 years from date of Substantial Completion.
- D. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:
 - 1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
 - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products indicated.

2.2 JOINT SEALANTS, 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. Colors of Exposed Joint Sealants: Contractor to provide color samples for selection.

2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant, including those referencing ASTM C 920 classifications for type, grade, class, and uses.
- B. Additional Movement Capability: Where additional movement capability is specified in the Elastomeric Joint-Sealant Schedule, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at the time of installation and remain in compliance with other requirements of ASTM C 920 for uses indicated.
- C. Stain-Test-Response Characteristics: Where elastomeric sealants are specified in the Elastomeric Joint-Sealant Schedule to be non-staining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- D. Low-Modulus Nonacid-Curing Silicone Sealant
 - 1. Products: Provide one of the following:
 - a. 790; Dow Corning.
 - b. Silpruf; GE Silicones.
 - c. 890; Pecora Corporation.
 - d. Or approved equal.
 - 2. Type and Grade: S (single component) and NS (nonsag).
 - 3. Class: 25.
 - 4. Additional Movement Capability: 100 percent movement in extension and 50 percent movement in compression for a total of 150 percent movement.
 - 5. Use Related to Exposure: NT (non-traffic).
 - 6. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, 0.
 - 7. Stain-Test-Response Characteristics: Non-staining to porous substrates per ASTM C 1248.

2.4 SOLVENT-RELEASE JOINT SEALANTS

- A. Butyl Sealant: Non-curing, nondrying, nonhardening, non-skinning, non-staining, gunnable, synthetic rubber sealant.
 - 1. Products: Provide one of the following:
 - a. Bostik 300; Bostik Inc.
 - b. BA-98; Pecora Corporation.
 - c. Tremco Acoustical Sealant; Tremco, Inc.
 - d. Or Approved Equal.

B. Butyl Polyisobutylene Sealant: Non-curing, nondrying, solvent-release; complying with 809.2, as described in AAMA 800.

C. Butyl-Rubber-Based Solvent-Release Joint-Sealant:

1. Products: Provide one of the following:

- a. Bostik 300; Bostik Inc.
- b. BC-158; Pecora Corporation.
- c. Tremco Butyl Sealant; Tremco.
- d. Or Approved Equal.

2. Comply with ASTM C 1085.

2.5 LATEX JOINT SEALANTS

A. Latex Sealant:

1. Products: Provide one of the following:

- a. Chem-Calk 600; Bostik Inc.
- b. AC-20 + Silicone; Pecora Corporation.
- c. Sonolac; Sonneborn Building Products Div., ChemRex, Inc.
- d. Tremflex 834; Tremco.
- e. Or approved equal.

2. Comply with ASTM C 834.

2.6 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

1. Type B: Bicellular material with a surface skin.
2. Type C: Closed-cell material with a surface skin.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.7 MISCELLANEOUS MATERIALS

A. General: Select and provide materials that are non-harming and non-staining to existing historic materials; are compatible with joint substrates and sealant materials; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. 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.

- C. 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.
- D. 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 performance of the Work.
- 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, 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.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by 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 or primer 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. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. 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.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs 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.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
 - 4. Provide recessed joint configuration of recess depth according to Figure 8C in ASTM C 1193.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field-test joint-sealant adhesion to joint substrates as follows:
 - 1. Extent of Testing: Test completed elastomeric sealant joints as follows:
 - a. Perform 10 tests for the first 1000 feet of joint length for each type of elastomeric sealant and joint substrate.
 - b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.
 - 2. Test Method: Test joint sealants by hand-pull method described below:
 - a. Make knife cuts from one side of joint to the other, followed by two cuts approxi-

mately 2 inches long at sides of joint and meeting cross cut at one end. Place a mark 1 inch from cross-cut end of 2-inch piece.

- b. Use fingers to grasp 2-inch piece of sealant between cross-cut end and 1-inch mark; pull firmly at a 90-degree angle or more in direction of side cuts while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
 - c. For joints with dissimilar substrates, check adhesion to each substrate separately. Do this by extending cut along one side, checking adhesion to opposite side, and then repeating this procedure for opposite side.
3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field adhesion test log.
 4. Inspect tested joints and report on the following:
 - a. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
 - b. Whether sealants filled joint cavities and are free from voids.
 - c. Whether sealant dimensions and configurations comply with specified requirements.
 5. Record test results in a field adhesion test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
 6. Repair sealants pulled from test area by applying new sealants following same procedures used to originally seal joints. Ensure that original sealant surfaces are clean and new sealant contacts original sealant.
- B. Evaluation of Field-Test Results: Sealants not evidencing adhesive failure from testing or non-compliance with other indicated requirements, will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Re-test failed applications until test results prove sealants comply with indicated requirements. Re-test failed applications until test results prove sealants comply with indicated requirements.

3.5 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.

3.6 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, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

- A. General:
 - 1. All joint sealant materials and locations shall be approved by the Architect prior to commencement of work.
 - 2. Joints of a nature similar to that of joints indicated on the schedule shall be sealed with same sealer, whether indicated on drawings to be sealed or not.

- B. Exterior Building joints:
 - 1. Sealant: Low-modulus silicone sealant.
 - 2. Backer: Plastic foam joint backer.
 - 3. Joint shape: Concave joint configuration.
 - 4. Color: To be selected by Architect.

- C. Concealed Metal Flashing Joints:
 - 1. Acceptable sealants:
 - a. Butyl sealant.
 - b. Butyl polyisobutylene sealant.
 - c. Butyl-rubber-based solvent-release joint sealant.
 - a. Color: To be selected by Architect.

- D. Interior Building Joints to be Painted:
 - 1. Sealant: Acrylic-latex emulsion sealant.
 - 2. Backer: Plastic foam joint backer.
 - 3. Joint shape: Concave joint configuration.

END OF SECTION 079200

SECTION 080314 - HISTORIC TREATMENT OF WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes historic treatment of wood doors in the form of the following:
 - 1. Repair of existing historic stile and rail wood doors per door schedule.
 - 2. Repairing, refinishing, and replacing historic hardware per door schedule.

Note: all exterior doors were repaired, stripped and the first finish coat was applied to the interior face of the door as part of the Exterior Restoration project.
- B. Related Requirements:
 - 1. Section 013510 – Special Procedures for Historic Treatment
 - 2. Section 024119 - Selective Demolition
 - 3. Section 060140.91 – Architectural Woodwork Restoration
 - 4. Section 061000 - Rough Carpentry
 - 5. Section 064023 – Interior Architectural Woodwork
 - 6. Section 079200 - Joint Sealant
 - 7. Section 081433 – Stile and Rail Wood Doors
 - 8. Section 087100 – Door Hardware
 - 9. Section 099113 – Painting and Lead Safe Practices
 - 10. Section 099300 – Staining and Transparent Finish Restoration

1.3 DEFINITIONS

- A. Glazing: Includes glass, glazing points, glazing tapes, glazing sealants, and glazing compounds.
- B. Door Generally, this term includes door frame, leaves, hardware, side panels or lights, fan light, transom, storm and screen doors, and storm vestibule unless otherwise indicated by context.
- C. Wood Door Component Terminology: Wood door components for historic treatment work include the following classifications:
 - 1. Frame Components: Head, jambs, stop, and threshold or sill.
 - 2. Leaf Components: Stiles, rails, and muntins.
 - 3. Exterior Trim: Exterior casing, brick mold, and cornice or drip cap.
 - 4. Interior Trim: Casing.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference on site.
 - 1. Review minutes of Preliminary Historic Treatment Conference that pertain to historic treatment of wood doors.
 - 2. Review methods and procedures related to historic treatment of wood doors including, but not limited to, the following:
 - a. Historic treatment specialist's personnel, equipment, and facilities needed to make

- progress and avoid delays.
- b. Materials, material application, sequencing, tolerances, and required clearances.
- c. Fire-protection plan.
- d. Wood door historic treatment program.
- e. Coordinate security for access with Owner.

1.5 SEQUENCING AND SCHEDULING

- A. Perform historic treatment of wood doors in the following sequence, which includes work specified in this and other Sections:
 - 1. Label each door frame with permanent opening-identification number in inconspicuous location.
 - 2. Tag existing door leaves, storm doors, and storm-vestibule panels with opening-identification numbers and remove for on-site or off-site repair. Indicate on tags the locations on door of each component, such as "left-hand door leaf" and "right-hand reverse door leaf."
 - 3. Remove door, dismantle hardware, and tag hardware with door opening-identification numbers.
 - 4. In the shop, label each leaf with permanent opening-identification number in inconspicuous location and remove site-applied tags.
 - 5. Install temporary protection and security at door openings.
 - 6. Sort units by condition, separating those that need extensive repair.
 - 7. Clean surfaces.
 - 8. General Wood-Repair Sequence:
 - a. Photograph each door, front and back, before removal.
 - b. Remove hardware necessary for repair and refinishing. Coordinate and tag all hardware to the door from which it was removed.
 - c. Remove paint to bare wood.
 - d. Photograph each door after paint removed, front and back. Indicate repair location and type of repair and prepare schedule describing and quantifying repairs against base quantity amount.
 - e. Provide necessary wood repairs, as outlined in the Drawings.
 - f. Rack frames slightly to inject adhesive into mortise and tenon joints, square frames to proper fit before adhesive sets.
 - g. Repair wood by consolidation, member replacement, partial member replacement, and patching.
 - h. Sand, prime, fill, sand again, and prime surfaces again for refinishing.
 - 9. Repair, refinish, and replace hardware if required. Reinstall operating hardware.
 - 10. Remove temporary protection and security at door openings.
 - 11. Reinstall units.
 - 12. Apply finish coats. Color to be determined by Architect.

1.6 ACTION SUBMITTALS

- A. Product Data and Manufacturer's Literature: For each type of product.
 - 1. Include recommendations for product application and use. Include test data substantiating that products comply with requirements.
- B. Shop Drawings: For locations and extent of wood-door repair and replacement work.
 - 1. Detailed photograph of each door clearly indicating scope of repair. To be completed after paint removal.
 - 2. Include plans, elevations, sections, and details of replacement parts at full scale indicating materials, profiles, joinery, reinforcing, method of splicing into or attaching to existing

- wood door, accessory items, and finishes.
3. Include field-verified dimensions and the following:
 - a. Full-size shapes and profiles with complete dimensions for replacement components and their jointing, showing relation of existing to new components.
 - b. Templates and directions for installing hardware and anchorages.
 - c. Identification of each new unit and its corresponding door locations in the building on annotated plans and elevations.
 4. Submit a schedule with shop drawings showing the scope of repair work and necessary replacement hardware for each door.
- C. Samples for Initial Selection: For each type of exposed wood and finish.
1. Identify wood species, cut, and other features.
 2. Include Samples of hardware and accessories.
- D. Samples for Verification: For the following products in manufacturer's standard sizes unless otherwise indicated, finished as required for use in the Work:
1. Replacement Units: 12-inch long, full-size frame sections with applied finish.
 2. Replacement Members: 12 inches long for each replacement member, including parts of frame, leaf, exterior trim, and interior trim.
 - a. Additional Samples of replacement members that show fabrication techniques, materials, and finishes as requested by Architect.
 3. Repaired Wood Door Members: Prepare Samples using existing wood door members removed from site, repaired, and prepared for refinishing.
 4. Refinished Wood Door Members: Prepare Samples using existing wood door members removed from site, repaired, and refinished.
 5. Hardware: Full-size units with each factory-applied or restored finish.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For historic treatment specialist and wood-repair-material manufacturer.
1. The wood door restoration subcontractor must demonstrate a minimum of 5 years successful experience in comparable restoration, repair, and replication of historic doors.
- B. Wood Door Historic Treatment Program: Submit before work begins. Retain "Preconstruction Test Reports" Paragraph below if "Preconstruction Testing" Article is retained.
- C. Preconstruction Test Reports: For historic treatment of wood doors.

1.8 QUALITY ASSURANCE

- A. Historic Treatment Specialist Qualifications: A qualified historic wood door specialist with a minimum of 5 years successful experience in repairing, refinishing, and replacing wood doors in whole and in part. Experience only in fabricating and installing new wood doors is insufficient experience for wood-door historic treatment work.
1. Field Supervisor: Require that an experienced full-time supervisor be at Project site during times that historic treatment of wood doors is in progress.
- B. Wood-Repair-Material Manufacturer Qualifications: A firm regularly engaged in producing wood consolidant and wood-patching compound that have been used for similar historic wood-treatment applications with successful results, and with factory-authorized service representatives who are available for consultation and Project-site inspection and on-site assistance.

- C. Wood Door Historic Treatment Program: For each phase of historic treatment process, prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for historic treatment work, including protection of surrounding materials and Project site during operations.
 - 1. If materials and methods other than those indicated are proposed for any phase of historic treatment work, add a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project.

- D. Mockups: Prepare mockups of historic treatment repair processes to demonstrate aesthetic effects and to set quality standards for materials and execution and for fabrication and installation. Prepare mockups so they are as inconspicuous as practicable.
 - 1. Prepare mockups under the same weather conditions to be expected during remainder of Work.
 - 2. Locate mockups in locations that enable viewing under same conditions as the completed Work.
 - 3. Wood Door Repair: As necessary, prepare one entire door unit to serve as mockup to demonstrate Samples of each type of repair of wood door members including frame, leaves, glazing, and hardware.
 - 4. Wood Door Repair, Partial: Prepare one mockup to demonstrate proposed repair of wood door members with all associated components, including frame, leaves, and hardware.
 - 5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 6. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

- E. AWI Quality Standard: Comply with applicable requirements in AWI's "Architectural Woodwork Quality Standards for construction, finishes, grades of wood windows, and other requirements.

1.9 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified historic treatment specialist to perform preconstruction testing on historic wood doors.
 - 1. Provide test specimens representative of proposed materials and existing construction.
 - 2. Test historic treatment products and methods for effectiveness and compliance with specified requirements.

1.10 WARRANTY

- A. Special Warranty for Door Hardware: 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 of operators and door hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

1.11 MAINTENANCE/SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Maintenance Service: Beginning at Substantial Completion, provide twelve 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.

1.12 DELIVERY, STORAGE, AND HANDLING

- A. Pack, deliver, and store products in suitable packs, heavy-duty cartons, or wooden crates; surround with sufficient packing material to ensure that products will not be deformed, broken, or otherwise damaged.
- B. Store products inside a well-ventilated area, protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity, and where environmental conditions comply with manufacturer's requirements.
- C. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

1.13 FIELD CONDITIONS

- A. Weather Limitations: Proceed with historic treatment of wood doors only when existing and forecasted weather conditions are within the environmental limits set by each manufacturer's written instructions and specified requirements.

PART 2 - PRODUCTS

2.1 HISTORIC TREATMENT OF WOOD DOORS, GENERAL

- A. Quality Standard: Comply with applicable requirements in Section 12, "Historic Restoration Work," and related requirements in AWI/AWMAC/WI's "Architectural Woodwork Standards" for construction, finishes, grades of wood doors, and other requirements unless otherwise indicated.
 - 1. Exception: Industry practices cited in the "Architectural Woodwork Standards," Section 12, Article 1.5, "Industry Practices," do not apply to the work of this Section.

2.2 REPLICATED WOOD DOOR UNITS

- A. Replicated Wood Door Frames and Leaves: Custom-fabricated replacement wood units and trim, with operating and latching hardware.
 - 1. Joint Construction: Mortise and tenon joints.
 - 2. Wood Species: Match wood species of existing exterior or interior door and frame parts. Refer to "Wood Replacement" article.
 - 3. Wood Cut: Match cut of existing exterior or interior wood door and frame parts.

4. Wood Member and Trim Profiles: Match profiles and detail of existing door members and trim.
5. Hardware: See Specification 087100 "Door Hardware."
6. Glazing Stops: Provide replacement glazing stops coordinated with glazing system indicated.
7. Weather Stripping: Full-perimeter weather stripping for each exterior door leaf.
8. Date Identification: Emboss on a concealed surface of each replaced door frame and leaf, in easily read characters, "DOOR FRAME MADE <Insert year>" or "DOOR LEAF MADE <Insert year>." Manufacturer's name may also be embossed.

2.3 WOOD REPLACEMENT MATERIALS

- A. Provide wood for replacement: Use salvaged old growth wood to match existing wood used in original construction based on scientific wood identification by a wood inspector deemed qualified by Architect. All repair wood to be kiln dried to a moisture content of 6 to 12 percent at time of fabrication, and is to be free from significant splits, cracks, and stakes and is to have a minimum of 12 growth rings/inch. Wood is to be free from all knots, rot, and fungus.
- B. Wood identification: Contractor will be responsible for matching wood with existing wood. Contractor to allow for wood identification costs of at least 5 samples in base contract. A written wood identification report is required from a qualified wood specialist to be approved by Architect. Refer also to Rough Carpentry Specifications for minimum wood requirement standards.

2.4 PAINT REMOVAL

1. See specification 099113 Painting and lead safe practices.

2.5 WOOD-REPAIR MATERIALS

- A. Source Limitations: Obtain wood consolidant and wood-patching compound from single source from single manufacturer.
- B. Wood Consolidant: Epoxy Repair System
 1. Ready-to-use product designed to penetrate, consolidate, and strengthen soft fibers of wood materials that have deteriorated because of weathering and decay and designed specifically to enhance the bond of wood-patching compound to existing wood.
 2. Consolidating low viscosity epoxy resins and hardeners.
 3. Patching epoxy resins, hardeners, and filler.
 4. Additives and catalysts.
 5. Provide from a single manufacturer/supplier as follows:
 - a. Liquid Wood and Wood Epox, Abatron, Inc., 33 Center Drive, Gilberts, IL 60136, Tel 800-445-1754.
 - b. West System, Gougeon Brothers, Inc., PO Box 908, Bay City, MI 48707, Tel 517-684-7286.
 - c. BETA Systems, Dell Corporation, PO Box 1462, Rockville, MJ 20850, Tel 301-279-2612.
 - d. Or Approved Equal.
 6. Provide compatible solvents, tools, gloves, goggles, and safety equipment as necessary.
- C. 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 because of weathering and decay. Compound shall be capable of filling deep holes and spreading to feather edge.

1. Provide from a single manufacturer/supplier as follows:
 - a. Wood Epox, Abatron, Inc., 33 Center Drive, Gilberts, IL 60136, Tel 800-445-1754.
 - b. West System, Gougeon Brothers, Inc., PO Box 908, Bay City, MI 48707, Tel 517-684-7286.
 - c. Flexible Epoxy Patch 200, ConServ Epoxy LLC, Northford, CT 06472, Tel 203-484-4123.
 - d. Or Approved Equal.

2.6 HARDWARE

- A. Primary Door Hardware, General: Provide complete sets of door hardware consisting of hinges, pulls, locks, latches, and accessories indicated for each door or required for proper operation. Sets shall include replacement hardware to complement repaired and refinished, existing hardware. Door hardware shall smoothly operate, tightly close, and securely lock wood doors and be sized to accommodate frequency of use, glazing weight, and dimensions.
- B. Coordination in 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.
- C. Replacement Hardware: See Section 087100 "Door Hardware."
- D. Repair and refurbish existing hardware to remain.

2.7 MISCELLANEOUS MATERIALS

- A. Borate Preservative Treatment: Inorganic, borate-based solution, with disodium octaborate tetrahydrate as the primary ingredient; manufactured for preserving weathered and decayed wood from further damage by decay fungi and wood-boring insects; complying with AWPA P5; containing no boric acid.
- B. Insect Screening:
 1. Bronze Wire Fabric: 18-by-14 count per sq. in. mesh of 0.009-inch- diameter bronze wire with a clear varnish finish.
- C. Adhesives: Wood adhesives with minimum 15- to 45-minute cure at 70 deg F, in gunnable and liquid formulations as recommended in writing by adhesive manufacturer for each type of repair and exposure conditions. Adhesive to be used only where historically appropriate and as necessary.
- D. Fasteners: Use fastener metals that are noncorrosive and compatible with each material joined.
 1. Match existing fasteners in material and type of fastener unless otherwise indicated.
 2. Use concealed fasteners for interconnecting wood components.
 3. Use concealed fasteners for attaching items to other work unless exposed fasteners are unavoidable or the existing fastening method.
 4. For fastening metals, use fasteners of same basic metal as fastened metal unless otherwise indicated.
- E. Anchors, Clips, and Accessories: Fabricate anchors, clips, and door accessories of non-magnetic

stainless-steel complying with requirements in ASTM B 633 for SC 3 (Severe) service condition.

F. Cleaning Materials:

1. Detergent Solution: Solution prepared by mixing 2 cups of tetrasodium pyrophosphate (TSP), 1/2 cup of laundry detergent that contains no ammonia, 5 quarts of 5 percent sodium hypochlorite bleach, and 15 quarts of warm water for each 5 gal. of solution required.
2. Mildewcide: Commercial, proprietary mildewcide or a solution prepared by mixing 1/3 cup of household detergent that contains no ammonia, 1 quart of 5 percent sodium hypochlorite bleach, and 3 quarts of warm water.

2.8 WOOD DOOR FINISHES

- A. Restore wood door in preparation for stain or prime and finish coats: Provide exposed exterior and interior wood surfaces of replacement units unfinished; smooth, filled, and suitably prepared for on-site priming and finishing. Prime coat to be applied all sides of exposed wood.
- B. See Specifications Section 099113 "Painting and Lead Safe Practices" and Section 099300 "Staining and Transparent Finish Restoration" for wood door finishes.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect adjacent materials from damage by historic treatment of wood doors.
- B. Clean wood doors 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.
- C. Condition replacement wood members and replacement units to prevailing conditions at installation areas before installing.

3.2 HISTORIC TREATMENT OF WOOD DOORS, GENERAL

- A. Quality Standard: Comply with applicable requirements in Section 12, "Historic Restoration Work," and related requirements in AWI/AWMA/WI's "Architectural Woodwork Standards" for construction, finishes, grades of wood doors, and other requirements unless otherwise indicated.
 1. Exception: Industry practices cited in the "Architectural Woodwork Standards," Section 12, Article 1.5, "Industry Practices," do not apply to the work of this Section.
- B. Examine all existing field conditions prior to commencing the work. Verify that work may be properly installed. Do not proceed with any work until unsatisfactory conditions have been resolved.
- C. Historic Treatment Appearance Standard: Completed work is to have a uniform appearance as viewed by Architect from the door interior at 5 feet away, and from the door exterior at 10 feet away.

- D. General: In treating historic items, disturb them as minimally as possible and as follows:
1. Stabilize and repair wood doors to reestablish structural integrity and weather resistance while maintaining the existing form of each item.
 2. Remove coatings before repair. Remove coatings according to Section 099113 "Painting and Lead Safe Practices" unless otherwise indicated.
 3. Repair items in place where possible.
 4. Install temporary protective measures to protect wood door work that is indicated to be completed later.
 5. Refinish historic wood windows according to Sections 099113 "Painting and Lead Safe Practices" and 099300 "Staining and Transparent Finish Restoration" unless otherwise indicated.
- E. Mechanical Abrasion: Where mechanical abrasion is needed for the work, use only the gentlest mechanical methods, such as scraping and natural-fiber bristle brushing, that will not abrade wood substrate, reducing clarity of detail. Do not use abrasive methods such as sanding, wire brushing, or power tools except as indicated as part of the historic treatment program and as approved by Architect.
- F. Repair and Refinish Existing Hardware: Dismantle door hardware; strip paint, repair, and refinish it to match finish Samples; and lubricate moving parts just enough to function smoothly.
- G. Repair Wood Doors: Match existing materials and features, retaining as much original material as possible to perform repairs.
1. Unless otherwise indicated, repair wood doors by consolidating, patching, splicing, or otherwise reinforcing wood with new wood matching existing wood or with salvaged, sound, original wood.
 2. Where indicated, repair wood doors by limited replacement matching existing material.
- H. Replace Wood Units: Where indicated, duplicate and replace units with units made from salvaged, sound, original wood or with new wood matching existing wood. Use surviving prototypes to create patterns for duplicate replacements.
1. Do not use substitute materials unless otherwise indicated.
 2. Compatible substitute materials may be used.
- I. Protection of Openings: Where doors are indicated for removal, cover resultant openings with temporary enclosures so that openings are weathertight during repair period.
- J. Identify removed doors, frames, leaves, and members with numbering system corresponding to door locations to ensure reinstallation in same location. Key doors, leaves, and members to Drawings showing location of each removed unit. Permanently label units in a location that will be concealed after reinstallation.
- K. Severely rotten, missing with holes through the entire wood section, cracked, warped or split wood: Install new wood dutchman spliced in to match profile of member being repaired. Cut back existing wood 1" beyond rot. Spliced repair should be tight and flush with the existing profile and not visible after painting.
- L. Surface wood deterioration: Treat wood with a fungicide. Apply paste of putty filler to eroded voids. Fill interior voids by saturating the wood with liquid epoxy.
- M. Loose joints between stiles and rails: Secure loose joints by installing blind wood dowels/piles. Straighten the sash and door frames by setting it on a jig and using pipe clamps.
- N. Sand all surfaces in preparation for repainting.

- O. Paint all wood doors.
- P. Install restored doors plumb, level and true to line, without warp to frame. Provide proper support and anchor securely in place.

3.3 PAINT REMOVAL

- A. Remove the door leaf from its frame.
- B. Remove all paint using a pH neutral poultice or gel or a steam box removal process. Follow manufacturer's instructions and comply with all VOC requirements.
- C. Properly test all wood after paint removal for pH neutrality. A minimum of 5 random core tests may be requested by the architect during the work in order to maintain quality control.

3.4 WOOD DOOR PATCH-TYPE REPAIR

- A. General: Patch wood members that exhibit depressions, holes, or similar voids and that have limited amounts of rotted or decayed wood.
 - 1. Remove leaves from door frames before performing patch-type repairs at meeting or sliding surfaces unless otherwise indicated. Reglaze units prior to reinstallation.
 - 2. Verify that surfaces are sufficiently clean and free of paint residue before patching.
 - 3. Treat wood members with wood consolidant before applying patching compound. Coat wood surfaces by brushing, applying multiple coats until wood is saturated and unable to absorb more. Allow treatment to harden before filling void with patching compound.
 - 4. Remove rotted or decayed wood down to sound wood.
- B. Apply borate preservative treatment to accessible surfaces either before applying wood consolidant or after removing rotted or decayed wood. Apply treatment liberally by brush to joints, edges, and ends; top, sides, and bottom. Allow treatment to dry.
- C. Apply wood-patching compound to fill depressions, nicks, cracks, and other voids created by removed or missing wood.
 - 1. Prime patch area with application of wood consolidant or manufacturer's recommended primer.
 - 2. Mix only as much patching compound as can be applied according to manufacturer's written instructions.
 - 3. Apply patching compound in layers as recommended in writing by manufacturer until the void is completely filled.
 - 4. Sand patch surface smooth and flush with adjacent wood, without voids in patch material, and matching contour of wood member.
 - 5. Clean spilled compound from adjacent materials immediately.

3.5 WOOD DOOR MEMBER – REPLACEMENT/REPAIR

- A. General: Replace parts of or entire wood door members at locations indicated on Drawings, indicated in the Door Schedule and where damage is too extensive to patch. Architect to review all locations.
 - 1. Severely rotten, missing with holes through the entire wood section, cracked, warped or split wood: Replace rail or stile with wood to match profile of member being repaired.
 - 2. Remove leaf from door frame before performing repairs, unless otherwise indicated.
 - 3. Verify that all surfaces are sufficiently clean and free of paint residue before repairing.

4. Custom fabricate new wood to replace missing wood; either replace entire wood member or splice new wood part into existing member.
 5. Secure new wood using only mortise and tenon or multiple dowels for the joints to ensure maximum structural integrity at each joint.
- B. Apply borate preservative treatment to accessible surfaces after replacements are made. Apply treatment liberally by brush to joints, edges, and ends; top, sides, and bottom.
 - C. Repair remaining depressions, holes, or similar voids with patch-type repairs.
 - D. Surface wood deterioration: Treat wood with a fungicide. Apply paste of putty filler to eroded voids. Fill interior voids by saturating the wood with liquid epoxy.
 - E. Clean spilled materials from adjacent surfaces immediately.
 - F. Loose joints between stiles and rails: Secure loose joints by installing blind wood dowels/piles. Straighten the sash and door frames by setting it on a jig and using pipe clamps.
 - G. Sand all surfaces in preparation for priming and repainting.
 - H. Paint all doors.
 - I. Reinstall units removed for repair into original openings.
 - J. Install restored doors plumb, level and true to line, without warp to frame. Provide proper support and anchor securely in place.
 - K. Salvaged woods: The owner prefers the use of high quality salvaged or old growth woods for all wood repairs. All wood should be visually inspected by the Architect, prior to installation. Wood is to be free from significant splits, cracks and stakes, with a minimum of 12 growth rings per inch. Wood must be free from all knots, rot, and fungus.

3.6 EPOXY REPAIRS (Only to be used on surfaces to be painted.)

- A. Manufacturers' Instructions:
 1. Follow manufacturers' instructions and safety recommendations exactly.
 2. Epoxies in mass placements may result in high heat release.
 3. Plan and execute epoxy placement to avoid dangerous curing temperatures.
- B. Preparation of repair areas:
 1. Remove all loose wood fiber, rotten wood, paint and paint chips, dirt, grease, mold, fungus etc., to assure proper adhesion.
 2. Prepare wood substrate per manufacturer's instructions.
 3. Verify proper wood moisture content:
 - a. If too high, dry the wood.
- C. Epoxy consolidation (Painted Wood Only):
 1. Epoxy consolidate porous or "punky" deteriorated wood.
 2. Drill holes and apply consolidant per manufacturer's instructions.
- D. Split repair:
 1. Apply epoxy adhesive to both faces of split.
 2. Join pieces and clamp/restrain in place until cured.

- E. Wood epoxy filler repair:
 - 1. Epoxy fill deteriorated wood containing voids or hollows.
 - 2. Carve and shape void.
 - 3. Carve and shape "Dutchman" to a snug fit in void.
 - 4. Clean surfaces.
 - 5. Apply epoxy adhesive to wood member and Dutchman.
 - 6. Join pieces and clamp/restrain in place until cured.
- F. Cleaning:
 - 1. Remove excess epoxy from exposed surfaces.
 - 2. Use recommended solvents.
 - 3. Do not drip or smear epoxy on exposed unpainted surfaces.
- G. Finishing:
 - 1. Sand, carve, and otherwise trim the exposed surface of the cured repair to match surface texture and elevation of the adjacent original existing materials.

3.7 WOOD DOOR UNIT REPLACEMENT

- A. General: Replace existing wood door frame and leaf units with new custom-fabricated units to match existing at locations indicated on Drawings and as indicated in the Door Schedule. Architect to review all locations.
- B. Apply borate preservative treatment to accessible surfaces before finishing. Apply treatment liberally by brush to joints, edges, and ends; top, sides, and bottom.
- C. Mill glazed members to accommodate glass thickness. Glaze units before installation.
- D. Install units, hardware, weather stripping, accessories, and other components as indicated on Drawings.
- E. Install units level, plumb, square, true to line, without distortion or impeding movement, anchored securely in place to structural support, and in proper relation to wall flashing, trim, and other adjacent construction.
- F. Set threshold or sill members in bed of sealant for weathertight construction unless otherwise indicated.
- G. Install door units with new anchors into existing openings.
- H. Metal Protection: Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- I. Disposal of Removed Units: Deliver as salvage to Owner for storage, as noted. Remaining doors to be removed from Owner's property and legally disposed of.

3.8 HARDWARE RESTORATION

- A. Clean and remove all paint from all existing hardware, lubricate, repair and reinstall where noted. Where hardware is missing, install new period castings to match existing. See products specified.

- B. All door repairs to be completed, including wood repair, fill of all holes, and consolidation of wood, as necessary to reinstall hardware.
- C. Install hardware and assume all new attachments. Finish of attachments needs to match paint color.
- D. 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.

3.9 PAINTING REPAIR

- A. Exterior: Prime and apply two finish coats of paint. Allow paint to fully dry minimum 10 days prior to installation of door.
 - 1. Colors in Paint Schedule.
- B. Interior: Prime and apply two finish coats of paint. Allow paint to dry fully minimum 10 days prior to installation of door.
 - 1. Colors in Paint Schedule.

3.10 FIELD QUALITY CONTROL

- A. Manufacturers Field Service: Engage a factory-authorized, wood-repair-material service representative for consultation and Project-site inspection and to provide on-site assistance when requested by Architect.

3.11 ADJUSTING

- A. Adjust existing and replacement operating leaves, hardware, weather stripping, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

3.12 CLEANING AND PROTECTION

- A. Protect door surfaces, interior and exterior, from contact with contaminating substances resulting from construction operations. Monitor door surfaces adjacent to and below exterior masonry during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances contact door surfaces, remove contaminants immediately.
- B. Clean exposed surfaces immediately after historic treatment of wood doors. Avoid damage to coatings and finishes. Remove excess sealants, patching materials, dirt, and other substances.
- C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 080314

SECTION 080352 - HISTORIC TREATMENT OF WOOD WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. The existing historic window sash were restored during the previous phase and this section refers to the trim and frames of the recently restored window sash.

1.2 SUMMARY

- A. Section includes historic treatment of wood windows in the form of the following:
 - 1. Carefully remove double hung sash (previously restored) and store safely with all their associated weatherstripping and hardware.
 - 2. Repair and restore existing historic wood window frames and trim, interior and exterior ONLY.
 - 3. Reinstall sash after frames and trim are restored and painted/stained.
 - 4. Secure upper sash and make lower sash fully operational including all hardware and weather stripping.
- B. Related Requirements:
 - 1. Section 013591 "Historic Preservation Treatment Procedures" for general historic treatment requirements.
 - 2. Section 024119 "Selective Demolition" for removal and dismantling of historic work.
 - 3. Section 061053 "Rough Carpentry."
 - 4. Section 062013 "Exterior Finish Carpentry."
 - 5. Section 079200 "Joint Sealants"
 - 6. Section 099000 "Painting and Lead Safe Practices"
 - 7. Section 099300 "Staining and Transparent Finish Restoration"
 - 8. Install all weather stripping prior to sash installation.
 - 9. For Double-Hung Windows: Make lower sash windows fully operational. Upper sash window to remain closed.

1.3 DEFINITIONS

- A. Glazing: Includes glass, glazing points, glazing tapes, glazing sealants, and glazing compounds.
- B. Window: Includes window frame, sash, hardware, storm window, and exterior and interior shutters, unless otherwise indicated by context.
- C. Wood Window Component Terminology: Wood window components for historic treatment work include the following classifications:
 - 1. Frame Components: Head, jambs, and sill.
 - 2. Sash Components: Stiles and rails, parting bead, stop, and muntins.
 - 3. Exterior Trim: Exterior casing, brick mold, and cornice or drip cap.
 - 4. Interior Trim: Casing, stool, and apron.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at the Project Site.
 - 1. Review minutes of Preliminary Historic Treatment Conference that pertain to historic treatment of wood windows.
 - 2. Review methods and procedures related to historic treatment of wood windows including, but not limited to, the following:
 - a. Historic treatment specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Materials, material application, sequencing, tolerances, and required clearances.
 - c. Fire-protection plan.
 - d. Wood window historic treatment program.

1.5 SEQUENCING AND SCHEDULING

- A. Perform historic treatment of wood windows in the following sequence, which includes work specified in this and other Sections:
 - 1. Label each window frame with permanent opening-identification number in inconspicuous location.
 - 2. Tag existing window sash, storm windows, and shutters with opening-identification numbers and remove for on-site or off-site repair. Indicate on tags the locations on window of each component, such as "top sash," "bottom sash," "left shutter," and "right shutter."
 - 3. Remove window, dismantle hardware, and tag hardware with opening-identification numbers.
 - 4. Install temporary protection and security at window openings.
 - 5. In the shop, label each sash, storm window, shutter, and louvered blind unit with permanent opening-identification number in inconspicuous location and remove site-applied tags.
 - 6. Sort units by condition, separating those that need extensive repair.
 - 7. Clean surfaces.
 - 8. General Wood-Repair Sequence:
 - a. Remove paint to bare wood.
 - b. Rack frames slightly to inject adhesive into mortise and tenon joints; square frames to proper fit before adhesive sets.
 - c. If thicker than original glass is required, rout existing muntins to required rebate size.
 - d. Repair wood by consolidation, member replacement, partial member replacement, and patching.
 - e. Sand, prime, fill, sand again, and prime surfaces again for refinishing.
 - 9. Repair, refinish, and replace hardware if required. Reinstall operating hardware.
 - 10. Install glazing.
 - 11. Remove temporary protection and security at window openings.
 - 12. Reinstall units.
 - 13. Apply finish coats.
 - 14. Install remaining hardware and weather stripping.

1.6 ACTION SUBMITTALS

- A. General:
 - 1. Provide a removal sequencing plan.

2. Submit protection drawings for each window and door.
- B. Product Data: For each type of product.
1. Include recommendations for product application and use. Include test data substantiating that products comply with requirements.
- C. Shop Drawings:
- a. Document repairs to window trim and frames.
- D. Samples for Initial Selection: For each type of exposed wood and finish.
1. Identify wood species, cut, and other features for each wood species to be molded..
 2. Repaired Wood frame and Trim Members: Prepare Samples using existing wood window members removed from site, repaired, and prepared for refinishing.
 3. Refinished Wood Window Members: Prepare Samples using existing wood window members removed from site, repaired, and refinished.
 4. Hardware: Full-size units with each factory-applied or restored finish.
 5. Weather Stripping: 12-inch- long sections.
 6. Glass: Full size units of each type and appearance.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For historic treatment specialists, including workers. The wood window and door restoration sub-contractor must demonstrate at least 5 years of experience in restoration, repair and replication of historic windows and doors.
- B. Wood Window Historic Treatment Program: For each phase of historic treatment process, including protection of surrounding materials on the building and Project site during operations. Describe in detail the materials, methods, equipment, and sequence of operations to be used for each phase of historic treatment work. Retain "Preconstruction Test Reports" Paragraph below if specifying preconstruction testing in "Preconstruction Testing" Article as Contractor's responsibility.

1.8 QUALITY ASSURANCE

- A. Provide grade stamps for all repair wood.
- B. Historic Treatment Specialist Qualifications: A qualified historic wood window specialist, experienced in repairing, refinishing, and replacing wood windows in whole and in part. Experience only in fabricating and installing new wood windows is insufficient experience for wood-window historic treatment work.
1. Field Supervision: Require that an experienced full-time supervisor be at the Project site during times that historic treatment of wood windows is in progress.
- C. Wood-Repair-Material Manufacturer Qualifications: A firm regularly engaged in producing wood consolidant and wood-patching compound that have been used for similar historic wood-treatment applications with successful results, and with factory-authorized service representatives who are available for consultation and Project-site inspection and on-site assistance.
- D. Wood Window Historic Treatment Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for historic treatment work, including protection of surrounding materials and Project site.

1. If materials and methods other than those indicated are proposed for any phase of historic treatment work, add a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project.
- E. Mockups: Prepare mockups of historic treatment repair processes to demonstrate aesthetic effects and to set quality standards for materials and execution and for fabrication and installation. Prepare mockups so they are as inconspicuous as practicable.
1. Wood Window Frame and Trim Repair: Prepare one entire window unit to serve as mockup to demonstrate samples of each type of repair of wood window members including frame, sash, glazing, and hardware. All mockup locations are to be reviewed by the Preservation Architect.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 3. Paint removal samples on the wood window trim and frame. Note a pH neutral “gel” type paint removal product is to be used or offsite paint removal techniques noted below as acceptable.
 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- F. AWI Quality Standard: Comply with applicable requirements in AWI’s “Architectural Woodwork Quality Standards” for construction, finishes, grades of wood window frames and trim , and other requirements.

1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with historic treatment of wood windows frame and trim work only when existing and forecasted weather conditions are within the environmental limits set by each manufacturer's written instructions and specified requirements.

PART 2 - PRODUCTS

2.1 HISTORIC TREATMENT OF WOOD WINDOWS, GENERAL

- A. Quality Standard: Comply with applicable requirements in:
1. Section 013510, "Special Procedures for Historic Treatments"
 2. AWI/AWMAC/WI's "Architectural Woodwork Standards" for construction, finishes, grades of wood windows, and other requirements unless otherwise indicated.
 3. National Park Service Preservation Brief #9 Repair of Historic Wooden Windows.

2.2 WOOD REPLACEMENT MATERIALS

- A. Provide wood for replacement: Use salvaged old growth wood to match existing wood species in original construction based on scientific wood identification by a wood specialist deemed qualified by Architect. All repair wood is to be free from significant splits, cracks, and stakes and is to have a minimum of 12 growth rings/inch and be 100% edge grain. Wood is to be free from all knots, rot, and fungus.

- B. Wood identification: Contractor will be responsible for matching wood with existing wood. Contractor to allow for wood identification costs of at least 5 samples in base contract. A written wood identification report is required from a qualified wood specialist to be approved by Architect. Refer also to Division 06 Specifications for minimum wood requirement standards.
- C. Wood, General: Clear fine-grained lumber; kiln dried to a moisture content of 6 to 12 percent at time of fabrication; free of finger joints, knots, pitch pockets, and surface checks.
- D. Frame Heads, Jambs, and Exterior Trim: Match existing species.
- E. Exterior Trim: Match existing species.
- F. Sills: Match existing species.
- G. Interior Trim: Match existing species.
- H. Severely rotten, missing with holes through the entire wood section, cracked, warped or split wood: Install new wood dutchman spliced in to match profile of member being repaired. Cut back existing wood 1" beyond rot. Spliced repair should be tight and flush with the existing profile and not visible after painting.
- I. Loose joints between stiles and rails: Secure loose joints by installing a blind wood dowels/piles. Straighten the sash and door frames by setting it on a jig and using pipe clamps.
- J. Sand all surfaces in preparation for repainting.
- K. Paint all window sashes and frames.
- L. Install restored window sashes and frames plumb, level and true to line, without warp to frame. Provide proper support and anchor securely in place.

2.3 PAINT REMOVAL

- A. Existing Finishes:
 1. Exterior: Paint
 2. Interior: Paint
 3. All Hardware
- B. Paint removal using pH neutral gel products:
 1. Multi-strip paint removal (must be pH Neutral gels) Manufactured by Sunnyside Corporation, 225 Carpenter Avenue, Wheeling, IL 60090, (800) 323-8611.
 2. Smart-Strip Peel Away Paint Removal Gel (must be pH neutral gels) manufactured by Dumond Chemicals, New York, NY, (609) 655-7700.
 3. Or approved equal.
- C. Off-site Paint Removal:
 1. Steam Box Paint Removal Method.
 2. pH neutral paint remover (see above), suitable for wood previously used on historic buildings.
- D. Steel wool
- E. Turpentine or boiled linseed oil

- F. Water: Potable
- G. Plastic scrapers
- H. Natural bristle brushes
- I. Sandpaper

2.4 WOOD REPAIR MATERIALS

- A. Wood window repair includes wood replacement for:
 - 1. Trim
 - 2. Frame
 - 3. Dividing lights (muntins)
 - 4. Rail and sash (window)
 - 5. Sill and jambs
- B. Wood Linseed Oil Putty Fillers and Oakum to be used for minor repairs
- C. Wood Adhesive

2.5 HARDWARE

- A. Reinstall existing hardware to include:
 - 1. Material: Solid bronze of alloy indicated unless otherwise indicated.
 - 2. Design: Custom hardware to replicate existing hardware.
 - 3. Weight and Pulley Sash-Balance: Concealed weight and pulley balance system including steel or cast iron weights, cast-bronze pulleys, size and capacity to hold sash stationary at any open position.
 - 4. Replacement Window Hardware: Match existing window hardware of the following types:
 - a. Projected window hinge.
 - b. Window lock.
 - c. Window latch.
 - d. Handle.
 - e. Pole ring.
 - f. Window sash lifts.
 - 5. Date Identification: Emboss on a concealed surface of the metal body of each new hardware item, in easily read characters, "MADE <Insert year>." Manufacturer's name may also be embossed. For cast iron or other brittle metals, add the identification to the mold pattern before casting. For malleable metals, stamp identification with an imprinting tool.
- B. Hardware Finishes: Comply with BHMA A156.18 for base material and finish requirements indicated by the following:
 - 1. BHMA 613: Dark-oxidized satin bronze, oil-rubbed; bronze base metal.

2.6 WEATHER STRIPPING

- A. Restore existing weatherstripping.
- B. Available Manufacturers:

1. Basis of Design: Resource Conservation Technology, 2633 North Calvert Street, Baltimore, MD 21218, (800) 477-7724.
2. Approved Equal.

2.7 MISCELLANEOUS MATERIALS

- A. Cleaning Materials:
 1. Detergent Solution: Solution prepared by mixing 2 cups of trisodium phosphate (TSP), 1/2 cup of laundry detergent that contains no ammonia, 5 quarts of 5 percent sodium hypochlorite bleach, and 15 quarts of warm water for each 5 gal. of solution required.
- B. Adhesives: Wood adhesives for exterior exposure, with minimum 15- to 45-minute cure at 70 deg F, in gunnable and liquid formulations as recommended in writing by adhesive manufacturer for each type of repair.
- C. Fasteners: Use fastener metals that are noncorrosive and compatible with each material joined.
 1. Match existing fasteners in material and type of fastener unless otherwise indicated.
 2. Use concealed fasteners for interconnecting wood components.
 3. Use concealed fasteners for attaching items to other work unless exposed fasteners are the existing fastening method.
 4. For fastening metals, use fasteners of same basic metal as fastened metal unless otherwise indicated.
 5. For exposed fasteners, use Phillips-type machine screws of head profile flush with metal surface unless otherwise indicated.
 6. Finish exposed fasteners to match finish of metal fastened unless otherwise indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect adjacent materials from damage by historic treatment of wood windows.
- B. Remove existing sash and install temporary protection.
- C. Clean wood window frame and trim 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.
- D. Condition replacement wood members and replacement units to prevailing conditions at installation areas before installing.

3.2 HISTORIC TREATMENT OF WOOD FRAMES AND TRIM, GENERAL

- A. Examine all existing field conditions prior to commencing the work. Verify that work may be properly installed. Do not proceed with any work until unsatisfactory conditions have been resolved.
- B. Historic Treatment Appearance Standard: Completed work is to have a uniform appearance as

viewed by Architect from the window interior at 5 feet away and from the window exterior at 10 feet away.

- C. General: In treating historic items, disturb them as minimally as possible and as follows:
 - 1. Stabilize and repair wood frames and trim 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 Section 099113 "Painting and Lead Safe Practices" unless otherwise indicated.
 - 3. Repair items in place where possible.
 - 4. Install temporary protective measures to protect wood window work that is indicated to be completed later.
- D. Mechanical Abrasion: Where mechanical abrasion is needed for the work, use only the gentlest mechanical methods, such as scraping and natural-fiber bristle brushing, that will not abrade wood substrate, reducing clarity of detail. **Do not use abrasive methods such as sanding, wire brushing, or power tools** in accordance with lead safe paint removal practices.
- E. 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.
- F. Repair Wood window frames and trim: Match existing materials and features, retaining as much original material as possible to perform repairs.
- G. Replace Wood Units: As necessary, duplicate and replace window frames and trim from salvaged, sound wood or with new wood matching existing wood. Use surviving prototypes to create patterns for duplicate replacements.
 - 1. Do not use substitute materials unless otherwise indicated.
 - 2. Compatible substitute materials may be used.
- H. Protection of Openings: When sash are removed for frames and trim to be restored, cover resultant openings with temporary enclosures so that openings are weathertight during repair period.
- I. Identify removed windows, frames, sash, and members with numbering system corresponding to window locations to ensure reinstallation in same location. Key windows, sash, and members to Drawings showing location of each removed unit. Permanently label units in a location that will be concealed after reinstallation.

3.3 PAINT REMOVAL

- A. Remove all paint using a pH neutral poultice or gel or a steam box removal process. Follow manufacturer's instructions and comply with all Lead safe practices.
- B. Properly test all wood after paint removal for pH neutrality. A minimum of 5 random core tests may be requested by the architect during the work in order to maintain quality control.
- C. Remove all glazing putty and replace with new at all windows.

3.4 WOOD WINDOW PATCH-TYPE REPAIR (DUTCHMAN)

- A. General: Severely rotten, missing with holes through the entire wood section, cracked, warped or

split wood: Install new wood dutchman spliced in to match profile of member being repaired.

1. Remove sash from windows before performing patch-type repairs at meeting or sliding surfaces unless otherwise indicated. Reglaze units before reinstallation.
 2. Verify that surfaces are sufficiently clean and free of paint residue before patching.
 3. Treat wood members with wood consolidant before applying patching compound. Coat wood surfaces by brushing, applying multiple coats until wood is saturated and unable to absorb more. Allow treatment to harden before filling void with patching compound.
 4. Remove rotted or decayed wood to 1 inch beyond sound wood.
 5. Spliced repair should be tight and flush with the existing profile and not visible after painting.
- B. Apply wood-patching linseed putty to fill depressions, nicks, cracks, and other voids created by removed or missing wood.
1. Prime patch area with application of wood putty or manufacturer's recommended primer.
 2. Mix only as much patching compound as can be applied according to manufacturer's written instructions.
 3. Apply patching compound in layers as recommended in writing by manufacturer until the void is completely filled.
 4. Sand patch surface smooth and flush with adjacent wood, without voids in patch material, and matching contour of wood member.
 5. Clean spilled compound from adjacent materials immediately.
- C. Surface wood deterioration: Treat wood with a fungicide. Apply paste of putty filler to eroded voids. Fill interior voids by saturating the wood with liquid epoxy.
- D. Loose joints between stiles and rails: Secure loose joints by installing a blind wood dowels/piles. Straighten the sash and door frames by setting it on a jig and using pipe clamps.
- E. Sand all surfaces in preparation for repainting.
- F. Paint all windows.
- G. Install restored sash and doors plumb, level and true to line, without warp to frame or sash. Provide proper support and anchor securely in place.
- H. Salvaged woods: The owner prefers the use of high quality salvaged woods for wood dutchman repair. All wood should be visually inspected by the Architect, prior to installation. Wood is to be free from significant splits, cracks and stakes, with a minimum of 12 growth rings per inch. Wood must be free from all knots, rot, and fungus.

3.5 WOOD WINDOW MEMBER-REPLACEMENT REPAIR

- A. General: Replace parts of or entire wood window members at locations indicated on Drawings, indicated in the Historic Wood Window Schedule, and where damage is too extensive to patch.
1. Remove sash from windows before performing member-replacement repairs unless otherwise indicated.
 2. Verify that surfaces are sufficiently clean and free of paint residue before repair.
 3. Remove broken, rotted, and decayed wood down to sound wood.
 4. Custom fabricate new wood to replace missing wood; either replace entire wood member or splice new wood part into existing member.
 5. Secure new wood using finger joints, multiple dowels, or splines with adhesive and nailing

to ensure maximum structural integrity at each splice. Use only concealed fasteners. Fill nail holes and patch surface to match surrounding sound wood.

- B. Repair remaining depressions, holes, or similar voids with patch-type repairs.
- C. Clean spilled materials from adjacent surfaces immediately.
- D. Glazing: Replace broken glazing units before reinstallation.
 - 1. Mill new and rout existing glazed members to accommodate new glass thickness.
 - 2. Provide replacement glazing stops coordinated with glazing system indicated.
 - 3. Provide glazing stops to match contour of sash frames.
- E. Reinstall units into original openings.
- F. Weather Stripping: Replace nonfunctioning and adjust weather stripping to ensure full-perimeter and meeting rail weather stripping for each operable sash.

3.6 WOOD WINDOW UNIT REPLACEMENT

- A. General: Replace existing wood window frame and units with new custom-fabricated units to match existing at locations indicated on Drawings, indicated in the Historic Wood Window Schedule, and where damage is too extensive to repair.
- B. Install units, hardware, weather stripping, accessories, and other components.
- C. Install units level, plumb, square, true to line, without distortion or impeding movement; anchored securely in place to structural support; and in proper relation to wall flashing, trim, and other adjacent construction.
- D. Set sill members in bed of sealant for weathertight construction unless otherwise indicated.
- E. Install window units with new anchors into existing openings.
- F. Weather Stripping: Install full-perimeter and meeting rail weather stripping for each operable sash.
- G. Metal Protection: Separate corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- H. Disposal of Removed Units: Remove from Owner's property and legally dispose of them.

3.7 WEATHER STRIPPING INSTALLATION

- A. Insure weather stripping has a tight seal at joints as determined by demonstrated in mockup.

3.8 ADJUSTING

- A. Adjust existing and replacement operating sash, screens, hardware, weather stripping, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

3.9 CLEANING AND PROTECTION

- A. Protect window surfaces from contact with contaminating substances resulting from construction operations. Monitor window surfaces adjacent to and below exterior concrete and masonry during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances contact window surfaces, remove contaminants immediately.
- B. Clean exposed surfaces immediately after historic treatment of wood windows. Avoid damage to coatings and finishes. Remove excess sealants, glazing and patching materials, dirt, and other substances.
- C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction.

END OF SECTION 080352

SECTION 081433 - STILE AND RAIL WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. All doors should replicate the historic profiles noted on the drawings. Field verify profiles and dimensions.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Interior custom new stile and rail wood doors with raised panels.
 - 2. Shop priming stile and rail wood doors.
 - 3. Factory finished stile and rail wood doors.
 - 4. Factory fitted stile and rail wood doors to frames and factory machining for hardware.
- B. Related Sections include the following:
 - 1. Section 060140.91 - Architectural Woodwork Restoration
 - 2. Section 064023 - Interior Architectural Woodwork
 - 3. Section 087100 – Door Hardware
 - 4. Section 099113 - Painting and Lead Safe Practices
 - 5. Section 099300 – Staining and Transparent Finish Restoration

1.3 SUBMITTALS

- A. Product Data: For each type of door. Include details of construction and finishing.
 - 1. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data, including those for stiles, rails, panels, and moldings (sticking); and other pertinent data, including weather stripping.
 - 1. Indicate dimensions and locations of mortises and holes for hardware.
 - 2. Indicate doors to be factory finished and finish requirements.
- C. Samples for Initial Selection: Sample of wood to be used and veneers.
- D. Samples for Verification: Corner sections of doors approximately 8” by 10” showing edges, faces, joinery, and material qualities of typical stile, rail, molding, and panel for each species and door type.
 - 1. Finish sample with same materials proposed for factory-finished doors.

- E. Product Certificates: Signed by door manufacturers certifying that the products furnished comply with requirements.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain stile and rail wood doors through one source from a single manufacturer.
- B. Quality Standard: Comply with the following standard:
 - 1. NWWDA Quality Standard: NWWDA I.S.6, "Industry Standard for Wood Stile and Rail Doors."
 - a. Mark, label, or otherwise identify stile and rail wood doors as complying with NWWDA I.S.6.
 - 2. AWI Quality Standard: AWI's "Architectural Woodwork Quality Standards" for grade of door, construction, finish, and other requirements.
 - 3. WI Quality Standard: WI's "Manual of Millwork" for grade of door, construction, finish, and other requirements.
 - a. Provide WI Certified Compliance Certificate indicating that doors meet requirements of grades specified.
 - b. Provide WI Certified Compliance Certificate for Installation.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standard and manufacturer's written instructions.
 - 1. Individually package doors in plastic bags or cardboard cartons.
 - 2. Individually package doors in cardboard cartons and wrap bundles of doors in plastic sheeting.
 - 3. Comply with WI's Technical Bulletin 420-R for delivery, storage, and handling of doors.
- B. Mark each door with individual opening numbers used on Shop Drawings. Use removable tags or concealed markings.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet-work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Environmental Limitations: Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during the remainder of the construction period to comply with requirements of the referenced quality standard for Project's geographical location.

1.7 WARRANTY

- A. Manufacturer's signed warranty covering manufacturing or material defects for life of original installation, including repair replacement, machining, detailing, and/or pre-finishing, is a required part of the manufacturer's warranty for all doors. Minimum 5-year warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering new doors are:
 - 1. Hahn's Woodworking Co., Inc., 181 Meister Avenue, Branchburg, NJ 08876, Tel 908-722-2742, www.hahnswoodworking.com.
 - 2. Pinecrest, 2118 Blaisdell Avenue, Minneapolis, MN, Tel 800-443-5357, www.pinecrestinc.com.
 - 3. Starke Millwork, Inc., 671 Bangor Road, Nazareth, PA 18064, Tel 610-759-1753, www.starkemillwork.com.
 - 4. Or approved equal.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Stile and Rail Doors of Custom Design and Construction:
 - a. Refer to Door Schedule on Drawings

2.2 STILE AND RAIL DOORS OF SPECIAL DESIGN AND CONSTRUCTION

- A. Construction, General: Comply with the following requirements:
 - 1. Grade of Doors for Opaque Finish: Interior: Clear Select (No Knots)
 - 2. Wood Species and Cut for Transparent Finish: Match species of existing doors with transparent finish, plain sawed/sliced.
 - 3. Stile and Rail Construction for Opaque Finish: Clear softwood; may be edge glued for width or finger jointed.
 - 4. Raised Panel Construction for Opaque Finish: Clear softwood lumber, edge glued for width, at exterior locations; shaped, medium-density fiberboard panels at interior locations.
 - 5. Flat Panel Construction for Transparent Finish: Solid, wood-based on panel product.
- B. Doors: Comply with the following requirements.
 - 1. Stile and Rail Widths: As indicated.
 - 2. Molding Profile: As indicated.
 - 3. Raised Panel Thickness: As indicated.
 - 4. Flat Panel Thickness: As indicated.
 - 5. Panel Design: As indicated.

2.3 FABRICATION

- A. Fabricate stile and rail wood doors in sizes indicated for Project site fitting. Field verify all existing openings prior to fabrication.
- B. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:
 - 1. Clearances: Provide 1/8" at heads and jambs. Provide 1/2" from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 3/8" from bottom of door to top of threshold.
 - a. Comply with NFPA 80 for fire-rated doors.
 - 2. Bevel non-fire-rated doors 1/8" in 2" at lock and hinge edges.

2.4 SHOP PRIMING

- A. Doors with Painted Finish: Shop prime exposed portions of doors for paint finish with two coats of wood primer specified in Section 099113 "Painting and Lead Safe Practices."
- B. Doors with Stain Finish: follow staining instructions specified in 099300 "Staining and Transparent Finish Restoration".

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine installed and existing door frames before hanging doors.
 - 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Manufacturer's Written Instructions: Install wood doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.
 - 1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- C. Job-Fit Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.
 - 1. Clearances: Provide 1/8" at heads, jambs, and between pairs of doors. Provide 1/8" from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4" from bottom of door to top of threshold.
 - a. Comply with NFPA 80 for fire-rated doors.
 - 2. Bevel non-fire-rated doors 1/8" in 2" at lock and hinge edges.

- D. Field-Finished Doors: Refer to the following for finishing requirements:
 - 1. Division 9 Section "Painting and Lead Safe Practices."
 - 2. Division 9 Section "Staining and Transparent Finish Restoration."

3.3 ADJUSTING AND PROTECTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Refinish or replace doors damaged during installation.
- C. Protect doors as recommended by door manufacturer to ensure that wood doors are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 081433

SECTION 090120.91 - PLASTER RESTORATION AND REPAIR

PART 1 - GENERAL

1.1 SUMMARY

A. Scope of work includes:

1. The restoration of all missing/cracked cut and damaged plaster on interior walls and ceiling as noted in drawings.
3. Trim and accessories.

B. Related Sections:

1. Section 013510 – Special Procedures for Historic Treatment
2. Section 017310 - Cutting and Patching
3. Section 024119 - Selective Demolition
4. Section 097200 – Wall Coverings
5. Section 099113 - Painting and Lead Safe Practices

1.2 SUBMITTALS

A. General: Submit manufacturer's product data and installation instructions for systems specified, demonstrating compliance with requirements.

B. Material certificates: Submit producer's certification that each kind of building material complies with specified requirements.

C. Samples:

1. Submit 12" square sample of each plaster type mounted on plywood or hardwood.
2. Submit 12" square samples of each metal lath and 6" sample of wood lath.
3. Submit samples of all trim and accessories.
4. Mockup: Prepare at least two field samples in locations selected by the architect. To establish the acceptable limits and variations in material and workmanship for each type of plaster condition. Do not commence plasterwork without architect acceptance of the mockup.

1.3 QUALITY ASSURANCE

A. Restoration specialist: The plasterer must have a minimum of 10 years experience on historic buildings of this type. An experienced supervisor will be required full time on site.

B. Use a manufacturer regularly engaged in producing plaster materials.

C. Following the installation of new plasters the contractor must warranty for 120 days after completion of the work that all cracks that appear will be repaired using paper tape and a setting type drywall compound.

1.4 PROJECT CONDITIONS

A. Environmental requirements: Comply with provisions of ASTM - 842 and recommendations of gypsum plaster manufacturer for environmental conditions before, during and after application of plaster.

B. Cold weather requirements:

1. When ambient outdoor temperatures are below 55° F maintain continuous, uniform temperature of no less than 55°F for not less than one week prior to beginning plaster installation, and for no less than one week after completion of plastering.
2. Avoid heat sources in immediate vicinity of plaster, and conditions under which uneven heating could occur.

C. Warm weather requirements:

1. Protect plaster against uneven and excessive evaporation of moisture and from strong flows of dry air, both natural and artificial.
2. Apply and cure plaster as required by climatic and job conditions to prevent drying out during curing period.

Prevent premature drying of plaster using any of the following:

1. Moist curing
2. Barriers to deflect sunlight and wind
3. Proprietary curing compounds

D. Ventilation: Provide natural or mechanical ventilation of interior spaces to remove excessive moisture from the time plastering is started until it is completely dry and cured.

1. Do not use air blowers on plaster surfaces.

E. Plaster dust control: Ensure that plaster dust is kept to a minimum and cleared daily while plaster work is in progress.

1.5 MATERIALS TESTING

- A. The contractor must obtain verification of compatibility of existing plasters and proposed new plasters and bonding agents in writing from the plaster manufacturers.

PART 2 - PRODUCTS

2.1 PLASTER

A. Interior plaster repairs.

1. Repairing and restoration: The system will be a three-coat plaster system with wood lath and may include a scratch coat, brown coat and finish coat.

B. Patching repairs to existing damaged/cracked plaster, to use the three-coat system described above.

2.2 PLASTER MATERIALS

A. Binder:

1. Base Coat: Red Top Gypsum wood fiber plaster “Gypsum Plaster” ASTM C28, regular (for hand application) with lime, manufactured by USG Corporation.
2. Scratch or Brown Coat: “Red Top Gypsum Gauging Plaster” (neat) Gypsum Plaster ASTM C

- 28, regular (for hand application) manufactured by USG Corporation.
- 3. Finish Coat: “Red Top Gypsum gauging plaster with lime” manufactured by USG Corporation. ASTM C206.
- 4. Lime: Single Hydrated lime “Red Top” manufactured by USG Corporation. ASTM C 206, Type N.

- B. Sand: Texture and size to match texture of existing plaster. Must be submitted to Architect for review.
- C. Water: Clean, potable and free of oils, alkalis, acids and organic matter.
- D. No color additives permitted.

2.3 PLASTER MIXING

- A. General: Do not use add-mixtures of any kind in plaster, unless otherwise indicated.
- B. Measure all materials in dry condition by volume.
- C. Thoroughly mix dry material prior to adding water.
- D. Plaster ratio mixes: Ratios to be verified with Architectural Conservator.

Plaster Coat	Sand	Lime	Gypsum Plaster	Gypsum Wood Fiber Plaster
Base	--	1	--	1
Scratch or Brown	4	2	1	
Finish	4	2	1	

Note: **The proportions and products may vary based on the mock-ups prepared by the Contractor.** The aim is to match the existing historic plaster in texture and strength and to ensure that the new plaster is compatible with the existing plaster.

2.4 LATH

- A. Wood Lath

2.5 BONDING AGENT

- A. Bonding Agent. Larsons Plaster Weld manufactured by Larsons Products, 824 Preston Court, Jessup, MD 20794
- B. Or Approved equal provided the plaster weld is pink so it can be seen where applied.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine all existing field conditions prior to commencing the work. Verify that material is

sound.

3.2 PREPARATION

- A. Remove all unstable and damaged plaster where noted on the drawings, clean dust and debris from joints. Use a bristle brush. No metal brushes will be permitted.
- B. Insure the existing retained plaster and adjacent wood lath are in sound condition with a good key.
- C. Cut a key for attachment of each new plaster coat to existing. Remove all paper and paint to provide a clean surface for bonding. Apply bonding agent to all locations where new plaster meets existing.
- D. Plaster removal:
 - 1. Upon identification of unstable plaster the contractor is responsible for the removal and disposal of all identified unstable plaster and deteriorated wood supporting systems.

3.3 LATH

- A. Inspect existing exposed wood lath.
- B. If wood lath is sound, replace single pieces and clean off existing plaster from surface to insure good bonding.
- C. Provide supplementary backing, spacing and framing necessary to support edges of lath, decorative plaster elements, existing and new fixtures, hardware and accessories.
- D. Isolation: Provisions may need to be provided for movement of the building structure to prevent transfer of structural loads and movement to the lath and plaster work.

3.4 PLASTER REPAIR

- A. Apply plaster in the following maximum thickness to be field verified by the Contractor:
 - 1. Base Coat: ½”
 - 2. Scratch or Brown Coat: 1/2”
 - 3. Finish Coat: 1/4”

Note: Additional coats may be required to allow for alignment with existing plaster.
- B. Apply each coat to the next prior to setting of previous coat. At the end of the workday seal completed work to prevent drying out. Float from right to left and finish from left to right.
- C. Apply and work finish coat to match approved mockup and existing plaster finish.
 - 1. Coordinate plaster application with installation of adjacent work to avoid soiling and damage of plaster and other work.
 - 2. Textured plaster finish to match existing adjacent plaster texture in all respects.
- D. Tolerances: Deviation from the plain not to exceed 1/8” in 10’-0” as measured with a straight edge at any location on the surface.
- E. Cure plaster by maintaining in a damp condition for not less the 72 hours.

3.5 PLASTER PATCHING

- A. Cut back plaster as per details to insure appropriate attachment.
- B. For all small patches build up as necessary with the three-coat system. The number of coats will depend on the depth of the patch.
- C. Apply the bonding agents to all edges of existing plaster prior to patching.
- D. Wall tolerance described under plaster application also apply to all patches.

3.6 FINAL CLEANING

- A. After plaster has fully hardened, thoroughly clean exposed surfaces using a damp rag, in preparation for finish. Damp rag with water only.
- B. Do not use metal scrapers or alkali cleaning agents.
- C. Dispose of all debris resulting from cleaning and plaster operations.
- D. Allow new plaster to cure for 4 weeks prior to painting or wallpaper application.

END OF SECTION 090120.91

SECTION 090364 - WOOD FLOOR RESTORATION AND REPLACEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Cleaning of existing wood floors.
 - 2. Repair of existing wood T&G floors.
 - 3. Patching of existing wood T&G floors where radiators are removed.
 - 4. Repair of existing parquet floors.
 - 5. Light sanding and application of two coats of varnish to existing wood floors. Assume varnish is the existing floor finish.
- B. Related Sections include the following:
 - 1. Section 013510 – Special Procedures for Historic Treatment
 - 2. Section 061000 – Rough Carpentry
 - 3. Section 060140.91 – Architectural Woodwork Restoration
 - 4. Section 064023 – Interior Architectural Woodwork
 - 5. Section 099113 – Painting and Lead Safe Practices
 - 6. Section 099300 – Staining and Transparent Finishing

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show installation details including location and layout of each type of wood flooring, patching and accessory. Indicate all termination details.
- C. List of all wood patches to be completed, include room number and wood species based on wood identification.
- D. Wood Identification: Remove samples and obtain and pay for a wood species identification by an approved wood scientist for the existing T&G floor. and allow 2 weeks for wood identification by a qualified wood species identification agency including:
 - 1. Ligno Logic LLC: Suzana Radivojevic, PhD suzana@lignologic.com Tel: 718.502.5753
 - 2. Wood Science Consulting: Matthew Anderson email matt@woodscienceconsulting.com Tel 914-489-6727
 - 3. Approved Equal
- E. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors and finishes available for wood flooring.
- F. Samples for Verification: For each type of wood flooring and accessory, with stain color and

finish required, approximately 12 inches long and of same thickness and material indicated for the Work. Include sample sets showing the full range of normal color and texture variations expected.

- G. Finish removal on 3rd floor T&G floor mock-up: Sand and prepare T&G floor for finish 1'x 2' for review by Architect.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed wood flooring similar in material, design, and extent to that indicated for this Project and whose work has resulted in wood flooring installations with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of material and product from one source with resources to provide materials and products of consistent quality in appearance and physical properties.
- C. Softwood Flooring: Comply with WCLIB No. 17 grading rules for species, grade, and cut.
- D. Perform work in accordance with AWI custom quality standards.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver wood flooring materials in unopened cartons or bundles.
- B. Protect wood flooring from exposure to moisture. Do not deliver wood flooring until after concrete, masonry, plaster, ceramic tile, and similar wet-work is complete and dry.
- C. Store wood flooring materials in a dry, warm, well-ventilated, weathertight location.
- D. Move wood flooring into spaces where it will be installed, at least seven days before installation.

1.6 PROJECT CONDITIONS

- A. Conditioning: Maintain relative humidity planned for building occupants and an ambient temperature between 65 and 75 deg F in spaces to receive wood flooring for at least seven days before installation, during installation, and for at least seven days after installation. After post-installation period, maintain relative humidity and ambient temperature planned for building occupants.
 - 1. For unfinished products, open sealed packages to allow wood flooring to acclimatize.
 - 2. Do not install flooring until it adjusts to the relative humidity of and is at the same temperature as the space where it is to be installed.
 - 3. Close spaces to traffic during flooring installation and for time period after installation recommended in writing by flooring and finish manufacturers.
- B. Install factory-finished wood flooring after other finishing operations, including painting, have been completed.

1.7 WARRANTY

- A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Wood Flooring: Equal to 1 percent of amount installed for each type and finish indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, provide products listed below or an approved equal.

2.2 TOUNGUE AND GROOVE FLOORING

- A. New 3rd floor T&G Flooring: Provide kiln-dried wood flooring as follows:
 - 1. Species: White Oak (*Quercus spp.*)
 - 2. Grade: Clear
 - 3. Cut: Rift sawn
 - 4. Thickness: match existing, assume 3/8" inch, field verify
 - 5. Face Width: match existing, assume 1 inch, field verify
 - 6. Matching: Tongue and groove, and end matched
 - 7. Lengths: Provide lengths necessary for replacement of missing pieces
 - 8. Machine milled with offset "floor match" T&G
 - 9. Minimum 10 rings to the 1 inch of wood
- B. Patching material for patching of holes:
 - 1. Species: Match existing. Note known species are as follows all other rooms/ floors being patched will need species identification.

Room 202	White Oak (<i>Quercus spp.</i>)
Room 203	Southern Yellow Pine (<i>Pinus spp.</i>)
Room 205	Southern Yellow Pine (<i>Pinus spp.</i>)
Room 206	Eastern White Pine (<i>Picea spp.</i>)
 - 2. Grade: Clear
 - 3. Cut: Rift sawn

4. Thickness: match existing
5. Face Width: match existing
6. Matching: Tongue and groove, and end matched

2.3 CUSTOM FLOORING SUPPLIERS

A. Salvaged recycled wood floor acceptable provided it meets NHLA Standards.

1. Vintage Lumber Co.: 845 848 3040

B. Reclaimed Wood Sources

1. Vintage Lumber Co: Tel 800 222 1068.
2. The Hudson Co.: Tel 845 848 3040
3. Tindall's Virgin Timbers: Tel 717 548 2435
4. or Approved equal reclaimed wood source

2.4 FINISHING MATERIALS

A. Varnish Finish System: Complete system of compatible components to match the existing wood floors to be refinished. Basis of design.

1. Base coat (If using Liberty Golden Spike Railroad Varnish, Hard Gloss, Medium French polish, or Matte finish): Liberty Golden Spike Railroad Varnish, Low Odor Tung Oil Sealer Manufactured by Liberty Paint Corporation: Tel: 518 828 4060.

Or if using approved equal varnish follow manufacturers instructions for base coat.

2. Finish coats: Liberty Golden Spike Railroad Varnish, Low odor: Hard Gloss, Old Soft Luster, or Matte finish (supplied in gallons or quarts). Manufactured by Liberty Paint Corporation: Tel: 518 828 4060.

Or Approved equal varnish

3. Sand paper: #220 aluminum oxide grit.
4. Cleaning: Tack cloth.
5. Buffing: Slow speed floor buffer.
6. Buffing: 3M Natural Blend White Pad 3300.

B. Wood Filler: Formulated to fill and repair seams, defects, and open-grain hardwood floors; compatible with finish system components and recommended by filler and finish manufacturers for use indicated. If required to match approved samples, provide pigmented filler.

2.5 ACCESSORY MATERIALS

A. Vapor Retarder: ASTM D 4397, polyethylene sheet not less than 6.0 mils (0.15 mm) thick.

B. Felt Underlayment: ASTM D 226, Type I, No. 15, asphalt-saturated felt or rosin paper 5lb. Nominal weight.

C. Wood Flooring Adhesive: Mastic recommended by flooring and adhesive manufacturers for application indicated.

- D. Fasteners: As recommended by manufacturer, but not less than that recommended in NOFMA's "Installing Hardwood Flooring."
- E. Wood Trim: In same species and grade as existing wood. See Section 064023 Interior Architectural Woodwork.
 - 1. Wood Base: Custom, see Architectural Drawings.
 - 2. Base Shoe Molding: Custom, see Architectural Drawings.
 - 3. Threshold: Tapered on each side and routed at bottom of one side to accommodate wood flooring.
- F. Wood Floor Filler: Timetable wood filler suitable for varnish finish.

Or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, floor framing, and conditions, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of wood flooring. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.

3.2 INSTALLATION NEW WOOD FLOOR

- A. General: Comply with flooring manufacturer's written instructions, but not less than recommendations in NOFMA's "Installing Hardwood Flooring," as applicable to flooring type.
- B. Pattern: Lay wood flooring matching existing pattern and as directed by Architect based on submitted shop drawings and review of existing conditions.
- C. Expansion Space: Provide expansion space at walls and other obstructions and terminations of flooring of not less than 3/4 inch, unless otherwise indicated on Drawings.
 - 1. Unless fully concealed by trim, fill expansion space with flush cork expansion strip.
- D. Felt Underlayment: Where flooring is nailed to solid-wood subfloor, install flooring over a layer of asphalt-saturated felt or rosin paper.
- E. Solid-Wood Strip and Plank Flooring: Blind nail flooring to substrate according to NOFMA's written recommendations.
 - 1. Plank Flooring: For flooring of face width more than 3 inches, install not less than two countersunk nails at each end of each piece, spaced not more than 16 inches along length of each piece, in addition to blind nailing. Fill holes with matching wood filler.
- F. Accessories: Nail baseboard to wall and nail shoe molding or other trim to baseboard; do not nail to flooring.

3.3 REPAIR OF EXISTING WOOD SUBFLOOR

- A. Carefully remove all rotten wood flooring. Retain tongue on existing boards to remain.
- B. Remove all nails and miscellaneous attachments.
- C. Install salvaged tongue and groove wood floorboards. Retain tongues wherever possible. Stagger joints to make repair indiscernible.
- D. Fill all holes with appropriate wood filler that is stained to match wood color.
- E. Lightly sand and prep surface for varnish.

3.4 SANDING AND FINISHING

- A. Revitalize the wood by sanding it with fine grade #220 aluminum oxide sandpaper. Hand apply or use an orbital sander. NO drum sanders permitted for this work. Carefully complete sanding by hand to ensure that all wood surfaces, including all grooves and moldings have been sanded. The existing varnish does not need to be removed in its entirety. Note that 3rd floor T&G floorboards are extremely thin. Sand as little as possible to revitalize the wood evenly and retain an even floor, but only remove the minimal amount of surface wood.
- B. Apply filler according to manufacturer's written instructions.
 - 1. Fill open-grained hardwood.
 - 2. Fill and repair seams and defects.
- C. Apply stain to match approved Sample if required.
- D. Varnish Application (Liberty Golden Spike Railroad Varnish):
 - 1. Clean all surfaces using a vacuum and tack cloths to ensure all dirt and dust fully removed. Take every measure to provide a dust free environment prior to applying oil sealer and varnish
 - 2. Apply one very thin coat of Liberty Golden Spike Railroad Varnish low odor tung oil sealer and buff into wood floors using a slow speed floor buffer and nylon pad. Hand buffing is allowed for areas the slow speed floor buffer can not reach. Carefully complete buffing to ensure that all wood surfaces, including all grooves have been buffed. Sealer should be buffed into open grain and spread at the rate of 600-800 sq ft per quart. When buffing is complete there should be no standing liquid oil visible on the floor. Allow to dry per manufacturer's instructions.
 - 3. Sand surface lightly with fine grade #220 aluminum oxide sandpaper. Hand apply or use an orbital sander. (Between coat scuff sanding might be more controlled entirely by hand.) NO drum sanders permitted for this work. Carefully complete sanding by hand to ensure that all wood surfaces, including all grooves and moldings have been lightly sanded. Clean all surfaces using a vacuum and tack cloths to ensure all dirt and dust fully removed. Take every measure to provide a dust free environment prior to applying varnish
 - 4. Apply first of two finish coats of Hard Gloss varnish. Allow to dry per manufacturer's instructions (24 hours dry time).
 - 5. Sand surface lightly with fine grade #220 aluminum oxide sandpaper. Hand apply or use an orbital sander. NO drum sanders permitted for this work. Carefully complete sanding

by hand to ensure that all wood surfaces, including all grooves and moldings have been lightly sanded. Clean all surfaces using a vacuum and tack cloths to ensure all dirt and dust fully removed. Take every measure to provide a dust free environment prior to applying final coat of varnish.

6. Apply second (final) finish coat of hard high gloss varnish. Varnish is to be applied evenly, assuring a final finish with at least 20 mil thickness. To be free of caps, cloudiness, color irregularities, runs, brush marks, orange peel or blush.
7. Cover finished varnish walking surfaces with rosin paper and protect for at least 21 days to allow the varnish to dry fully.

3.5 PROTECTION

- A. Cover installed wood flooring to protect it from damage or deterioration, before and after finishing, during remainder of construction period. Use heavy kraft paper or other suitable covering. Do not use plastic sheet or film that could cause condensation.
 1. Do not cover site-finished floors with kraft paper, or any other material, until finish reaches full cure, but not less than seven days after applying last coat.
 2. Provide owner with a 5-gallon supply of varnish.

END OF SECTION 090364

SECTION 092116 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Definitions: GWB/Drywall and Sheetrock are interchangeable terms used on drawings.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Interior gypsum board for painted finish
 - 2. Fire rated gypsum board
 - 3. Tile backing panels.
 - 4. Interior gypsum board for veneer plaster finish
- B. Related Sections include the following:
 - 1. Section 061000 – Rough Carpentry
 - 2. Section 064023 – Interior Architectural Woodwork
 - 3. Section 072100 – Thermal Insulation
 - 4. Section 092613 – Gypsum Veneer Plastering
 - 5. Section 093013 – Ceramic Tile
 - 6. Section 099113 – Painting and Lead Safe Practices

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For the following products:
 - 1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.

1.4 QUALITY ASSURANCE

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

- C. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Install mockups for the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations.
 - b. Each texture finish indicated.
 - 2. Apply or install final decoration indicated, including painting and wall coverings, on exposed surfaces for review of mockups.
 - 3. Simulate finished lighting conditions for review of mockups.
 - 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install interior products until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PANELS, GENERAL

- A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 INTERIOR GYPSUM BOARD

- A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent. For all interior walls and ceilings at, but not limited to, offices, stairs, closets, halls and other locations as noted on drawings.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. USG Corporation.
 - 1) Sheetrock Brand Gypsum Panels “Fire Code Core.”
 - 2) Sheetrock Brand Gypsum Panel “AR Fire Code Core” for all hallways.
 - 3) Or approved equal.
 - b. Type: Refer to all drawings for all thicknesses. All long edges to be tapered.

2.3 WATER RESISTANT AND TILE BACKING PANELS

A. Water-Resistant Gypsum Backing Board: ASTM C 630/C 630M or ASTM C 1396/C 1396M. For all basement and bathroom walls.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. USG Corporation.
 - 1) FibreRock Brand Aqua-Touch Fiber Reinforced Gypsum Interior Panel
 - 2) Or approved equal.

B. Glass-Mat, Water-Resistant Backing Board:

1. Complying with ASTM C 1178/C 1178M.
 - a. Product: Subject to compliance with requirements, provide "DensShield Tile Guard" by G-P Gypsum.
2. Complying with ASTM C1177/C 1177M.
 - a. Product: Subject to compliance with requirements, provide "DensArmor Plus Interior Guard" by G-P Gypsum.
3. Or approved equal.

C. Cementitious Backer Units: ANSI A118.9.

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. Custom Building Products; Wonderboard.
 - b. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
 - c. USG Corporation; DUROCK Cement Board.
3. Thickness: As indicated on Drawings.

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized 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. Expansion (control) joint.
- g. Curved-Edge Cornerbead: With notched or flexible flanges.

2.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 - 1. Interior Gypsum Wallboard: Paper.
 - 2. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
 - 3. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 - 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.
- D. Joint Compound for Exterior Applications:
 - 1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.
 - 2. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.
- E. Joint Compound for Tile Backing Panels:
 - 1. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.
 - 2. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
 - 3. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.6 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 - 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 C 1002.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.

2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
 3. Use stainless steel in wet areas at exterior walls.
- D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- E. Acoustical Sealant: As specified in Division 7 Section "Joint Sealants."
- F. Thermal Insulation: As specified in Division 7 Section "Thermal Insulation."
- G. Vapor Retarder: As specified in Division 7 Section "Thermal Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. 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.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board 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.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 2. Fit gypsum panels around ducts, pipes, and conduits.
 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.
- J. 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 C 919 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.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
1. Regular Type: As indicated on Drawings
 2. Type X: As indicated on Drawings
 3. Type C: As indicated on Drawings
 4. Ceiling Type: As indicated on Drawings
 5. Moisture- and Mold-Resistant Type: As indicated on Drawings
- B. Single-Layer Application:
1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
 2. On partitions/walls, apply gypsum panels vertically (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.
 - b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints 1 framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
 4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.
- E. Curved Surfaces:
1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch-long straight sections at ends of curves and tangent to them.
 2. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

3.4 APPLYING TILE BACKING PANELS

- A. Water-Resistant Gypsum Backing Board: Install at basement walls and in all bathrooms, kitchen areas, and where indicated. Install with 1/4-inch gap where panels abut other construction or penetrations.
- B. Glass-Mat, Water-Resistant Backing Panel: Comply with manufacturer's written installation instructions and install where indicated. Install with 1/4-inch gap where panels abut other construction or penetrations.
- C. Cementitious Backer Units: ANSI A108.11, where indicated.
- D. Retain paragraph below if regular-type gypsum board is an acceptable substrate in dry locations.
- E. Areas Not Subject to Wetting: Install regular-type gypsum wallboard panels to produce a flat surface except at locations indicated to receive water-resistant panels.
- F. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 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 control joints at locations indicated on Drawings.
- C. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners, unless otherwise indicated.
 - 2. LC-Bead: Use at exposed panel edges
 - 3. U-Bead: Use at exposed panel edges
 - 4. Curved-Edge Cornerbead: Use at curved openings.
- D. Exterior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners.
 - 2. LC-Bead: Use at exposed panel edges

3.6 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Pre-fill open joints rounded or beveled edges and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile
 - 3. Level 3 is suitable for surfaces receiving medium- or heavy-textured finishes before painting or heavy wall coverings where lighting conditions are not critical.
 - 4. Level 4: At all panel surfaces that will be exposed to view.
 - a. Primer and its application to surfaces are specified in other Division 9 Sections.
- E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.
- F. Glass-Mat, Water-Resistant Backing Panels: Finish according to manufacturer's written instructions.
- G. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092116

SECTION 092400 - STUCCO RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Scope of work includes:
 - 1. Stucco repairs at foundation walls, as necessary, and indicated on the drawings.
- B. Related sections:
 - 1. Section 040140.91 – Historic Masonry Restoration

1.2 SUBMITTALS

- A. General: Submit manufacturer's product data and installation instructions for systems specified, demonstrating compliance with requirements.
- B. Material certificates: Submit producer's certification that each kind of building material complies with specified requirements.
- C. Shop Drawings: Show locations and installation of control and expansion joints, including plans, elevations, sections, details of components, and attachments to other work. Show locations to be repaired.
- D. Material Testing: Contractor is responsible for submitting the material test reports from the material conservator.
- E. Samples:
 - 1. Submit at least six 12" square samples of the exterior stucco type replicating the existing finish textures, mounted on plywood or hardwood panels.
 - 2. Mockup: Prepare at least two field samples in locations selected by the architect/conservator. To establish the acceptable limits and variations in material and workmanship for each type of stucco condition. Do not commence work without architect/conservator's acceptance of the mockup. Minimum sizes 4' x 4'.
 - 3. Samples for verification: A bagged and labeled sample of each component. Identify sources, both supplier and quarry.

1.3 QUALITY ASSURANCE

- A. Installer must be familiar with NPS Preservation Brief 22 Repair of Historic Stucco.
- B. Quality Control Program: Prepare a written quality-control program for this Project to systematically demonstrate the ability of personnel to properly follow methods and use materials and tools without damaging masonry. Include provisions for supervising worker performance and preventing damage.
- C. Following the installation of new stuccos the contractor must warranty for 1 year after completion of the work that all cracks that appear will be repaired.

- D. No air-entrained or premixed products will be permitted for use on this site.

1.4 PROJECT CONDITIONS

- A. Environmental requirements: Comply with provisions of ASTM 926 and recommendations of cement stucco manufacturer for environmental conditions before, during and after application of stucco.
- B. Protect sills, ledges surrounding woodwork, projects, and all surfaces from mortar droppings.
- C. Use all means necessary to protect the materials of this section before, during and after installation and to protect the work and material of other trades, the building, and the public.
- D. Cold weather requirements:
 - 1. When ambient outdoor temperatures are below 55° F maintain continuous, uniform temperature of no less than 55°F for not less than one week prior to beginning stucco installation, and for no less than one week after completion of stuccoing.
 - 2. Avoid heat sources in immediate vicinity of stucco, and conditions under which uneven heating could occur.
- E. Warm weather requirements:
 - 1. Protect stucco against uneven and excessive evaporation of moisture and from strong flows of dry air, both natural and artificial.
 - 2. Apply and cure stucco as required by climatic and job conditions to prevent drying out during curing period.
Prevent premature drying of stucco using any of the following:
 - a. Moist curing.
 - b. Barriers to deflect sunlight and wind.
 - c. Proprietary curing compounds.
- F. Ventilation: Provide natural or mechanical ventilation to remove excessive moisture from the time stuccoing is started until it is completely dry and cured.
 - 1. Do not use air blowers on stucco surfaces.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Product Handling: Deliver all products to job in original container with seals unbroken and use without reducing.
- B. Materials Storage: Protect all products from freezing and store above ground.
- C. Store all materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.6 MATERIALS TESTING

- A. The contractor must obtain verification of compatibility of existing stuccos and proposed new stuccos in written form from the stucco manufacturers. This must be done prior to proceeding with mock-ups.

PART 2 - PRODUCTS

2.1 STUCCO

- A. The existing Stucco is approximately ¼” applied over brick and stone foundation. Cracks will be repaired using materials listed below.

2.2 STUCCO MATERIALS

- A. 2 Part Portland Cement ASTM C 150, Gray Portland Cement, Type 1.
- B. 1 Part High Calcium Hydrated Lime, Manufacturer: Graymont, 965 East College Ave, Pleasant Gap, PA 16823, Supplier: Hybrett Puratex, 6219-6947 Westfield Ave., Pennsauken, NJ 08110, Tel 856-662-1717. Or approved equal.
- C. Sand aggregate: ASTM C 897: Aggregate for job mixed Portland Cement Based Stuccos
9 parts #180 Sand
George Schofield
831 E. Main Street
Bridgewater, NJ 08807
Tel 732-356-0858
- D. Portland Cement: ASTM C 150 1C 150M Type 1 gray, no air-entrained products allowed.
- E. Water: Clean, potable and free of oils, alkalis, acids and organic matter.
- F. No color additives permitted.

2.3 STUCCO MIXING

- A. Mix Ratio: 1 part binder (cement) to 3 parts aggregate (sand)
- B. Premix dry binder and premix dry sand separately before mixing in a 1:3 ratio.
- C. General: Do not use add-mixtures of any kind in stucco, unless otherwise indicated.
- D. Measure all materials in dry condition by volume.
- E. Thoroughly mix dry material prior to adding water.

2.4 STUCCO ATTACHMENT METHOD

- A. Existing surface will be scarified to provide a proper key for stucco application. A light slurry of water and Portland cement can be applied to assist with bounding.

2.5 STUCCO FINISH

- A. Finish stucco texture to match existing historic stucco, including scoring pattern where applicable.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine all existing field conditions prior to commencing the work. Verify that material is sound. Contractor is to provide access for the architect and structural engineer to verify the condition of the walls. Do not proceed with any work until drawings locating the scope of the work have been provided by the architect.

3.2 SURFACE PREPARATION

- A. Cut back surface at cracks to be infilled. Angle cuts so that water drips away from the building.
- B. Provide a scarified surface for a sound key for new stucco.
- C. Pre-wet surface before application of new stucco.
- D. Apply a Portland cement slurry to prepped surface immediately prior to installing stucco.

3.3 STUCCO APPLICATION

- A. Apply stucco to match existing thickness to be field verified by the Contractor/
Note: Additional coats may be required to allow for alignment with existing stucco. Use light water spray to prevent stucco drying out between stucco application coats.
- B. Apply each coat to the next prior to setting of previous coat. At the end of the workday seal completed work to prevent drying out. Float from right to left and finish from left to right.
- C. Apply and work finish coat to match approved mock up and existing stucco finish.
 - 1. Coordinate stucco application with installation of adjacent work to avoid soiling and damage of stucco and other work.
 - 2. Comply with ASTM C926 for two coat – cement stucco on solid base.
- D. Tolerances: Deviation from the plain not to exceed 1/8” in 10’-0” as measured with a straight edge at any location on the surface.
- E. Cure stucco by maintaining in a damp condition for not less the 72 hours.
- F. Install movement joints in accordance with drawings.
- G. Curing:
 - 1. When ambient relative humidity will be below 75 percent during non-work hours, moist cure the set and hardened base coat stucco at the end of the workday by spraying a fine mist of water over the entire surface. Repeat application of a fine mist of water morning and evening until stucco has been in place 24-48 hours. Alternatively, coverage of the

base coat stucco with plastic membrane unit application of subsequent coat or finish coat stucco is permitted.

2. When ambient relative humidity will be above 75 percent during non-work hours, neither water spraying nor coverage with plastic membrane is required.

3.4 STUCCO PATCHING

- A. Cut back stucco as per details to insure appropriate attachment.
- B. Ensure the wall is clean, free of oils, dust, and dirt.
- C. For all small patches build up as necessary. The number of coats will depend on the depth of the patch.
- D. Wall tolerance described under stucco application also apply to all patches.
- E. Match existing finish.

3.5 FINAL CLEANING

- A. After stucco has fully hardened, thoroughly clean exposed surfaces using a damp rag, in preparation for finish. Damp rag with water only.
- B. Do not use metal scrapers or alkali cleaning agents.
- C. Dispose of all debris resulting from cleaning and stucco operations.

END OF SECTION 092400

SECTION 092613 - GYPSUM VENEER PLASTERING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Gypsum Plaster Base
 - 1. Regular

- B. Gypsum Veneer Plaster
 - 1. To be installed in rooms as noted on Finish Schedules.
 - 2. At large repairs adjacent to existing plaster walls.

1.2 PERFORMANCE CRITERIA

- A. Wall Assembly Fire-Resistance Rating: Non-rated

PART 2 - PART 2 - PRODUCTS

2.1 MANUFACTURER / PRODUCTS

- A. Basis of Design: Products of National Gypsum Company

2.2 GYPSUM PLASTER BASE

- A. Basis of Design: Gold Bond® BRAND Kal-Kore Plaster Base
 - 1. Core: Regular gypsum core lathing panel
 - 2. Surface Paper: Absorptive paper on front and long edges
 - 3. Long Edges: Tapered
 - 4. Overall Thickness: 1/2 inch
 - 5. Panel complies with requirements of ASTM C 1396 Standard Specification for Gypsum Board

2.3 BASE PLASTER

- A. Basis of Design: Gold Bond® BRAND Kal-Kote Base Plaster
 - 1. Physical Characteristics
 - a. Complies with requirements of ASTM C 587 Standard Specification for Gypsum Veneer Plaster

2.4 FINISH PLASTER

- A. Basis of Design: Gold Bond® BRAND Kal-Kote Smooth Finish Plaster
 - 1. Physical Characteristics
 - a. Complies with requirements of ASTM C 587 Standard Specification for Gypsum Veneer Plaster
 - b. Finish: Smooth

2.5 ONE COAT GYPSUM PLASTER

- A. Basis of Design: Gold Bond® BRAND X-KALibur Veneer Plaster
 - 1. Physical Characteristics
 - a. Complies with requirements of ASTM C 587 Standard Specification for Gypsum Veneer Plaster
 - b. Finish: Smooth

2.6 AUXILIARY MATERIALS

- A. Silica Sand: Complying with ASTM C 35 Specification for Inorganic Aggregates for Use in Gypsum Plaster
- B. Water: Potable

2.7 ACCESSORIES

- A. Joint Treatment
 - 1. Joint Reinforcing Tape: 2-1/16 in. wide paper reinforcing tape (ProForm Brand Joint Tape)
 - 2. Joint Reinforcing Tape: 2-1/2 in. wide coated fiberglass reinforcing tape (Kal-Mesh Tape)
 - 3. Or Approved Equal

PART 3 - EXECUTION

3.1 INSTALLATION, PLASTER BASE

- A. Install in accordance with manufacturer recommendations and in accordance with ASTM C 844 Specification for Application of Gypsum Base to Receive Veneer Plaster.

3.2 INSTALLATION, GYPSUM VENEER PLASTER

- A. Install in accordance with manufacturer recommendations and in accordance with ASTM C 843 Specification for Application of Gypsum Veneer Plaster.

END OF SECTION 092613

SECTION 093013 - CERAMIC TILE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 1. New ceramic floor tiles. See finish schedules.
 2. New ceramic wall tiles. See finish schedules.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Field verify all existing conditions. Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints.
- C. Samples:
 1. Each type, composition, color, and finish of tile.
 2. Assembled samples with grouted joints for each type, composition, color, and finish of tile.

1.3 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.
 1. Build mockup of each type of floor tile installation.
 2. Build mockup of each type of wall tile installation.
 3. Build mockup of each type of backsplash installation.
 4. Accepted mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 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 percent of amount installed, for each type, composition, color, pattern, and size indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified on drawings or equal.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified on drawings or equal.
3. Basis-of-Design Product: The design for each tile type is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.2 TILE PRODUCTS

- A. Ceramic Wall Tiles: Supplier: Subway Ceramics <https://www.subwaytile.com> (888) 387-3280 – Basis of Design
 1. Sanitary CoBe Base - Color: 53 Midnight Blue
 2. 3x6 Field Tile – Color: 53 Midnight Blue
 3. 1x6 Flat Accent Liner – Color: 41 Heather Gray
 4. Standard P-Cap – Color: 53 Midnight Blue
- B. Floor Tile: Supplier: Daltile. <https://www.daltile.com/> (800) 449-3591. – Basis of Design
 1. Type 1: Scrapbook ceramic tile in Petal (Color code SB35)
- C. Backsplash Tile: Supplier - Daltile. <https://www.daltile.com/> (800) 449-3591. – Basis of Design
 1. Type 2: Color Wheel Mosaics in K175 (1) Biscuit

2.3 ACCESSORY MATERIALS

- A. Thresholds: Fabricate to provide transition between adjacent floor finishes. Bevel edges at 1:2 slope, limit height of bevel to 1/2 inch or less, and finish bevel to match face of threshold.
- B. Waterproofing and Crack-Suppression Membranes for Thin-Set Tile Installations: Manufacturer's standard product that complies with ANSI A118.10, selected from the following.
 1. Polyethylene-Sheet Product: Polyethylene faced on both sides with fleece webbing, 0.008-inch nominal thickness.
 - a. Product: Schluter Systems L.P.; KERDI.
 - b. Or approved equal.

2.4 SETTING MATERIALS

- A. See Tile Manufacturer's installation and care requirements.
- B. Available Manufacturers:
 1. LATICRETE International Inc.
 2. MAPEI Corporation
 3. TEC Specialty Products Inc.
 4. Or approved equal.
- C. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.
 1. Prepackaged dry-mortar mix containing dry additive to which only water must be added.

2.5 GROUTING MATERIAL

- A. See Tile Manufacturer's installation and care requirements.
- B. Available Manufacturers:
 - 1. LATICRETE International Inc.
 - 2. MAPEI Corporation
 - 3. TEC Specialty Products Inc.Note: Basis of Design is Laticrete
- C. Permacolor Grout: ANSI A118.7
 - 1. Prepackaged dry grout mix containing pigment.
 - 2. See finish schedules on drawings for color.

2.6 MISCELLANEOUS MATERIALS

- A. Elastomeric Sealants: Elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements in Division 7 Section "Joint Sealants."
 - 1. One-Part, Mildew-Resistant Silicone: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for in-service exposures of high humidity and extreme temperatures.
 - a. Available Products: (Basis of Design)
 - 1) Dow Corning Corporation; Dow Corning 786.
 - 2) GE Silicones; Sanitary 1700.
 - 3) Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
 - 4) Tremco, Inc.; Tremsil 600 White.
- B. Cementitious Backer Units: ANSI A118.9 in maximum lengths available to minimize end-to-end butt joints.
 - 1. Thickness: 1/4 inch.
 - 2. Available Products: (Basis of Design)
 - a. C-Cure; C-Cure Board 990.
 - b. Custom Building Products; Wonderboard.
 - c. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
 - d. USG Corporation; DUROCK Cement Board.
- C. Trowelable Underlayments and Patching Compounds: Latex-modified, Portland cement-based formulation provided or approved by manufacturer of tile-setting materials.
- D. Metal Edge Strips: Angle or L-shape, stainless steel; ASTM A 666, 300 Series exposed-edge material.
- E. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints that does not change color or appearance of grout.

PART 3 - EXECUTION

3.1 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. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions.
- C. Remove protrusions, bumps, and ridges by sanding or grinding.
- D. Blending: For tile exhibiting color variations, use factory blended tile or blend tiles at Project site before installing.
- E. Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.2 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. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA 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. Grind cut edges of tile abutting trim, finish, or built-in items. 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.
- F. Expansion Joints: Locate expansion joints and other sealant-filled joints 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 7 Section "Joint Sealants."
- G. Grout tile to comply with requirements of ANSI A108.10, unless otherwise indicated.
 - 1. For chemical-resistant epoxy grouts, comply with ANSI A108.6.

- H. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.
 - 1. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

- I. For installations indicated below, follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.
 - 1. Tile floors in wet areas.
 - 2. Tile floors in laundries.
 - 3. Tile floors composed of tiles 8 by 8 inches or larger.
 - 4. Tile floors composed of rib-backed tiles.

- J. Install tile on floors with the following joint widths:
 - 1. Ceramic Tile: 1/6 inch.

- K. 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.

- L. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

- M. Install metal lath and scratch coat for walls to comply with ANSI A108.1A, Section 4.1.

3.3 FLOOR TILE INSTALLATION SCHEDULE

- A. Interior floor installation on wood; organic adhesive; TCA F142.
 - 1. Grout: Polymer-modified sanded grout.

END OF SECTION 093013

SECTION 096816 - CARPETING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes woven carpet, carpet runners, carpet cushion and stair hardware to be installed as shown in finish schedule.
 - 1. Stair carpet runners and accessories.
 - 2. Carpet in rooms noted on schedule.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Show the following:
 - 1. Existing flooring materials to remain.
 - 2. Carpet type, color, and dye lot.
 - 3. Seam locations.
 - 4. Pattern type, repeat size, location, direction, and starting point.
 - 5. Pile direction.
 - 6. Insets and borders.
 - 7. Edge, transition, and other accessory strips.
 - 8. Transition details to other flooring materials.
 - 9. Carpet cushion.
- C. Samples: For each color and texture required.
 - 1. Carpet: 12-inch- square Sample or 12"x17" for carpet runners.
 - 2. Exposed Edge, Transition, and other Accessory Stripping: 12-inch- long Samples.
 - 3. Carpet Cushion: 6-inch- square Sample.
 - 4. Carpet Stair accessories.
- D. Product Schedule: For carpet use same designations indicated on Drawings and Finish Schedule. Basis of Design.
- E. Maintenance data.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.

- B. Mockups: Before installing carpet, build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104, Section 5, "Storage and Handling."

1.5 PROJECT CONDITIONS

- A. Comply with CRI 104, Section 7.2, "Site Conditions; Temperature and Humidity" and Section 7.12, "Ventilation."

1.6 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Carpet: Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

PART 2 - PRODUCTS

2.1 WOVEN STAIR RUNNER

- A. Products: Subject to compliance with requirements, provide the following:
 - 1. Stair Runner Carpet: Manufacturer Woodward & Greenstein
 - a. Style Name: Cedar Hill #231
 - b. Type: Woven
 - c. Color: As selected by Architect from manufacturer's full range
 - d. Source: Woodward & Greenstein, 217 East 70th St #2507, New York, NY 10021, Tel 212-988-2906, www.woodwardweave.com, info@woodwardandgreenstein.com
 - 2. Carpet Runner Stair Rod: Heritage Round Tip Stair Rod – ½” diameter brass with standard brackets. www.houseofantiquehardware.com; Basis of Design.
 - 3. Dust Corners: Decorative Brass Dust Corner for each stair corner. www.houseofantiquehardware.com; Basis of Design.

- B. Backing: Manufacturers standard interlaced into pile.
- C. Applied Soil-Resistance Treatment: Manufacturer's standard material.

2.2 CUSTOM CARPET REPLICATION

- A. Products: Subject to compliance with requirements, provide the following: Basis of design
 - 1. Replicated carpets: Manufacturer: Thistle Hill
 - a. Style: to match historic carpet fragments found in Rm 102A.
 - b. Type: All wool ingrain carpet woven in historic widths to be butt seamed to create full carpet size
 - c. Color: As selected by Architect based on historic colors found in carpet fragments found in Rm 102A.
 - d. Source: Thistle Hill, 101 Chestnut Ridge Rd., Cherry Valley, NY 13320, Tel: 518-284-2729, Cell: 518- 852-5536, e-mail: rabbitgoodythw@gmail.com
www.thistlehillweavers.com
 - e. Or Approved Equal

2.3 CARPET CUSHION

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- B. Products: Subject to compliance with requirements, provide the following:
 - 1. Stainmaster Carpet Cushion Manufactured by Carpenter Co., 5016 Monument Ave., Box 27205, Richmond, VA 23230, United States of America Tel: (804) 359-0800 Fax: (804) 355-7708 Website Address: <http://www.carpenter.com>
 - a. Traffic Classification: CCC Class III, extra-heavy traffic.
 - b. Performance Characteristics: As follows:
 - 1) Critical Radiant Flux Classification: Not less than .45 W/sq. cm.
 - 2) Noise Reduction Coefficient (NRC) per ASTM C 423.
 - 3) Environmental Requirements: Provide carpet cushion that complies with testing and product requirements of Carpet and Rug Institute's "Green Label" program.
 - c. Thickness:40oz.
 - 2. Dura-holdplus manufactured by no-muv, 5801 Phillips Highway, Jacksonville, FL, 32216, Tel (800)227-7237, www.nomuv.com/duraholdplus.html
 - 3. Or Approved equal

2.4 INSTALLATION ACCESSORIES

- A. Tackless Carpet Stripping: Water-resistant plywood, in strips as required to match cushion thickness and that comply with CRI 104, Section 12.2.

- B. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Notify Architect of planned removal of linoleum and grass matting in Rm 102A at least 1 week prior to removal. Allow for Architect’s representative to document the removal of linoleum and grass matting in RM 102A. Items are to be handled with care, retained for client’s collection. Contractor to share documentation of grass matting with custom carpet replication manufacturer.

3.2 INSTALLATION

- A. Comply with CRI 104 and carpet and carpet cushion manufacturers' written installation instructions for the following:
 1. Carpet with Attached-Cushion Installation: Comply with CRI 104, Section 11, "Attached-Cushion Installations."
 2. Stair Installation: Comply with CRI 104, Section 13, "Carpet on Stairs" for runner and rod installation.
- B. All installations should be reversable and not cause damage to existing historic wood floors. Tackless strips should use a minimal amount of fine nails to minimize damage to flooring.
- C. Comply with carpet manufacturer's written recommendations and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile.
- D. Install pattern parallel to walls and borders.

3.3 CARPET SCHEDULE

LOCATION	Material/Type	Size	Manufacturer	Padding	Style
Stairs, Entry Hall Rm101 and Rm 201	Woven	27” wide	Woodward & Greenstein	Stainmaster Carpet Cushion	Cedar Hill #231
Rm 102	Wool Ingrain Jacquard	Match to center un- patterned portion of the	Thistle Hill	Durohold	Custom replication based on carpet fragments found in Rm 102A

		wood floor.			
Rm 202	Wool Ingrain Jacquard	Match to center un-patterned portion of the wood floor.	Thistle Hill	Durohold	Custom replication based on carpet fragments found in Rm 102A
Rm 203	Wool Ingrain Jacquard	Match to center un-patterned portion of the wood floor.	Thistle Hill	Durohold	Custom replication based on carpet fragments found in Rm 102A
Rm 205	Wool Ingrain Jacquard	Match to center un-patterned portion of the wood floor.	Thistle Hill	Durohold	Custom replication based on carpet fragments found in Rm 102A
RM 206	Wool Ingrain Jacquard	Match to center un-patterned portion of the wood floor.	Thistle Hill	Durohold	Custom replication based on carpet fragments found in Rm 102A

END OF SECTION 096816

SECTION 097200 - WALL COVERINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. New wallpaper installation.
- B. Related Requirements
 - 1. Section 090120.91 – Plaster Restoration and Repair
 - 2. Section 092613 – Gypsum Veneer Plastering
 - 3. Section 099113 – “Painting and Lead Safe Practices” for priming and preparation of walls.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference on site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include data on physical characteristics, printing, durability, fade resistance, and fire-test-response characteristics.
- B. Shop Drawings: Show location and extent of each wall-covering type. Indicate pattern placement, seams and termination points.
- C. Samples: For each type of wall covering and for each color, pattern, texture, and finish specified, full width by 36” long in size.
 - 1. Wallpaper Sample: From same production run to be used for the Work. Show complete pattern repeat. Mark top of paper.
- D. Samples for Initial Selection: For each type of wall covering.
- E. Samples for Verification: For each type of wall covering and for each color, pattern, texture, and finish specified, full width by 36” long in size.

1. Wallpaper Sample: From same production run to be used for the Work. Show complete pattern repeat. Mark top of paper.
- F. Product Schedule: For wall coverings. Use manufacture's identifying information, and information from schedule in this specification. Include photograph of paper. Show which borders go with which wallpapers.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Product Test Reports: For each wall covering, for tests performed by a qualified testing agency.
- C. Qualification Data: For qualified installer.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For wall coverings to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Wall-Covering Materials: For each type, color, texture, and finish, full width by length to equal to 5% of amount installed, a minimum of one full roll stored in the wrapping provided by the manufacturer.

1.8 QUALITY ASSURANCE

- A. Supervision: An experienced supervisor with experience in removing historic finishes and installing wallpaper will be required 5 years to be on site.
- B. Qualified Installer: An experienced installer with experience preparing walls for wallpaper and in trimming and hanging wallpaper so that the patterns/ paper are properly aligned is required.
- C. Mockups: Build mockups to verify selections made under submittals and to demonstrate aesthetic effects and set quality standards for material and execution.
 1. Build mockups for each type of wall covering on each substrate required. Comply with requirements in ASTM F 1141 for appearance shading characteristics.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.
- B. Lighting: Do not install wall covering until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive wall covering.
- C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

PART 2 - PRODUCTS

2.1 WALL COVERINGS

- A. General: Provide rolls of each type of wall covering from same print run or dye lot.

2.2 WALLPAPER

- A. Manufacturer: Bradbury & Bradbury, www.bradbury.com Tel: 707-746-1900. Basis of Design.
- B. Description: Provide wallpaper listed in wallpaper schedule in this specification. Wallpaper to be delivered to site in rolls, untrimmed and from same production run and that complies with ASTM F 793.

2.3 ACCESSORIES

- A. Adhesive: Mildew-resistant, nonstaining adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by wall-covering manufacturer.
- B. Primer/Sealer: Mildew resistant and recommended in writing by primer/sealer and wall-covering manufacturers for intended substrate.
- C. Seam Tape: As recommended in writing by wall-covering manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of the Work.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
 - 1. Moisture Content: Maximum of 5 percent on new plaster when tested with an electronic moisture meter.
 - 2. Plaster: Allow new plaster to cure. Do not install wallpaper less than 4 weeks after plaster or veneer plaster has been installed. Neutralize areas of high alkalinity. Prime with primer recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 3. Metals: If not factory primed, clean and apply primer recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 4. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
 - 5. Painted Surfaces: Treat areas susceptible to pigment bleeding.
- D. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finish with fine sandpaper.
- E. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- F. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 WALL-COVERING INSTALLATION

- A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated.
- B. Cut wall-covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.
- C. Install strips in same order as cut from roll.
 - 1. For solid-color, even-texture, or random-match wall coverings, reverse every other strip.
- D. Install wall covering without lifted or curling edges and without visible shrinkage.
- E. Match pattern 72" above the finish floor.
- F. Install seams vertical and plumb at least 6" from outside corners and 6" from inside corners unless a change of pattern or color exists at corner. Horizontal seams are not permitted.

- G. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.
- H. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

3.4 CLEANING

- A. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.
- B. Use cleaning methods recommended in writing by wall-covering manufacturer.
- C. Replace strips that cannot be cleaned.
- D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

3.5 WALLPAPER SCHEDULE

- A. Wallpaper to be supplied by and installed by contractor:

LOCATION	ARCHITECTURAL ELEMENT	PAPER
Room 101 – Entrance Hall Stair	Wall	Empire Star ESW-310
Room 102 – Front Parlor	Wall	Briar Rose BRW-980
Room 102 – Front Parlor	Ceiling	Circlet Ceiling in Natural CCC-930
Room 104 – Library	Wall	Daisy in Yellow 5G-129-A
Room 201 – Upstairs Hall	Wall	Empire Star ESW-310
Room 201 – Upstairs Hall	Ceiling	Findlay Ceiling Paper FYC-310
Room 201 – Upstairs Hall	Ceiling Border	Olympia Border Paper in Cream OLB-250S. Trimming of paper TBD.

END OF SECTION 097200

SECTION 099113 – PAINTING AND LEAD SAFE PRACTICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related sections: The following sections contain requirements related to this section:
 - 1. Section 062013 – Finish Carpentry
 - 2. Section 064023 – Interior Architectural Woodwork
 - 3. Section 080314 –Historic Treatment of Wood Doors
 - 4. Section 081433 – Stile and Rail Wood Doors
 - 5. Section 090364 – Wood Floor Restoration & Replacement - for varnish
 - 6. Section 09120.91 – Plaster Restoration and Repair
 - 7. Section 092116 – Gypsum Wallboard Assemblies
 - 8. Section 092613 – Gypsum Veneer Plastering
 - 9. Section 099300 – Staining and Transparent Finishes
 - 10. Appendix A – Interior Finishes Schedule

1.2 SUMMARY

- A. This Section includes surface preparation and field painting of the following:
 - 1. Strip all exterior woodwork to bare wood.
 - 2. Strip of paint on selected surfaces at interior.
 - 3. Painting of house exterior including clapboard, trim and all exterior woodwork noted on drawings.
 - 4. Painting of porch ceilings and floors, columns, railings and stairs.
 - 5. Painting of interior and exterior window trim including sills (Note exterior window sash painted in previous phase) and exterior doors and trim as shown on schedules.
 - 6. Touch up of exterior face of previously refinished window sash and shutters.
 - 7. All interior surfaces, including plaster, gypsum wall board, veneer plaster, and wood trim.
 - 8. Painting of brick piers noted on drawings with silicate paint.
 - 9. Painting of masonry interior walls.
 - 10. Painting of miscellaneous metal including grilles as noted on drawings.
 - 11. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Paint or stain exposed surfaces, as noted.
- C. Do not paint pre-finished items such as glass, finished metal surfaces, operating parts, and labels.
- D. Assume all painted surfaces to have **all** paint removed prior to repainting. Removal to be in accordance with Lead Safe Practices.
- E. All paint on exterior must comply with paint manufacturer's requirements for environmental/weather conditions.

1.3 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 below 15 when measured at an 85-degree meter.
 - 2. Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.
 - 3. Satin refers to low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.
 - 4. Semi-gloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
 - 5. Full gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

1.4 SUBMITTALS

- A. Product Data: For each paint system specified. Include block fillers and primers.
 - 1. Material List: Provide 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: Provide manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use.
 - 3. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
- B. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for each type of finish-coat material indicated.
 - 1. After color selection, the Architect will furnish color chips for surfaces to be coated.
- C. Samples for Verification: Of each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.
 - 1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
 - 2. Provide a list of materials and applications for each coat of each sample. Label each sample for location and application.
 - 3. Submit Samples on the following substrates for the Architect's review of color and texture only:
 - a. Painted Wood: Provide two 12-inch square samples of each color and material on hardboard.
- D. Paint schedule showing surfaces to be painted, paint system and colors.
- E. 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.

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.
- B. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.
- C. Paint Removal Sample and Surface Preparation Sample: Contractor to provide at least four paint removal samples and wood surface preparation samples for review by architect prior to commencing any work. The location and size of samples are to be selected by the Architect.
- D. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample of each type of coating and substrate required on the Project. Comply with procedures specified in PDCA P5. (Painting and Decorator Contractors of America Standards) Duplicate finish of approved prepared samples.
 - 1. The Architect will select surface to represent surfaces and conditions for each type of coating and substrate to be painted.
 - a. Small Areas and Items: The Architect will designate an item or area as required.
 - 2. Final approval of colors will be from job-applied samples.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:
 - 1. Product name or title of material.
 - 2. Product description (generic classification or binder type).
 - 3. Manufacturer's stock number and date of manufacture.
 - 4. Contents by volume, for pigment and vehicle constituents.
 - 5. Thinning instructions.
 - 6. Application instructions.
 - 7. Color name and number.
 - 8. VOC content.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg. F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.
 - 1. Protect from freezing. Keep storage area neat and orderly. Remove soiled rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.
 - 2. Comply with all municipal safety storage requirements.

1.7 PROJECT CONDITIONS

- A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 deg F.

- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 deg F.
- C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
 - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

1.8 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied in the quantities described below. Package paint materials in unopened, factory-sealed containers for storage and identify with labels describing contents. Deliver extra materials to the Owner.
 - 1. Quantity: Furnish the Owner with an additional 5 percent, but not less than: 2 gal or 1 case, as appropriate, of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of design: Subject to compliance with requirements, provide products by the following:
 - 1. Benjamin Moore & Co., www.benjaminmoore.com, Sales Rep: Diana Rattazzi, Tel: 914-261-8603
 - 2. Brouns & Co., www.linseedoilpaint.com
- B. Products: Subject to compliance with requirements, provide one of the products in the paint schedules.
- C. Manufacturers Names: The following manufacturers are referred to in the paint schedules by use of shortened versions of their names, which are shown in parentheses:
 - 1. Benjamin Moore & Co. (Moore).
 - 2. Brouns & Co. (Brouns).

2.2 PAINT REMOVAL PRODUCTS

- A. Existing Finishes:
 - 1. Paint
- B. Paint removal using pH neutral gel products:
 - 1. Multi-strip paint removal pH Neutral gels Manufactured by Sunnyside Corporation, 225 Carpenter Avenue, Wheeling, IL 60090 (800) 323-8611.
 - 2. Smart-Strip Peel Away Paint Removal Gel (must be pH neutral) manufactured by Dumond

- Chemicals, New York, NY, (609) 655-7700.
3. Saf Strip 8 - Enviro Klean manufactured by Prosoco, www.prosoco.com.
 4. Or Approved equal
- C. Micro-Abrasive cleaning techniques for all substrates (offsite):
1. Paint removal using IBIX technology Supplier: IBIX North America, 2075 Lake Avenue, Largo, FL. 33771 USA, www.ibixusa.com, tel: 727-322-4611.
 2. Or Approved Equal.
- D. Infrared Paint Remover:
1. Silent Paint Remover SH 2000 TWIN, 115 V-15 amp outlet, Viking Sales, Inc., 7710 Victor-Mendon Road, Victor, NY 14564, Tel (585) 924-8070.
 2. Speed Heater, Cobra at www.speedheater.com.
 3. Or Approved Equal.
- E. Steam Cabinet:
1. Paint and glazing putty removal.
 2. Suppliers:
 - i. Portable Steam Paint Stripper, Tel 603-529-0261
 - ii. The Steam Stripper Window Restoration Systems, Tel 207-725-0051
 - iii. Approved Equal.
- F. Off-site Paint Removal: pH neutral paint remover, suitable for wood, previously used on historic buildings:
1. TNT Paint Removal, Hudson NY - Paint removal system. T.N.T. Furniture Strippers 421 Violet Ave., Poughkeepsie, NY 12601, Tel (845) 454-4400.
 2. George Draguns, JRB Historic Restoration, LLC, 7217 McCallum Street, Philadelphia, PA 19119, Tel (215) 534-5737.
 3. Stenton Painting Corp, 72 Jansen Street Essington, PA 19029 Tel (610) 521-5498.
 4. Approved Equal
- G. Steel Wool
- H. Turpentine or boiled linseed oil
- I. Water: Potable
- J. Plastic scrapers
- K. Fungicide
- L. Natural bristle brushes
- M. Sandpaper

2.3 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
 - 1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
- C. Colors: Specified (see Finish Schedules) or To Be Selected.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
- B. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.
- C. 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 the Architect about anticipated problems using the materials specified over substrates primed by others.

3.2 PAINT REMOVAL

- D. Complete paint removal testing regime.
- E. Review drawings and specifications for paint removal requirements:
 - 1. Strip paint to bare wood means remove all paint.
 - 2. Prep means remove all loose paint.
- F. Remove all paint using a pH neutral poultice or gel or infrared or stripper or steam stripper. Follow manufacturer's instructions and comply with all VOC requirements and Lead Safe Practices.
- G. Properly test all wood after paint removal for pH neutrality. A minimum of 5 random core tests will be requested by the architect during the work, in order to maintain quality control.
- H. All wood and gypsum veneer plaster surfaces are to be sanded smooth and cleaned of all uneven surfaces such as dried paint removal products.
- I. All brick must be free of all paint removal product, previous paint layers and efflorescence.

- J. Protect all exposed wood and metal from moisture by priming immediately.

3.3 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted.
 - 1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning.
 - 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
 - 1. Provide barrier coats over incompatible primers or remove and re-prime.
 - 2. Plaster: Allow new plaster to cure for a minimum of 4 weeks before painting.
 - 3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
 - (a) Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 - (b) Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and backsides of wood, including cabinets, counters, cases, and paneling.
 - 4. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
 - (a) Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 - (b) Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 - (c) Use only thinners approved by paint manufacturer and only within recommended limits.
 - (d) Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.4 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the schedules.
 2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
 3. Provide finish coats that are compatible with primers used.
 4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
 5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 2. Omit primer on metal surfaces that have been shop primed and touchup painted.
 3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.
 - 5.
- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
 2. Rollers: Not permitted without consultation with Architect.
 3. Spray Equipment: Not permitted on site.
 4. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.
 5. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.
 6. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
 7. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.5 FIELD QUALITY CONTROL

- A. The Owner reserves the right to invoke the following test procedure at any time and as often as the Owner deems necessary during the period when paint is being applied.
- B. The Owner will engage the services of an independent testing agency to sample the paint material being used. Samples of material delivered to the Project will be taken, identified, sealed, and certified in the presence of the Contractor.
 - 1. The testing agency will perform appropriate tests for the following characteristics as required by the Owner:
 - a. Quantitative material analysis.
 - b. Abrasion resistance.
 - c. Apparent reflectivity.
 - d. Flexibility.
 - e. Washability.
 - f. Absorption.
 - g. Accelerated weathering.
 - h. Dry opacity.
 - i. Accelerated yellowness.
 - j. Recoating.
 - k. Skinning.
 - l. Color retention.
 - m. Alkali and mildew resistance.
 - 2. The Owner may direct the Contractor to stop painting if test results show material being used does not comply with specified requirements. The Contractor shall remove non-complying paint from the site, pay for testing, and repaint surfaces previously coated with the rejected paint. If necessary, the Contractor may be required to remove rejected paint from previously painted surfaces if, on repainting with specified paint, the 2 coatings are incompatible.

3.6 CLEANING

- A. At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.
 - 1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

3.7 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.
 - 1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1 (Painting and Decorating Contractors of America Standards).

3.8 EXTERIOR PAINT PRODUCTS

A. Exterior Wood; Trim, Beadboard and Doors

1. Prime Coat: Exterior, alkyd wood primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.5 mils.
 - a. Moore: Fresh Start Exterior Wood Primer 094; Or Approved Equal.
 - a. Tint primer for all dark colors, per manufacturer
2. First and Second Coat: High-gloss, exterior, latex enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.4 mils per coat.
 - a. Moore: Ultra Spec Ext Gloss Finish W449; Or Approved Equal.
 - b. Color: Match existing paint color

Note: Finish to match existing trim, adjustments may be required.

E. Exterior Walking Surfaces

1. Prime Coat: Exterior, alkyd wood primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.5 mils.
 - a. Moore: Fresh Start Exterior Wood Primer 094; Or Approved Equal.
 - a. Tint primer for all dark colors, per manufacturer
2. First and Second Coat: Water based solid body deck stain.
 - a. Moore: Woodluxe Exterior Stain Solid (694)
 - a. Mix in final coat sand to create nonslip painted finish.

E. Exterior Masonry & Stucco

1. Prime Coat: Exterior Acrylic High-build Masonry Primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.5 mils.
 - a. Moore: Ultra Spec interior/exterior Acrylic High-build masonry primer 609.
 - b. Tint primer for all dark colors, per manufacturer.
2. First and Second Coat: acrylic low lustre finish applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.5 mils.
 - a. Moore: Aura waterborne exterior paint low lustre finish 634; or approved equal.

3.9 INTERIOR PAINT PRODUCTS

Note: Wood species may require a change in paint product. To be reviewed with Architect.

A. Interior Wood Trim and Doors: Linseed Oil Paint

1. Primer: Brouns Exterior Linseed Oil Paint blended with raw linseed oil and balsam turpentine per manufacturer's instructions for primer coat; or Approved Equal.
2. Finish: 2 coats Brouns Exterior Linseed Oil Paint; or Approved Equal.

B. Interior Wood Trim and Doors: (new & previously coated) Alkyd High Gloss Finish

1. Primer 1 coat Moore Fresh Start Alkyd Primer (032) ; or Approved Equal.
2. Finish: 2 coats Moore Advance Waterborne Interior Alkyd High Gloss Finish (794)
Total DFT not less than 1.3 mils; or Approved Equal.

C. Interior Ceilings: Gypsum/ Veneer Plaster (new & previously coated) Matte Finish

1. Primer: 1 Coat Moore Fresh Start Hiding Primer (046)
2. Finish: 2 Coats Moore Regal Select Matte Finish (548)
Total DFT not less than 1.5 mils

D. Interior Walls: Lime based plaster & Gypsum/ Veneer Plaster (new & previously coated) Eggshell Finish

1. Primer: 1 Coat Moore Fresh Start High Hiding Primer (046); or Approved Equal.
2. Finish: 2 Coats Moore Regal Select Pearl Finish (N549)
Total DFT not less than 1.6 mils; or Approved Equal.

E. Interior Basement Walls: New fully cured stucco and previously painted stucco

1. Masonry Sealer (to be used on new fully cured stucco and bare masonry): Ultra Spec High Build Masonry Primer (N609); or Approved Equal.
2. Primer: Fresh Start High-Hiding All Purpose Primer (046); or Approved Equal.
3. Finish: 2 coats Ultra Spec 500 Interior Eggshell Finish (N38); or Approved Equal.
Total DFT not less than 1.8 mils.

3.10 PAINT FINISH SCHEDULE

EXTERIOR

LOCATION	Material	Paint System	Finish	Color
Exterior clapboard, trim, Window trim and exterior sashes	Wood	Ben Moore	Gloss	Abalone 2108-60
Shutters	Wood	Ben Moore	Gloss	Essex Green HC-188
Porch ceilings	Wood	Ben Moore	Gloss	Provenence Blue 2135-40
Porch floor, steps and other exterior walking surfaces	Wood	Ben Moore	Solid	TBD by Architect.
Wood Lattice	Wood	Ben Moore	Gloss	Pensicola Pink 1184
Brick Piers	Brick	Ben Moore	Low Lustre	Copper Clay 2172-10
Exterior Door Face	Wood	Ben Moore	Gloss	TBD by Architect

INTERIOR

LOCATION	Material	Paint System	Finish	Color
Basement Walls	Stucco/ Masonry	Ben Moore	Eggshell	TBD by Architect
Ceilings*	Plaster or Gypsum vener on drywall	Ben Moore	Matte	OC-57 White Heron
Room 104 – ONLY existing painted trim	Wood	Ben Moore	High Gloss	2135-40 Provence Blue
Room 105 – Walls	Plaster	Ben Moore	Eggshell	920 Honey Harbor
Room 106 - Trim	Wood	Ben Moore	High Gloss	HC-169 Coventry Gray
Room 106 – Walls	Gypsum vener on drywall	Ben Moore	Eggshell	1513 Snow on the Mountain
Room 108 – Walls	Gypsum vener on drywall	Ben Moore	Eggshell	1513 Snow on the Mountain
Room 108B – Walls	Gypsum vener on drywall	Ben Moore	Eggshell	TBD by Architect.
Room 108B – Trim	Wood	Ben Moore	High Gloss	TBD by Architect.
Room 109 – All trim, interior sash and door faces.	Wood	Brouns	Exterior linseed oil paint	#10 Clotted Cream, top with finish coat of oil varnish
Room 109 – Walls	Plaster	Ben Moore	Eggshell	496 Chopped Dill
Room 202 – Walls	Plaster	Ben Moore	Eggshell	TBD by Architect.
Room 202 – Trim	Wood	Ben Moore	High Gloss	TBD by Architect.
Room 203 – Walls	Plaster	Ben Moore	Eggshell	TBD by Architect.
Room 203 – Trim	Wood	Ben Moore	High Gloss	TBD by Architect.
Room 204 – Walls	Plaster	Ben Moore	Eggshell	HC-123 Kennebunkport Green
Room 204 – Trim	Wood	Ben Moore	High Gloss	1513 Snow on the Mountain
Room 205 – Walls	Plaster	Ben Moore	Eggshell	TBD by Architect.
Room 205 – Trim	Wood	Ben Moore	High Gloss	TBD by Architect.
Room 206 – Walls	Plaster	Ben Moore	Eggshell	TBD by Architect.
Room 206 – Trim	Wood	Ben Moore	High Gloss	TBD by Architect.
Interior Doors noted as	Wood	Ben	As Noted in	As Noted in Door

Painted in door schedule		Moore	Door Schedule	Schedule or TBD by Architect if not Noted.
Interior Doors noted as painted with linseed oil paint in door schedule**	Wood	Brouns	N/A	Interior Collection Color #10, Clotted Cream

*Note some ceilings are being wallpapered. See wallpaper specification. Only paint ceilings that will not be papered.

** For doors noted in door schedule as varnished after oil painting, see specification 090634 Wood Floor Restoration for varnish and varnishing information.

LEAD SAFE PRACTICES

- I. *Lead Safe Practices* are safe ways of working with leaded paint. Lead safe practices are used as part of activities when paint will be disturbed as part of the work.
- II. Lead Safe Practices have the following goals:
 1. To minimize dust during construction activity.
 2. To clean the work areas using lead specific cleaning methods.
 3. To keep the painted surfaces of the construction area intact. Intact leaded paint is not a lead hazard.
- III. This section is intended to provide the minimum requirements for lead-safe work practices.
- IV. Prohibited activities. When disturbing paint in the construction area do not:
 1. Dry scrape painted surfaces.
 2. Dry sand painted surfaces.
 3. Use a high temperature heat gun or open flame to remove paint.
 4. Use a grinder to remove paint.
 5. Use painters' masks, as they do not protect one from lead dust.
 6. Power-wash the construction area as this can spread lead paint chips into the surrounding ground area.
 7. Open flame burning.
 8. Power sanding without HEPA dust collection.
 9. Sand blasting.
- V. Lead safe practices require the following:
 1. Wet scraping of paint (use a spray bottle with water to pre-wet the surface).
 2. Wet sand the surface (use a spray bottle with water to pre-wet the surface).
 3. Use plastic sheeting to seal off area outside the construction area.
 4. Use plastic sheeting to seal furnace vents.
 5. Use a standard garden hose to wet down large areas before scraping/sanding.
 6. Use drop cloths to catch paint chips and throw the paint chips in the trash.
 7. Do not let children or pregnant women in the work areas until cleaned.
 8. Use a HEPA filtered vacuum to clean the work area. Due to the requirement to work in wet areas, all electric circuits must be protected by GFCI with integral test buttons.
 9. Maintain all paint not to be disturbed in an intact condition.
 10. Instruct all workers in these lead safe practices.
 11. Limited access to minimize the spread of lead dust by only allowing trained workers and supervisors to enter a work area until it has undergone specialized lead dust cleaning.
 12. Use HEPA filtered sanding/grinding equipment.
 13. Wash work clothes separately from the other clothing.

- VI. Exterior work area protection. Secure a 6 mil. polyethylene sheet to the horizontal ground plane (flooring or grade) 6 ft. minimum out from the work area. At the end of a task mist, remove and dispose of plastic.
- VII. Worker protection. To minimize the potential for worker exposure to lead dust, the following activities are never permitted in any work area:
 1. No eating.
 2. No drinking.
 3. No chewing gum or tobacco.
 4. No smoking.
 5. No applying cosmetics.
- VIII. Conclusion of activity. After completion of lead activities, and removal of containment, the following cleaning procedures must be followed:
 1. Reposition all exterior furnishings. HEPA vacuum all visible surfaces including clothing, furniture, walls, floors, windowsills, window troughs, etc. Wet wipe all surfaces with detergent and rinse. After surface is dry, HEPA vacuum all visible surfaces.

REFER TO THE INFORMATION BELOW FOR IMPORTANT BACKGROUND INFORMATION IN WHY LEAD REQUIRES SPECIAL HANDLING.

Lead is a naturally occurring, heavy, gray metal. When absorbed into the body, lead can have highly toxic effects. Lead exposure affects all the systems in the body. A small amount of lead exposure does more damage to children than adults. Lead can damage a child under 6 years old physically, behaviorally, and mentally. Once a child has been exposed to lead, the effects of exposure cannot be reversed.

Physical damage caused by lead exposure includes, but is not limited to, central nervous system problems, headaches, stomachaches, joint pains, and sleep disorders. Behavioral damage caused by lead exposure includes, but is not limited to, short attention span, irritability, aggressive and violent behavior, and hyperactivity. Mental damage caused by lead exposure includes, but is not limited to, lowered IQ points, lowered reading scores in school, and learning disabilities.

The only way to know if a child has been lead poisoned is to have a blood test performed by your physician. Once a child has been poisoned the damage cannot be reversed, but you can stop further damage from happening.

Lead has been used extensively in the United States for several centuries. As a result lead can be found in paint, soil, water, air and food. The most common way children are exposed to lead is through lead dust. The leaded dust comes from lead-based paint. Lead-based paint becomes a hazard and causes lead dust when the paint is in poor condition, is painted on friction or impact surfaces, and or is disturbed during a renovation.

Lead-based paint chips and dust then mix with household dust and build up in window troughs, on floors, and flat surfaces. Children are put at risk when lead in paint chips and dust gets on their hands and toys, which they may put in their mouths. If paint is kept intact and surfaces are kept clean, children can live safely in a home painted with lead-based paint. Homes built before 1940 have a 98% chance of containing lead-based paint. Homes built before 1960 have a 70% chance of containing lead based paint. Homes built before 1978 have a 20% chance of containing lead-based paint. Homes built after 1978 are unlikely to contain lead-based paint. Homes built before 1950 also used paint that had higher concentrations of lead. Paint kept in good condition that remains undisturbed is not a hazard.

Lead-based paint is usually not a hazard if it is in good condition. Children are most commonly exposed to lead poisoning through lead in household dust caused by lead-based paint in the following situations:

- a. In poorly maintained, older houses, lead-based paint, which may be several layers down, flakes and peels off and creates lead dust. Paint failure is usually caused by moisture problems.
- b. On friction or impact surfaces. For example, windows painted with lead-based paint rub (friction) together when the window is opened and closed, releasing lead dust. When a door painted with lead-based paint closes (impact) on a doorstop, the impact damages the paint and releases lead dust.
- c. On chewable surfaces, such as, windows and windowsills, doors and door frames, stairs railings, banisters, and porches. The lead in the paint gets directly into a child's mouth.

Uncontrolled or uncontained dust and debris from repainting and/or renovation that disturbs lead-based paint in a well-maintained home can also expose children to unsafe lead levels.

Lead-based paint chips and dust then mix with household dust and build up in window troughs, on floors, and flat surfaces. Children are endangered when lead in paint chips and dust gets on their hands and toys, which they may put in their mouths. If paint is kept intact and surfaces are kept clean, children can live safely in a home painted with lead-based paint.

The second most common way that children are exposed to lead is through soil. Soil around the buildings may have old lead-based paint chips from the exterior paint or lead from previous leaded gasoline deposits. Sanding and power washing can cause fine particles of lead-based paint to deposit in the soil. Children then play in the dirt and are at risk of ingesting lead or tracking lead into their homes on their shoes. Exposure can be decreased by covering bare soil with grass, sod, wood chips, concrete, or asphalt, or by making bare soil inaccessible to children.

Additional sources of lead exposure to children include water, parents whose jobs or hobbies expose them to lead, leaded crystal, lead soldered cans, lead glazed ceramics, and some home remedies or foreign cosmetics.

For additional requirements refer to and comply with Steps to Lead Safe Renovation, Repair and Painting. Steps to Lead Safe Renovation, Repair and Painting (January 2025).

END OF SECTION 099113

SECTION 099300 - STAINING AND TRANSPARENT FINISH RESTORATION

PART 1 - GENERAL

2.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section.
- B. Related Sections include the following:
 - 1. Section 013510 – Special Procedures for Historic Treatment
 - 2. Section 060140.91 - Architectural Woodwork Restoration
 - 3. Section 064023 – Interior Architectural Woodwork
 - 4. Section 080314 – Historic Treatment of Wood Doors
 - 5. Section 081433 – Stile and Rail Wood Doors
 - 6. Section 090364 – Wood Floor Restoration & Replacement - for varnish and varnish finishing.
 - 7. Section 099113 – Painting and Lead Safe Practices

2.1 SUMMARY

- A. This section includes:
 - 1. Interior Substrates:
 - a. The surface preparation and the application of wood finishes on new and existing finish carpentry, including but not limited to wood flooring, trim, beadboard, doors and window sashes.

2.1 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
- B. Historic Transparent Finish Materials: Transparent finish materials formulated to match historic formulations; either custom-formulated products or standard products available from manufacturers of transparent historic finishes.

2.1 SUBMITTALS

- A. Product Data: For each finish system indicated.
 - 1. Material List: An inclusive list of required coating materials. Identify each material by manufacturer's number and classification.
 - 2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.
- B. Samples for Verification: For each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate.
 - 1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
 - 2. Provide a list of materials and applications for each coat of each Sample. Label each Sample for location and application.

3. Submit sample on the following substrates for Architect's review of color and texture:
 - a. Stained wood: 4-by 8-inch Samples for each color and material on the same species of wood to receive the transparent finish. Submit samples for each wood species to be stained.
- C. Qualification Data: For restoration specialists including field supervisors and technicians.
- D. Restoration program: For each phase of restoration process, provide detailed description of materials, methods, equipment, and sequence of operations to be used. For each phase of restoration work including protection of surrounding materials on building and Project site.
 1. If materials and methods other than those indicated are proposed for any phase of restoration work, provide a written description, including evidence of successful use on comparable projects, and a testing program to demonstrate their effectiveness for this Project.

2.1 QUALITY ASSURANCE

- A. Transparent Finishes Specialist Qualifications: A firm or individual experienced in wood stain application similar in material, design, historic nature, and extent to that is indicated for this Project, whose work has resulted in applications with a record of successful in-service performance for a minimum of 10 years.
 1. Field Supervision: Require that an experienced full-time supervisor be at Project site during times that painting, and finish restoration is in progress.
- B. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample for each type of coating and substrate required. Comply with procedures specified in PDCA (Paints and Decorator Contractors of America Standards) P5. Duplicate finish of approved sample submittals.
 1. Architect will select one surface to represent surfaces and conditions for application of each type of coating and substrate.
 - a. Architect will designate items or areas required for mock-ups.
 2. Final approval of colors will be from benchmark samples.
 3. If preliminary stain color selections are not accepted, apply additional benchmark samples of additional stain colors selected by Architect at no added cost to Owner.
- C. MPI Standards:
 1. Products: Complying with MPI (Master Painters Institute) standards indicated and listed in its "MPI Approved Products List."
 2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and finish systems indicated.
 3. Final acceptance of stain color selections will be based on benchmark samples.

2.1 EXTRA MATERIALS

- 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 Owner with an additional 3 percent, but not less than 1 gal. or 1 case, as appropriate, of each material and color applied.

2.1 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and the following information:
 - 1. Product name or title of material.
 - 2. Product description (generic classification or binder type).
 - 3. Manufacturer's stock number and date of manufacture.
 - 4. Contents by volume, for pigment and vehicle constituents.
 - 5. Thinning instructions.
 - 6. Application instructions.
 - 7. Color name and number.
 - 8. VOC content.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain storage containers in a clean condition, free of foreign materials and residue.
 - 1. Keep storage area neat and orderly. Remove oily rags and waste from site at least daily. Store and dispose of oily rags or waste soaked in solvents and products related to transparent finishes in the manner proscribed by local regulations.

2.1 PROJECT CONDITIONS

- A. Do not apply with high humidity.
- B. Apply waterborne finishes only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F.
- C. Apply solvent-thinned finishes only when temperatures of surfaces to be coated and surrounding air are between 45 and 95 deg F.
- D. Do not apply coating in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
 - 1. Coating may continue during inclement weather if surfaces and areas to be coated are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

2.1 SEQUENCING AND SCHEDULING

- A. Order materials at earliest possible date, to avoid delaying completion of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS - GENERAL

- A. Compatibility: Provide materials that are compatible with one another, and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in the other Part 2 articles and stain schedule.
- B. Products: Subject to compliance with requirements, provide one of the products in the other Part 2 articles and/or paint schedule.
- C. Manufactures Names: The following manufacturers are referred to in the paint schedules by use of shortened versions of their names, which are shown in parentheses:
 - 1. (Brouns), manufactured by Brouns & Co.
 - 2. Or approved equal.

2.1 MIXING AND TINTING

- A. Agitate all finishes prior to and during application to ensure uniform color, gloss, and consistency.
- B. Thinner addition shall not exceed manufacturer's printed recommendations. Do not use organic solvents to thin stain without the manufacturer's written recommendation.

2.1 OIL BASED STAIN

- 1. Stain: Linseed oil wood stain interior
- 2. Manufacturer: Brouns & Co., Unit 1, Bypass Park Estate, Sherburn in Elmet, Leeds, England LS25 6EP, Tel +44 (0)1423 500 694, www.linseedpaint.com; or Approved Equal.

2.1 MISCELLANEOUS MATERIALS

- A. Lint free rags
- B. Clean unused brushes
- C. Sandpaper
- D. Filter papers
- E. Funnel
- F. Water for storage of used rags

PART 3 - EXECUTION

2.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared. This includes the full removal of paint and coatings from existing woodwork. See specification 099113 for removal of existing coatings.

- B. Ensure that surfaces to receive finishes are dry immediately prior to application.
- C. Ensure that moisture-retaining substrates to receive finishes have moisture content within tolerances allowed by coating manufacturer. Where exceeding the following values, promptly notify Architect and obtain direction before beginning work.
 1. Interior Wood: 15 percent.
 2. Interior Finish Detail Woodwork, such as Trim, and Casework: 10 percent.
- D. Examine surfaces to receive coatings for surface imperfections and contaminants that could impair performance or appearance of coatings, including but not limited to, old paint or coatings, loose primer, oil, grease, mildew, algae, or fungus, stains or marks, cracks, indentations, or abrasions.
- E. Correct conditions that could impair performance or appearance of coatings in accordance with specified surface preparation procedures before proceeding with coating application.
- F. Examine existing historic wood finishes to be matched.

2.1 PREPARATION - GENERAL

- A. Sand and clean surfaces thoroughly prior to coating application. Clean with tack cloth prior to finish application.
- B. Do not start work until surfaces to be finished are in proper condition to produce finished surfaces of uniform, satisfactory appearance.
- C. Stains and Marks: Remove completely, if possible, using materials and methods recommended by coating manufacturer; cover stains and marks which cannot be completely removed with isolating primer or sealer recommended by coating manufacturer to prevent bleed-through.
- D. Remove Mildew, Algae, and Fungus using materials and methods recommended by coating manufacturer.
- E. Remove dust and loose particulate matter from surfaces to receive coatings immediately prior to coating application.
- F. Remove or protect adjacent hardware, electrical equipment plates, mechanical grilles and louvers, lighting fixture trim, and other items not indicated to receive coatings.
- G. Move or protect equipment and fixtures adjacent to surfaces indicated to receive coatings to allow application of coatings.
- H. Protect adjacent surfaces not indicated to receive coatings.
- I. Prepare surfaces in accordance with manufacturer's instructions for specified coatings and indicated materials, using only methods and materials recommended by coating manufacturer.

2.1 APPLICATION - GENERAL

- A. Apply in uniform coating thickness in accordance with manufacturer's instructions, not exceeding manufacturer's specified maximum spread rate for indicated surface; thins, brush marks, roller marks, orange-peel, or other application imperfections are not permitted.

- B. Inspect each coat before applying next coat; touch-up surface imperfections with coating material, feathering, and sanding if required; touch-up areas to achieve flat, uniform surface without surface defects visible from 5 feet (1.5 m).
- C. Remove dust and other foreign materials from substrate immediately prior to applying each coat.
- D. Where application abuts other materials or other coating color, terminate coating with a clean sharp termination line without coating overlap.
- E. Re-prepare and re-coat unsatisfactory finishes; refinish entire area to corners or other natural terminations.

2.1 STAINING

- A. Sand wood to be stained using 120 grit sandpaper in direction of the wood grain and remove sanding dust.
- B. Clean with a tack cloth.
- C. Apply oil stain uniformly per manufacturer's instructions.
- D. Allow oil to dwell for time specified by the manufacturer. Then wipe the oil away with lint free cloth such as T-shirt fabric.
- E. Polish the surface of the wood using lint free cloth such as T-shirt fabric until desired sheen is reached. Surface must be fully polished and "dry" within 60 minutes.
- F. Allow stained item to cure in well ventilated room per manufacturer's instructions. Allow 2-3 days for drying. For surfaces to be used such as floors allow 10-14 days for full hardening.
- G. For surfaces receiving more than one coat, allow surface to dry for 48 hours. Lightly sand before reapplication of oil. Follow manufacturer's instructions for second coat dwell time.

2.1 CLEANING

- A. Rags, steel wool and all other waste soaked in transparent finish products and sanding residue may spontaneously catch fire if improperly discarded. Immediately remove from site and discard in accordance with local regulations immediately after use.
- B. Clean excess coating materials, and coating materials deposited on surfaces not indicated to receive coatings, as construction activities of this section progress; do not allow to dry.
- C. Re-install hardware, electrical equipment plates, mechanical grilles and louvers, lighting fixture trim, and other items that have been removed to protect from contact with coatings.
- D. Reconnect equipment adjacent to surfaces indicated to receive coatings.
- E. Relocate to original position equipment and fixtures that have been moved to allow application of coatings.
- F. Remove protective materials.

2.1 PROTECTION

- A. Protect completed coating applications from damage by subsequent construction activities.
- B. Repair to Architect's accepted coatings damaged by subsequent construction activities. Where repairs cannot be made to Architect's acceptance, re-apply finish coating to nearest adjacent change of surface plane, in both horizontal and vertical directions.

2.1 TRANSPARENT FINISH SYSTEMS

- A. Provide the following finish systems based on submitted finish investigation and accepted mock-ups:
- B. Linseed Oil Based Stain
 - 1. Manufacturer: Brouns & Co.; or Approved Equal.
 - 2. Match existing gloss, color and depth of item listed below
 - a. Linseed oil wood stain interior

Note: manufacturer's colors and number of coats will be based on accepted mock-ups.

Location	Material	Assumed # of Coats	Finish	Color
Floors	Wood	2	To match surrounding floorboards.	To match similar nearby floorboards. Maintain existing color pattern.
Doors noted as stained in door schedule	Wood	2	To match newel post in Room 101.	To match Munsell # 7.5 YR 3/6, similar to the newel post in Room 101.
Butler's Pantry cabinet, Room 105	Wood	2	To match newel post in Room 101.	Stain a strong brown (7.5 YR 3/6), Follow with a strong brown oil varnish (7.5 YR 4/6)
All other trim including stairs, balustrades and paneling in Rooms 101, 102, 105 and 201.	Wood	1	To match newel post in Room 101.	To match Munsell # 7.5 YR 3/6, similar to the newel post in Room 101.
Beadboard on third floor	Wood	1	Match surrounding woodwork	Match surrounding woodwork.

END OF SECTION 099300

SECTION 144216 - VERTICAL WHEELCHAIR LIFTS

PART 1 - GENERAL

1.1 SECTION INCLUDES:

- A. SL – Shaftway Lift

1.2 RELATED SECTIONS:

- A. Section 033000 - Cast-in-Place Concrete: Concrete shaftway and anchor placement.
- B. Section 042000 – Unit Masonry: Masonry shaftway and anchor placement.
- C. Section 061000 - Rough Carpentry: Blocking in framed construction for lift attachment.
- D. Section 092116 - Gypsum Wallboard Assemblies: Gypsum shaft walls.
- E. Section 260000 – Electrical: Dedicated telephone service and wiring connections, lighting, and wiring connections at top of shaft, Electrical power service and wiring connections.

1.3 REFERENCES:

- A. American Society of Mechanical Engineers (ASME) A18.1 – Safety Standard for Platform Lifts and Stairway Chairlifts
- B. American Society of Mechanical Engineers (ASME) A17.1 – Safety Code for Elevators and Escalators
- C. American Society of Mechanical Engineers (ASME) A17.5 – Elevator and Escalator Safety Equipment
- D. American National Standards Institute (ANSI) A117.1 – Accessible and Usable Buildings and Facilities
- E. National Fire Protection Agency (NFPA) – NFPA 70 – National Electrical Code
- F. ANSI/BHMA A156.19-2002 American National Standard for Power Assist & Low-Energy Power Operated Doors.
- G. UL 325 – Standard for Door, Drapery, Gate, Louver and Window Operators and Systems.

1.4 SUBMITTALS:

- A. Submit under provisions of Section 01 30 00 – Administrative Requirements.
- B. Product Data:
 - 1. Submit manufacturer’s installation instructions including preparation and equipment handling requirements.
 - 2. Show maximum and average power requirements.
- C. Drawings shall include:
 - 1. Typical details of assembly, erection, and anchorage.
 - 2. Wiring diagrams for power, control, and signal systems.
 - 3. Complete layout with location of equipment.
- D. Manufacturer’s Certificates must certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE:

- A. Manufacturer: Company shall contain personnel with not less than ten (10) years of experience in the design and fabrication of vertical wheelchair lifts.

- B. Technical Services: Manufacturer and authorized dealer shall work with architects, engineers and contractors to adapt the vertical wheelchair lift to the design and structural requirements of the building, site, and code requirements.
- C. Unit must be assembled and tested in factory before shipment. Vertical Wheelchair Lift equipment shall meet or exceed the National and Local standards.
- D. All load ratings and safety factors shall meet or exceed those specified by all governing agencies with jurisdiction and shall be certified by a professional engineer.
- E. Installer Qualifications: Factory trained and licensed to install equipment of this scope, with evidence of experience with specified equipment. Installing company shall have qualified people available to ensure fulfillment of maintenance and callback service.

1.6 REGULATORY REQUIREMENTS

- A. Provide Vertical Wheelchair Lift complying with:
 1. American Society of Mechanical Engineers (ASME) A18.1 – Safety Standard for Platform Lifts and Stairway Chairlifts
 2. American Society of Mechanical Engineers (ASME) A17.1 – Safety Code for Elevators and Escalators
 3. American Society of Mechanical Engineers (ASME) A17.5 – Elevator and Escalator Safety Equipment

1.7 DELIVERY, STORAGE, AND HANDLING:

- A. Products to be stored in manufacturers unopened packaging until ready for installation.
- B. Components stored off the ground in a dry covered space, protected from weather conditions.

1.8 PROJECT CONDITIONS:

- A. Vertical Wheelchair Lift shall not be used for hoisting materials or personnel during construction.

1.9 WARRANTY:

- A. Unit shall have a FOUR (4) year limited parts warranty covering replacement of defective parts of the basic unit, including all electrical and drive system components, at no cost. Labor costs required to replace parts is not included. Preventative maintenance agreement required.

1.10 MAINTENANCE

- A. Maintenance of the vertical wheelchair lift unit shall consist of regular cleaning, inspection, and adjustment of the unit at intervals not longer than every six (6) months. Rule 10.2.1 of ASME A18.1 requires all Vertical Wheelchair Lifts to be inspected every six (6) months. Provide maintenance contract for the following years:
 1. 4 years.

PART 2 - PRODUCT

2.1 MANUFACTURER:

- A. Acceptable Manufacturer: Symmetry Elevating Solutions
Email: customerservice@symmetryelevator.com

Toll Free: 877-568-5804

Website: www.symmetryelevators.com

Contact: Clinton Cox, Total Access, 610-331-4601

- B. U.S. OWNED AND OPERATED: Manufacturer must be a registered U.S. owned company with manufacturing operations located in the United States of America – America Owned, American Operated.
- C. Basis of Design.

2.2 SHAFTWAY VERTICAL WHEELCHAIR LIFT:

- A. General Description: The Shaftway vertical platform lift (wheelchair lift) is installed in a shaftway or hoistway built by others. The lift platform and drive tower are located within the shaftway, while each landing consists of a door or gate, integral to the operation of the lift. At the uppermost landing, the shaftway can extend all the way to the ceiling or to a minimum of 42 inches beyond the upper landing, for a more “open inches application.
- B. Capacity:
 - 1. 750 lbs.
- C. Lifting Height
 - 1. Model SL-42, 45 inches maximum lift height.
- D. Clear Platform Size:
 - 1. 36 inches W x 48 inches D
- E. Platform Configuration:
 - 1. Straight Through.
- F. Lower Door/Gate Construction:
 - 1. Solid wood frame shall be provided for flush mount application, 36” x 80” Door slab by others. Frame shall include lock plate cover and electric interlock.
 - a. Opening / Closing Mechanism
 - 1) Delayed Action Closer
- G. Upper Door/Gate Construction:
 - 1. Solid wood frame shall be provided for flush mount application, 36” x 42” Gate slab by others. Frame shall include lock plate cover and electric interlock.
 - 2. Opening / Closing Mechanism
 - a. Self Closing Hinges
- H. Drive System
 - 1. Standard Acme Screw Drive:
 - a. Travel speed: 10 fpm.
 - b. Motor: 1 ½ HP, 115 volt, 1 phase.
 - c. Power Supply:
 - d. 115 VAC, 25 Amp, Single Phase.
 - e. The drive mechanism shall be a stationary nut on a rotating 1 inches diameter Acme screw with a secondary safety nut.
- I. Lift Components:
 - 1. Symmetry Elevating Solutions PLC Controller with self diagnostics and digital display. A.W.A.R.E. Diagnostic System (Active Wiring, Accessories, Relay & Electronics) generates on-demand diagnostic codes identifying trouble codes.
 - 2. The Drive Tower support shall be a combination 7 gauge C Channel, 7 gauge interface plates and 16 gauge exterior skin.
 - 3. Platform shall be constructed of 12-gauge minimum hot rolled steel. If unit is not installed in a 3-inch pit, an auto-retracting ramp, or stationary ramp, shall be provided that extends to meet lower landing.

4. Platform side panels shall be 42 inches high, side panel framework shall be a minimum of 1 inch x 1 ½ inch steel. Solid infill panels shall be a minimum of 18 gauge steel.
 5. Carriage platform supports shall be a minimum of ½ inch steel
 6. Nonmetallic rollers shall be used for axial carriage guidance and wear pads shall be used for horizontal stability.
 7. Loaded fasteners shall be grade eight or higher. Locking fasteners shall be used in all critical locations.
- J. Platform Base & Frame Installation:
1. Pit Mount: (recess application) Level pit floor slab recessed a minimum 3 inches by others as outlined on site specific drawings. This application does not require ramp and allows for smooth transition from landing into lifting equipment.
- K. Platform Controls:
1. Constant pressure up/down control switches shall be installed on the platform. All switches meet IP66 requirements.
 2. An illuminated emergency stop switch shall be provided on the platform controls with an audible alarm as a means of signaling for assistance in the event of an emergency.
 3. Operation Type:
 - a. Keyless operation.
 4. Emergency Telephone:
 - a. Platform shall be equipped with a telephone meeting the following requirements:
 - 1) ADA compliant.
 - 2) Shall be operational in the event of power failure.
 - 3) Specified under Division 16 a telephone line shall be supplied to the lift.
- L. Landing Controls:
1. Constant pressure up/down control switch installed at each landing.
 2. Constant pressure, elevator-style, control switches provided at each landing.
 3. Operation Type:
 - a. Keyless operation.
 - b. Keyed operation.
 4. Landing Station Mounting:
 - a. Lower Landing Station:
 - 1) Surface Mount – Keyed operation
 - b. Upper Landing Station:
 - 1) Flush Mount – Keyless operation
- M. Safety Features/Devices:
1. Grounded electrical system with upper and lower limit switches.
 2. Upper final limit switch (Standard and Accelerated Acme Screw Drive).
 3. A grab rail shall be provided on the platform.
 4. A gate with a minimum height of 42 inches and a combination mechanical lock with an electric contact shall be provided at the upper landing, the gate must be closed for the lift to move away from landing.
 5. At all landings, electromechanical interlocks shall be used to keep doors closed when lift is on another floor.
 6. Electrical disconnect which will shut off power to the lift.
 7. Pit stop switch mounted on Drive Tower.
- N. Finishes:
1. Finish shall be powder coating, oven baked.
 2. Color:
 - a. A selection from 213 RAL colors.

PART 3 - EXECUTION

3.1 ACCEPTABLE INSTALLERS:

- A. Subcontractor Qualifications: A company that is listed as an authorized installer by the manufacturer.
- B. Electrical devices, service and final connections shall be by a qualified electrician.

3.2 EXAMINATION:

- A. Preliminary work must be properly prepared, including hoistway construction (if needed), landings and machine space, before installation.
- B. Verify hoistway shaft (if needed) and machine space are the correct size and within acceptance.
- C. Verify required landings and openings are the correct size and within acceptance.
- D. When required verify machine room is provided with lighting, light switch, outlets and meets the clear space requirements of ASME A18.1.
- E. Verify electrical power is available and of within acceptance.
- F. Notify Architect of any inadequate preparation when preliminary work is the responsibility of another installer.

3.3 PREPARATION:

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces and unit using the methods recommended by the manufacturer for achieving the optimum performance of vertical wheelchair lift.

3.4 INSTALLATION:

- A. Unit shall be installed and operated in accordance with the ICC/A117.1, NEC and ASME A18.1 Guidelines.
- B. A dedicated electrical supply provided to the disconnect shall be capable of supplying sufficient power.
- C. GC to coordinate "work by others inches with lift contractor.
- D. The installation of the vertical wheelchair lift shall be made in accordance with approved plans and specifications and the manufacturer's installation instructions.
- E. Startup and test unit in accordance with manufacturer's instructions.
- F. Adjust for smooth operation.

3.5 FIELD QUALITY CONTROL:

- A. Perform tests in compliance with ASME 17.1 or A18.1 and as required by authorities having jurisdiction.
- B. Load the vertical lift to rated capacity and test for several cycles to insure proper operation. No mechanical failures shall occur and no wear that would affect the reliability of the unit shall be detected.
- C. Schedule necessary tests with Architect, Owner, Contractor, and any authorities having jurisdiction.

3.6 PROTECTION:

- A. Protect installed products until completion of project.

- B. Touch-up, repair or replace damaged products before Substantial Completion.
- C. Clean unit prior to final inspection.

END OF SECTION

SECTION 220000 – PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 GENERAL REQUIREMENTS

- A. All work included under this section shall be performed in accordance with the requirements of the Contract Documents and the New Jersey Uniform Construction Code.
- B. With the submission of his Bid, Contractor shall give written notice to the Owner of any materials or apparatus believed inadequate or unsuitable, in violation of laws, ordinances, rules or regulations of Authorities having jurisdiction, and any necessary items of work omitted. In the absence of such written notice, it is mutually agreed that the Contractor has included the cost of all required items in his Proposal for a complete project.
- C. Contractor shall acknowledge that he has examined the Plans, Specifications and Site, and that from his own investigations he has satisfied himself as to the nature and location of the work; the general and local conditions, particularly those bearing upon transportation, disposal, handling, and storage of materials; availability of labor, water, electric power, roads and uncertainties of weather; the conformation and condition of the ground; the character, quality and quantity of surface and subsurface materials to be encountered; the character of equipment and facilities needed preliminary to and during the execution of the work; all federal, state, county, township, and municipal laws, ordinances and regulations particularly those relating to employment of labor, rates of wages, and construction methods; and all other matters which can in any way affect the work or the cost thereof under this Contract. Any failure by the Contractor to acquaint himself with the available information concerning these conditions will not relieve him from the responsibility for estimating properly the difficulty or cost of successfully performing the work.
- D. Contractor shall be responsible for examination of specification and drawings in their entirety. Any general condition and/or special conditions within specification or on all drawings, pertaining to the plumbing contract, shall be reflected and included in the plumbing contractor's proposal.
- E. All work shall be installed in accordance with 2021 National Standard Plumbing Code, New Jersey Uniform Construction Code, 2021 International Building Code NJ Edition, and 2021 International Fuel Gas Code.
- F. Contractor shall perform all excavation and backfill relating to his or her work. Contractor shall return all areas to existing conditions.
- G. Provide proper flashing, curbs, etc. for roof penetration.
- H. Run piping parallel and perpendicular to construction. Run between joists or otherwise concealed in all occupied spaces.

- I. Contractor shall be responsible for visiting site prior to bidding to acquaint himself with existing conditions relating to services, systems, site and building. The submission of a proposal will be construed as evidence that such an examination has been made and later claims for labor, equipment or material required for difficulties, which could have been foreseen and such an examination been made, will not be recognized.
- J. All plumbing Drawings of Division 22 are schematic and diagrammatic.
1. Symbols and diagrams are used to indicate the various items of work and the complete systems, but they do not necessarily have dimensional significance, neither do they necessarily include all related and subsidiary parts and equipment.
 2. The work is to be installed complete and ready for operation in conformity with the intent expressed on the Drawings and in the Specifications.
 3. Coordinate work with the requirements of the Architectural and Structural drawings for dimensions, locations and clearances.
 4. Locations of mechanical and electrical items which are exposed to view shall be taken from the Architectural Drawings where possible, or are to be located as directed by the Architect.
 5. Required relocation of components or modifications of size or routing shall be provided by the contractor at no additional expense.
- K. The entire Plumbing installation shall be fully guaranteed for a period of one year. Provide a one-year maintenance contract for all plumbing equipment and systems.
- L. Instruct Owners representatives on operation and maintenance of equipment. Submit three (3) copies of operating and maintenance manuals. Prepare record documents indicating as-built conditions. Include the following:
1. 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., valves and strainers, etc.). Indicate actual inverts and horizontal locations of underground piping.
 2. Concealed equipment locations dimensioned from prominent building lines.
 3. Approved substitutions, Contract Modifications, and actual equipment and materials installed.
 4. Record drawings shall be prepared at the scale of the design drawings and shall be stamped "As-Built".
- M. The Contractor shall give all necessary notices, obtain all permits and pay all government sales taxes, fees, and other costs, in connection with his work. However, all utility connections, extensions, and tap fees for water, storm, sewer, gas, telephone, and electricity shall be paid directly to utility companies and/or agencies by the Owner, unless otherwise indicated. The Contractor shall file all necessary plans, prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction, obtain all required certificates of inspection before work and deliver same to the Owners Representative before request for acceptance and final payment for the work.
- N. All materials and apparatus shall be new, of first-class quality, except where items are specifically stated in the contract documents to be reused.

- O. Motors and all equipment shall meet the efficiency requirements of ASHRAE 90.1.
- P. Provide manufacturers engraved metal nameplate for all items of equipment. Provide manufactured preprinted markers for piping, identifying system function.
- Q. Maintain indicated fire rating of walls, partitions, ceilings and floors at pipe penetrations. Seal with firestopping materials.
- R. Arrange for all openings, chases, temporary removals, etc. needed to allow installation of all equipment into the building. It is the contractor's responsibility to ensure that materials can be brought into the building, that chases and openings of sufficient size are made available and that all necessary rigging, lifting machinery, etc. be provided.
- S. Provide concrete housekeeping pads under all plumbing equipment. Pads shall be four inches thick. Construct concrete bases of dimensions as needed to support new equipment, but not less than six inches larger in both directions than supported unit. Follow supported equipment manufacturer's setting templates for anchor bolt and tie locations. Use 3000-psi , 28-day compressive-strength concrete and reinforcement.

1.3 WORK INCLUDED:

- A. The Contractor shall furnish all labor, materials, equipment, appliances, tools and accessories required for providing, installing, connecting, and testing the complete plumbing systems and associated equipment, in accordance with these specifications and the applicable drawings. All items to be new and free from defects. The work shall include, but not be limited to, the following:
 - 1. Sanitary Sewer Service.
 - 2. Domestic Water Service.
 - 3. Hot and Cold-Water Piping System.
 - 4. Sanitary Waste and Vent System.
 - 5. Gas Piping System.
 - 6. Plumbing Fixtures.
 - 7. Insulation.
 - 8. Individual Specialties and Special Systems.
 - 9. Equipment, Water Heater, Sump Pumps, Etc.
 - 10. Inspection, Testing and Cleaning.

1.4 SUBMITTALS

- A. Prepare coordination drawings in CAD format to a 1/4-inch equals 1-foot (1:48) scale or larger. Detail major elements, components, and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Show space requirements for installation and access. Show where sequence and coordination of installations are important to the efficient flow of the Work. Include the following:
 - 1. Proposed locations of piping, ductwork, equipment, and materials. Include the following:

- a. Planned piping layout, including valve and specialty locations. All piping shall be shown including that for HVAC, plumbing, and conduit for electrical systems.
 - b. Planned duct systems layout, including elbow radii and duct accessories.
 - c. Clearances for installing and maintaining insulation.
 - d. Clearances for servicing and maintaining equipment, including space for equipment disassembly required for periodic maintenance and required clearances for line voltage electrical equipment.
 - e. Equipment service connections and support details.
 - f. Exterior wall and roof penetrations.
 - g. Elevations above finished floor of all components including elevation of new and existing structure where such structure affects the height of installed components.
 - h. Prepare reflected ceiling plans to coordinate and integrate installations, air outlets and other ceiling-mounted items.
2. Coordination drawings shall be produced in the following sequence:
- a. Sheet metal plans with all structure and bottom of duct elevations indicated.
 - b. HVAC and plumbing piping with elevations of bottom of piping. Pay special attention to piping having required pitch.
 - c. Electrical conduits, including tel/data which may affect architectural items.
 - d. All ducts, piping, conduit, etc. shall be laid out to allow a clear path of travel in all areas to all items requiring service.
 - e. Ceiling grid and lights with actual ceiling elevations indicated. All locations where ceiling elevations shown on architectural drawings cannot be met shall be indicated.
 - f. Attend coordination meetings as necessary and modify coordination drawings as needed to enable all systems to be installed as per the design intent.
 - g. If, through their best efforts, contractors cannot resolve coordination issues, all necessary information shall be indicated for resolution by the Architect/Engineer.
3. Submit equipment and materials shop drawings for the following:
- a. Plumbing Fixtures
 - b. Water Heaters

- c. Pumps
 - d. Piping Materials
 - e. Valves and accessories.
 - f. Insulation
4. Include material specifications, operating characteristics, agency listings, etc. for all equipment indicated. Do not install any piping, conduits, or ductwork in any area prior to obtaining approval of its layout by means of shop drawings. Do not purchase any equipment prior to its acceptance by means of shop drawings. Follow the procedures specified in Division 1 Section SUBMITTALS.
 5. Substitutions: Substitutions for specified equipment may be allowed if the Engineer determines that such item is of equal or better quality. Contractor shall be responsible for any additional costs incurred by himself or other contractors resulting from the substitution. Contractor shall also make all necessary changes in shop drawings necessary to accommodate the substitution.

PART 2 - PRODUCTS

2.1 HANGERS AND SUPPORTS

- A. Provide all hangers and supports required for the support of various systems. All piping shall be supported from the building structure by means of approved hangers. Provide all supplemental steel where necessary to meet support or spacing requirements. Bands or rings supporting copper tubing shall be heavily copper plated or of solid brass or copper construction. Comply with MSS SP-69 and MSS SP-89.
- B. Attach to side of joist for support of piping and ductwork. Do not support piping from ductwork or vice versa.
- C. Horizontal piping shall be hung with adjustable wrought iron or malleable iron pipe hangers, spaced as follows:

<u>Pipe Size</u>	<u>Copper</u>	<u>HublessPlastic</u>		<u>Steel</u>	<u>Rod Size</u>
		<u>Cast Iron</u>	<u>Pipe</u>		
Up to 1-1/4"	6 ft.	8 ft.	4 ft.	7 ft.	3/8"
1-1/2" - 2"	8 ft.	10 ft.	4 ft.	10 ft.	3/8"
2-1/2" - 4"	10 ft.	10 ft.	4 ft.	12 ft.	1/2"

1. Hangers and supports by Grinnel, Crane or approved equal.
2. Provide factory fabricated flashings for all roof penetrations by piping. Flashings shall be similar to S.B.C. Industries Model P/S. Follow manufacturers instructions for installation. Arrange with roofing contractor for all roof penetrations so as to maintain roofing warranty.

Composite shall include insulation, jacketing and adhesive used to secure jacketing or facing. All accessory items such as PVC jacketing and fittings, adhesive mastic cement, tape and cloth shall have the same component ratings as specified above. These requirements apply to all insulation including, but not limited to, piping, ductwork, and all mechanical equipment requiring insulation. Insulation shall conform in all respects to NFPA 90A.

7. All insulation shall be by Owens-Corning, Johns-Manville, Knauf or approved equal.

B. Water Piping:

1. Material shall be heavy density fiberglass pipe insulation with all service jacket (ASJ) or all service jacket and self-sealing lap (ASJ/SSL).
2. All ends shall be firmly butted and secured with ASJ or SSL butt strips of a minimum 3" wide. ASJ jacket laps and butt strips shall be secured with outward clinch staples at a 4" spacing, or by use of a suitable lap adhesive.
3. All fittings and valves shall be insulated with preformed fiberglass fittings. Insulation shall be of equal thickness to the adjacent pipe insulation.
4. Piping and equipment insulation shall be as follows:

INTERIOR DOMESTIC COLD WATER AND STORM WATER

<u>PIPE SIZES (NPS)</u>	<u>MATERIALS</u>	<u>THICKNESS IN INCHES</u>	<u>VAPOR BARRIER REQ'D</u>	<u>FIELD-APPLIED JACKET</u>
All	GLASS FIBER	1/2	YES	NONE

INTERIOR DOMESTIC HOT WATER HOT WATER

<u>PIPE SIZES (NPS)</u>	<u>MATERIALS</u>	<u>THICKNESS IN INCHES</u>	<u>VAPOR BARRIER REQ'D</u>	<u>FIELD-APPLIED JACKET</u>
ALL	GLASS FIBER	1	NO	NONE

2.5 PLUMBING PIPING

A. Sanitary and Vent Piping:

1. Hub-less cast iron pipe with neoprene sleeve and stainless steel housing and clamp, for above ground installation.
2. Schedule 40 PVC, DWV pipe and fittings for below ground installation.

B. Water Piping:

1. Type K copper piping for buried piping.
2. Type L copper for above ground installation with solder fittings.

A. Gas Piping:

Above Ground

- a. Schedule 40 black steel pipe with malleable iron threaded fittings for above ground.

2. Underground

- a. PE Pipe: ASTM D 2513, SDR 11.
- b. PE Fittings: ASTM D 2683, socket-fusion type or ASTM D 3261, butt-fusion type with dimensions matching PE pipe.
- c. PE Transition Fittings: Factory-fabricated fittings with PE pipe complying with ASTM D 2513, SDR 11; and steel pipe complying with ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
- d. Anodeless Service-Line Risers: Factory fabricated and leak tested.
 - 1) Underground Portion: PE pipe complying with ASTM D 2513, SDR 11 inlet.
 - 2) Casing: Steel pipe complying with ASTM A 53/A 53M, Schedule 40, black steel, Type E or S, Grade B, with corrosion-protective coating covering. [Vent casing aboveground.]
 - 3) Aboveground Portion: PE transition fitting.
 - 4) Outlet shall be threaded or flanged or suitable for welded connection.
 - 5) Tracer wire connection.
 - 6) Ultraviolet shield.
 - 7) Stake supports with factory finish to match steel pipe casing or carrier pipe.

C. Floor Cleanout: Cast iron cleanout with round, adjustable, scoriated, secured nickel bronze top. Closure plus an outlet to match piping served, and vandalproof screws.

D. Water Hammer Arresters: Stainless steel, bellows type shock absorbing devices sized as per manufacturers recommendations. Provide access doors when installed in non-accessible space.

E. Wall Hydrants: Frost-proof hydrant furnished with bronze box, chrome plated face, bronze hydrant and hose connection with integral vacuum breaker. Provide six (6) tee handles to Owner.

F. Pipe Sleeves: Install pipe sleeves at all piping penetrations through foundation walls and floors. Use cast iron pipe sleeves below grade. Caulk pipe sleeves at exterior walls.

G. Access Door: Install access doors at location of valves, water hammer arresters, etc. requiring service or replacement in all areas not readily accessible.

H. Hangers and Supports: All piping shall be supported from construction by hangers or supports. Provide wrought iron rods of required length to give proper alignment, allow for expansion and

contraction, and be adjustable. Copper pipe to have copper coated hangers. Hangers and supports by Grinnel, Crane, or approved equal.

- I. Miscellaneous Specialties: Provide all specialties and special equipment to make a complete plumbing system as called for on the drawings and in specifications including, but not limited to; escutcheon plates, drip pans, strainers, T&P relief valves, blending valves, balancing valves, gauges, thermometers, expansion joints, etc.
- J. Floor Drain: Cast iron body with flashing collar, nickel bronze top, and sediment bucket.

2.6 PLUMBING FIXTURES

- A. Furnish, set and connect all plumbing fixtures including all necessary brackets, supports, hangers and chrome plated exposed work and fittings. Fixtures and trim shall be as specified below.

2.7 WATER HEATERS

- A. Install water heaters in accordance with manufacturers installation requirements and instructions. Provide all valves, unions, thermometers and accessories. Start-up, test, adjust and calibrate controls on all heaters. Heater shall be as indicated on the drawings.

2.8 DRAIN PUMP

- A. Provide and install where shown on plans, fully enclosed drain pump of size and capacity specified.

2.9 GUARANTEE

- A. Entire system shall be warrantied for a period of one year from date of acceptance. Provide standard maintenance agreement for all mechanical equipment for this period. Provide manufacturers standard extended warranty for water heater.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Comply with requirements in Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

- A. Coordinate piping installations and specialty arrangements with schematics on Drawings.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

- C. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."
- D. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve inside the building at each domestic water-service entrance.
- E. Install shutoff valve immediately upstream of each dielectric fitting.
- F. Install domestic water piping level with 0.25 percent slope downward toward drain and plumb.
- G. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- H. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- I. Install piping to permit valve servicing.
- J. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.
- K. Install piping free of sags and bends.
- L. Install fittings for changes in direction and branch connections.
- M. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- N. Install thermometers on inlet and outlet piping from each water heater.
- O. Install sleeves for piping penetrations of walls, ceilings, and floors.
- P. Install sleeve seals for piping penetrations of concrete walls and slabs.
- Q. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 Apply appropriate tape or thread compound to external pipe threads.
 Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube.

Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

- E. Joint Construction for Solvent-Cemented Plastic Piping: Clean and dry joining surfaces. Join pipe and fittings according to the following:

Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements. Apply primer.

PVC Piping: Join according to ASTM D 2855.

- F. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.4 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.
- C. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
 - 1. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
 - 2. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
 - 3. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection.

3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Piping Inspections:
 - a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
 - b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - 1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
 - 2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.
 - c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.

- d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
2. Piping Tests:
- a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
 - b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
 - c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - d. Cap and subject piping to static water pressure of 50 psig (345 kPa) above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 - e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
 - f. Prepare reports for tests and for corrective action required.
- B. Domestic water piping will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.6 ADJUSTING

- A. Perform the following adjustments before operation:
- 1. Close drain valves, hydrants, and hose bibbs.
 - 2. Open shutoff valves to fully open position.
 - 3. Open throttling valves to proper setting.
 - 4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
 - a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch.
 - b. Adjust calibrated balancing valves to flows indicated.
 - 5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
 - 6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
 - 7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
 - 8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.7 CLEANING

- A. Clean and disinfect potable domestic water piping as follows:
- 1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.

2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm (50 mg/L) of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm (200 mg/L) of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Repeat procedures if biological examination shows contamination.
 - e. Submit water samples in sterile bottles to authorities having jurisdiction.
- B. Prepare and submit reports of purging and disinfecting activities.
- C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

END OF SECTION 220000

SECTION 230000- HEATING, VENTILATING AND AIR CONDITIONING

PART 1- GENERAL:

1.1 RELATED DOCUMENTS

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

1.2 GENERAL

- A. All work included under this section shall be performed in accordance with the requirements of the contract documents and the New Jersey Uniform Construction Code.
- B. With the submission of his bid, contractor shall give written notice to the owner of any materials or apparatus believed inadequate or unsuitable, in violation of laws, ordinances, rules or regulations of authorities having jurisdiction, and any necessary items of work omitted. In the absence of such written notice, it is mutually agreed that the contractor has included the cost of all required items in his proposal for a complete project.
- C. Contractor shall acknowledge that they have examined the plans, specifications and site, and that from their own investigations is satisfied as to the nature and location of the work; the general and local conditions, particularly those bearing upon transportation, disposal, handling, and storage of materials; availability of labor, water, electric power, roads and uncertainties of weather; the conformation and condition of the ground; the character, quality and quantity of surface and subsurface materials to be encountered; the character of equipment and facilities needed preliminary to and during the execution of the work; all federal, state, county, township, and municipal laws, ordinances and regulations particularly those relating to employment of labor, rates of wages, and construction methods; and all other matters which can in any way affect the work or the cost thereof under this contract. Any failure by the contractor to acquaint himself with the available information concerning these conditions will not relieve him from the responsibility for estimating properly the difficulty or cost of successfully performing the work.
- D. All mechanical drawings are schematic and diagrammatic.
 - 1. Symbols and diagrams are used to indicate the various items of work and the complete systems, but they do not necessarily have dimensional significance, neither do they necessarily include all related and subsidiary parts and equipment.
 - 2. The work is to be installed complete and ready for operation in conformity with the intent expressed on the drawings and in the specifications.
 - 3. Coordinate work with the requirements of the architectural and structural drawings for dimensions, locations and clearances.
 - 4. Locations of mechanical and electrical items which are exposed to view shall be taken from the architectural drawings where possible, or are to be located as directed by the architect.
 - 5. If required for reasons of coordination, required relocation of components or modifications of size or routing shall be provided by the contractor at no additional expense.

- E. The entire HVAC installation shall be fully guaranteed for a period of one year. See this and other specification sections for warranty requirements for furnaces and air conditioning units. Provide a one-year maintenance contract for all HVAC equipment and systems. Replace all filters used during construction with new before occupancy. Turn over one complete set of filters for each item of equipment to the owner.
- F. Instruct owners representatives on operation and maintenance of equipment. A minimum of 4 hours of instruction time shall be provided at times of the owner's choosing. Submit two (2) copies of operating and maintenance manuals. Prepare record documents indicating as-built conditions. Include the following:
 - 1. Ductwork mains and branches, size and location, locations of dampers and other control devices; filters, boxes and terminal units requiring periodic maintenance or repair.
 - 2. Concealed equipment locations dimensioned from prominent building lines.
 - 3. Approved substitutions, contract modifications, and actual equipment and materials installed.

Record drawings shall be prepared at the scale of the design drawings and shall be stamped "as-built".

- G. The contractor shall give all necessary notices, obtain all permits and pay all government sales taxes, fees, and other costs, in connection with his work. However, all utility connections, extensions, and tap fees for water, storm, sewer, gas, telephone, and electricity shall be paid directly to utility companies and/or agencies by the owner, unless otherwise indicated. The contractor shall file all necessary plans, prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction, obtain all required certificates of inspection before work and deliver same to the owners representative before request for acceptance and final payment for the work.
- H. All materials and apparatus shall be new, of first-class quality, except where items are specifically stated in the contract documents to be reused.
- I. Motors and all equipment shall meet the efficiency requirements of ASHRAE 90.1 as currently adopted in New Jersey.
- J. Provide manufacturers engraved metal nameplate for all items of equipment.
- K. Maintain indicated fire rating of walls, partitions, ceilings and floors at pipe and duct penetrations. Seal with firestopping materials.
- L. Arrange for all openings, chases, temporary removals, etc. needed to allow installation of all equipment into the building. It is the contractor's responsibility to ensure that materials can be brought into the building, that chases and openings of sufficient size are made available and that all necessary rigging, lifting machinery, etc. Be provided. Break down equipment into smaller component parts, if needed to allow entry.
- M. Outdoor condensing units to be mounted on existing equipment pads.

1.3 WORK INCLUDED:

- A. The contractor shall furnish all labor, materials, equipment, appliances, tools and accessories required for providing, installing, connecting, and testing the complete heating, ventilating and air conditioning systems and associated equipment, in accordance with these specifications and the applicable drawings. It is the intent of these plans and

specifications to provide for the installation of a complete automatic system to heat, ventilate and air condition the space. All items to be new and free from defects. The work shall include, but not be limited to, the following:

1. Cutting and patching.
2. Tests, inspections and balancing.
3. Guarantees and warranties.
4. Instructions to owner.
5. Air conditioning condensers and gas fired furnace units.
6. Duct systems.
7. Insulation for ductwork and piping.
8. Refrigerant and condensate piping.
9. Zone damper system.
10. Control system for completely automatic operation.
11. Exhaust fans.

1.4 SUBMITTALS

A. Prepare coordination drawings in CAD format to a 1/4 inch equals 1 foot scale or larger. Detail major elements, components, and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Show space requirements for installation and access. Show where sequence and coordination of installations are important to the efficient flow of the work. Include the following:

1. Proposed locations of piping, ductwork, equipment, and materials. Include the following:
 - a. Planned piping layout. All piping shall be shown including that for HVAC, plumbing and conduit for electrical systems.
 - b. Planned duct systems layout, including elbow radii and duct accessories.
 - c. Clearances for installing and maintaining insulation.
 - d. Clearances for servicing and maintaining equipment, including space for equipment disassembly required for periodic maintenance and required clearances for line voltage electrical equipment.
 - e. Equipment service connections and support details.
 - f. Exterior wall and roof penetrations
 - g. Elevations above finished floor of all components including elevation of new and existing structure where such structure affects the height of installed components.
 - h. Prepare reflected ceiling plans to coordinate and integrate installations, air outlets and other ceiling-mounted items.
2. Coordination drawings shall be produced in the following sequence:
 - a. Sheet metal plans with all structure and bottom of duct elevations indicated.
 - b. HVAC and plumbing piping with elevations of bottom of piping. Pay special attention to piping having required pitch.
 - c. Electrical conduits, including tel/data which may affect architectural items.
 - d. All ducts, piping, conduit, etc. shall be laid out to allow a clear path of travel in all areas to all items requiring service.
 - e. Ceiling mounted items and lights with actual ceiling elevations indicated.

All locations where ceiling elevations shown on architectural drawings cannot be met shall be indicated.

- f. Attend coordination meetings as necessary and modify coordination drawings as needed to enable all systems to be installed as per the design intent.
 - g. If, through their best efforts, contractors cannot resolve coordination issues, all necessary information shall be indicated for resolution by the architect/engineer.
3. Submit equipment and materials shop drawings for the following:
- a. Furnaces
 - b. Condensing units and evaporator coils.
 - c. Ductwork
 - d. Piping
 - e. Insulation
 - f. Diffusers, registers and grilles - include complete listing by room number.
 - g. Fans
 - h. Pumps
 - i. Controls
 - j. Duct Shop Drawings
- 1 Duct shop drawings shall be produced in CAD format and shall be used in the development of the required coordination drawings.
 - 2 Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
 - 3 Factory- and shop-fabricated ducts and fittings.
 - 4 Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
 - 5 Elevation of top of ducts.
 - 6 Dimensions of main duct runs from building grid lines.
 - 7 Fittings.
 - 8 Reinforcement and spacing.
 - 9 Seam and joint construction.
 - 10 Penetrations through fire-rated and other partitions.
 - 11 Equipment installation based on equipment being used on Project.
 - 12 Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
 - 13 Hangers and supports, including methods for duct and building attachment
4. Include material specifications, operating characteristics, agency listings, etc. For all equipment indicated. Do not install any piping, conduits or ductwork in any area prior to obtaining approval of its layout by means of shop drawings. Do not purchase any equipment prior to its acceptance by means of shop drawings. Follow the procedures specified in division 1 section submittals.
5. Substitutions: substitutions for specified equipment may be allowed if the engineer determines that such item is of equal or better quality and efficiency. Contractor shall be responsible for any additional costs incurred by himself or other contractors resulting from the substitution. Contractor shall also make all necessary changes in shop drawings necessary to accommodate the substitution.

Any equipment other than that used as the basis for design shall be considered a substitution. Listing of alternate manufacturers does not imply that products by these manufacturers are acceptable alternates to the basis of design product.

PART 2- MATERIAL AND INSTALLATION

2.1 HANGERS AND SUPPORTS

- A. Provide all hangers and supports required for the support of various systems. All piping shall be supported from the building structure by means of approved hangers. Provide all supplemental supports where necessary to meet support or spacing requirements. Bands or rings supporting copper tubing shall be heavily copper plated or of solid brass or copper construction. Comply with MSS SP-69 and MSS SP-89.
- B. Attach to side of joist for support of piping and ductwork. Do not support piping from ductwork or vice versa.
- C. Horizontal piping shall be hung with adjustable wrought iron or malleable iron pipe hangers, spaced as follows:

<u>Pipe Size</u>	<u>Copper</u>	<u>Hubless Cast Iron</u>	<u>Plastic Pipe</u>	<u>Steel</u>	<u>Rod Size</u>
Up to 1-1/4"	6 ft.	8 ft.	4 ft.	7 ft.	3/8"
1-1/2" - 2"	8 ft.	10 ft.	4 ft.	10 ft.	3/8"
2-1/2" - 4"	10 ft.	10 ft.	4 ft.	12 ft.	1/2"

- D. Hangers and supports by Grinnel, Crane or approved equal.
- E. Provide factory fabricated flashings for all roof penetrations by piping. Flashings shall be similar to S.B.C. industries model P/S or similar. Follow manufacturer’s instructions for installation. Arrange with roofing contractor for all roof penetrations so as to maintain roofing warranty.

2.2 VIBRATION ISOLATION

- A. Flexible connectors shall be used to connect ductwork to HVAC units and exhaust fans.
- B. All interior rotating equipment shall be supported by spring type vibration isolators.
- C. Acoustically line ductwork 15 feet up and downstream of air handling units. Balance of ductwork shall be externally insulated, not lined, unless specifically indicated.

2.3 MECHANICAL INSULATION

- A. General:
 - 1. All materials shall be applied in strict accordance with manufacturer's recommendations. Insulation shall be applied to clean and dry surfaces after tests and approvals required have been completed.
 - 2. On cold surfaces where a vapor barrier must be maintained, insulation shall be applied with a continuous, unbroken moisture and vapor seal. All hangers,

- supports, anchors, or other projections that are secured to cold surfaces shall be insulated and vapor sealed to prevent condensation.
3. All surface finishes shall be extended in such a manner as to protect all raw edges, ends and surfaces of insulation.
 4. All pipe or duct insulation shall be continuous through walls, ceiling, floor openings, or sleeves, except where firestop or firesafing materials are required.
 5. Metal shields shall be installed between hangers or supports and piping insulation. Rigid insulation inserts shall be installed as required between the pipe and the insulation shields. Inserts shall be of equal thickness to the adjacent insulation and shall be vapor sealed as required.
 6. Surface burning characteristics: provide composite insulation which shall have surface burning characteristic ratings as tested by ASTM E-84, UL 273, or NFPA 255 not exceeding:

Flame spread	25
Smoke developed	50

 Composite shall include insulation, jacketing and adhesive used to secure jacketing or facing. All accessory items such as PVC jacketing and fittings, adhesive mastic cement, tape and cloth shall have the same component ratings as specified above. These requirements apply to all insulation including, but not limited to, piping, ductwork, and all mechanical equipment requiring insulation. Insulation shall conform in all respects to NFPA 90a.
 7. All insulation shall be by Owens-Corning, Johns-Manville, Knauf or approved equal.

B. Piping:

1. Material shall be heavy density fiberglass pipe insulation with all service jacket (ASJ) or all service jacket and self sealing lap (ASJ/SSL).
2. All ends shall be firmly butted and secured with ASJ or SSL butt strips of a minimum 3" wide. ASJ jacket laps and butt strips shall be secured with outward clinch staples at a 4" spacing, or by use of a suitable lap adhesive.
3. All fittings and valves shall be insulated with preformed fiberglass fittings. Insulation shall be of equal thickness to the adjacent pipe insulation.
4. All outdoor closed cell foam insulation shall be covered with an aluminum jacket.
5. Install heat trace before installation of pipe insulation. Do not use cellular foam insulation on piping with heat trace.
6. Piping and equipment insulation shall be as follows:

Interior Condensate Exposed and Concealed

Pipe Sizes <u>(Nps)</u>	<u>Materials</u>	Thickness In <u>Inches</u>	Vapor Barrier <u>Req'd</u>	Field- Applied <u>Jacket</u>
All	glass fiber	1/2	yes	none

Interior Condensate Exposed In Attic

Pipe Sizes <u>(Nps)</u>	<u>Materials</u>	Thickness In <u>Inches</u>	Vapor Barrier <u>Req'd</u>	Field- Applied <u>Jacket</u>
All	glass fiber	1	yes	none

Interior And Exterior Refrigerant Liquid and Suction Exposed and Concealed (Insulate Lines Separately)

Pipe Sizes (Nps)	Materials	Thickness In Inches	Vapor Barrier Req'd	Field-Applied Jacket
All	cellular foam	1	no	a-outdoors

Key = P - PVC, K - foil and paper, A - aluminum, SS - stainless steel

C. Duct Insulation:

Insulation for ductwork shall be as follows:

1. Material shall be duct wrap, .75 lbs./cu.ft. With FSK. Facing shall have a maximum vapor transmission rate of .04 perms.
2. Insulation thickness shall be as follows:
 - a. Supply, conditioned spaces- 1 ½ inches.
 - b. Return, conditioned spaces- none
 - c. Supply and return, unconditioned spaces- 2 ½ inches
3. Insulation shall be firmly butted at all joints with a maximum allowable compression of 15%. All seams shall overlap a minimum of 2" and be finished with appropriate pressure sensitive tape or glass fabric and vapor barrier mastic. Pressure sensitive tapes and glass cloth shall be a minimum 3" wide. All seams, joints, penetrations, and damage to the facing shall be sealed with vapor barrier mastic.

2.4 HVAC PIPING

Use the following piping materials:

- A. Condensate drain lines: schedule 40 PVC with cement joints.
- B. Refrigerant piping: annealed copper tubing, ASTM B88, type K or hard copper tubing, ASTM B 280 type ACR with ASME B16.22 wrought copper fittings, brazed connections.
- C. Use dielectric fittings at all connections between dissimilar materials. Use pipe sleeve and mechanical link-seal at all underground exterior wall penetrations.
- D. Lay out piping in the basement and attic to allow a clear path of travel from the point of access to all items requiring service.

2.5 DUCTWORK

- A. Galvanized, sheet steel: lock-forming quality; ASTM a 653/a 653m, g60 (z275) coating designation, mill-phosphatized finish for surfaces of ducts exposed to view.
- B. Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction with galvanized, sheet steel, according to SMACNA "HVAC duct construction standards - metal and flexible".
- C. Static-pressure classification: unless otherwise indicated, construct ducts to the following:
 1. Supply and return ducts: 2- inch wg.

2. Exhaust ducts: 1-inch wg negative pressure.
- D. Seam and joint sealing
1. General: seal duct seams and joints according to the duct pressure class indicated and as described in SMACNA “HVAC duct construction standards-metal and flexible”. Use duct sealant formulated for such purpose; duct tape alone will not be acceptable.
 2. All ductwork: SMACNA seal class “A”. Seal all transverse and longitudinal joints.
 3. Seal externally insulated ducts before insulation installation.
- E. Apply duct liner to the first 15 feet of ductwork up and downstream of each air handling unit. Duct liner shall be 1 inch thick in the basement and 1 ½ inches in the attic, fabric coated, 25/50 flame/ smoke spread, conforming with NFPA 90, thermal conductivity (k-value): 0.26 at 75 deg f mean temperature; Certaineed Toughgard or Knauf E-M.
- F. Lay out ductwork in the basement and attic to allow a clear path of travel from point of access to all items requiring service.

2.6 DUCT ACCESSORIES

- A. Flexible ducts
1. Comply with UL 181, class 1
 2. Steel wire reinforced with 1-1/2 inch insulation
 3. Rated for 6 inch positive pressure
 4. Maximum length 8 feet
 5. Install only in accessible attic. Do not use exposed in basement.
 6. Use hard duct elbows for 90 degree bends.
 7. Flexible duct may only be used at the end of each run, for connections to diffusers.

2.7 CHIMNEYS AND VENTS

- A. Combustion air intake to furnaces shall be schedule 40 PVC, exhaust shall be schedule 40 CPVC, solvent cement joints, size as recommended by the manufacturer. Pitch toward furnace minimum of 2 per cent or as recommended by manufacturer. Follow manufacturer’s instructions governing maximum lengths and number of fittings. Provide drain piping to drain as recommended by manufacturer. Install heat trace on entire length of condensate drain piping exposed to freezing temperatures from condensing furnaces.

2.8 TESTING ADJUSTING AND BALANCING

- A. Test, adjust, and balance the following mechanical systems:
1. Supply air systems.
 2. Exhaust air systems.
 3. Verify temperature control system operation.
 4. Coordinate with mechanical contractor to ensure that system is complete and ready for balancing.
- B. Balancer shall be certified by AABC or NEBB and shall use standard forms and methods as published by such organization.
- C. Submit balancing report for review by engineer. Rebalance as necessary to meet design air and water quantities.
- D. Set HVAC system airflow rates within the following tolerances:

- 1 Supply, return, and exhaust fans and equipment with fans: plus 5 to minus 5 percent.
- 2 Air outlets and inlets: plus 5 to minus 5 percent.

END OF SECTION 230000

SECTION 235416 – FURNACES AND SPLIT SYSTEM AIR CONDITIONERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Gas-fired, condensing furnaces and accessories complete with controls.
 - 2. Air filters.
 - 3. Refrigeration components.

1.3 SUBMITTALS

- A. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories for each of the following:
 - 1. Furnaces.
 - 2. Zone dampers and controls.
 - 3. Refrigeration components.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Wiring Diagrams: Power, signal, and control wiring.
- C. Operation and Maintenance Data: For each furnace to include in emergency, operation, and maintenance manuals for each of the following:
 - 1. Furnace and accessories complete with controls.
 - 2. Zone dampers and controls.
 - 3. Refrigeration components.
- D. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

1.5 COORDINATION

- A. Coordinate size and location of condensing units with existing concrete pad(s). Bolt condensing units to concrete pad.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace the following components of furnaces that fail in materials or workmanship within specified warranty period:
 - 1. Warranty Period, Commencing on Date of Substantial Completion:
 - a. Furnace Heat Exchanger: 5 years.
 - b. Integrated Ignition and Blower Control Circuit Board: Five years.
 - c. Draft-Inducer Motor: Five years.
 - d. Refrigeration Compressors: 5 years.
 - e. Evaporator and Condenser Coils: Five years.

1.7 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. Disposable Air Filters: Furnish two complete sets.
 - 2. Fan Belts: Furnish one sets for each furnace fan.

PART 2 - PRODUCTS

2.1 GAS-FIRED FURNACES, CONDENSING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equal:
 - 1. Carrier Corporation; Div. of United Technologies Corp.
 - 2. Lennox Industries Inc.
 - 3. Trane.
 - 4. York International Corp.
- B. General Requirements for Gas-Fired, Condensing Furnaces: Factory assembled, piped, wired, and tested; complying with ANSI Z21.47/CSA 2.3, "Gas-Fired Central Furnaces," and with NFPA 54.
- C. Cabinet:
 - 1. Cabinet interior around heat exchanger shall be factory-installed insulation.
 - 2. Lift-out panels shall expose burners and all other items requiring access for maintenance.
 - 3. Factory paint external cabinets in manufacturer's standard color.
 - 4. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.

- D. Fan: Centrifugal, factory balanced, resilient mounted, direct drive.
- E. Type of Gas: Natural.
- F. Heat Exchanger:
 - 1. Primary: Aluminized or Stainless steel.
 - 2. Secondary: Polyethylene-coated or Stainless steel.
- G. Burner:
 - 1. Gas Valve: 100 percent safety modulating main gas valve, main shutoff valve, pressure regulator, safety pilot with electronic flame sensor, limit control, transformer, and combination ignition/fan timer control board.
 - 2. Ignition: Electric pilot ignition, with hot-surface igniter or electric spark ignition.
- H. Gas-Burner Safety Controls:
 - 1. Electronic Flame Sensor: Prevents gas valve from opening until pilot flame is proven; stops gas flow on ignition failure.
 - 2. Flame Rollout Switch: Installed on burner box; prevents burner operation.
 - 3. Limit Control: Fixed stop at maximum permissible setting; de-energizes burner on excessive bonnet temperature; automatic reset.
- I. Combustion-Air Inducer: Centrifugal fan with thermally protected motor and sleeve bearings prepurges heat exchanger and vents combustion products; pressure switch prevents furnace operation if combustion-air inlet or flue outlet is blocked.
- J. Furnace Controls: Solid-state board integrates ignition, heat, cooling, and fan speeds; adjustable fan-on and fan-off timing; terminals for connection to accessories.
- K. Accessories:
 - 1. Vent and intake piping materials shall be as recommended by the manufacturer, consistent with NJUCC requirements.
 - 2. Combination Combustion-Air Intake and Vent: PVC plastic fitting to combine combustion-air inlet and vent through outside wall or roof.
 - 3. CPVC Plastic Vent Materials.
 - a. CPVC Plastic Pipe: Schedule 40, complying with ASTM F 441/F 441M.
 - b. CPVC Plastic Fittings: Schedule 40, complying with ASTM F 438, socket type.
 - c. CPVC Solvent Cement: ASTM F 493.
 - 1) Use CPVC solvent cement that has a VOC content of 490 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2) Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 4. PVC Plastic Vent Materials:
 - a. PVC Plastic Pipe: Schedule 40, complying with ASTM D 1785.
 - b. PVC Plastic Fittings: Schedule 40, complying with ASTM D 2466, socket type.
 - c. PVC Solvent Cement: ASTM D 2564.
 - 1) Use PVC solvent cement that has a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2) Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- L. Capacities and Characteristics: see schedule on drawings

2.2 THERMOSTATS

- A. Solid-State Thermostat: Wall-mounting programmable, microprocessor-based unit with automatic switching from heating to cooling, preferential rate control, seven-day programmability with minimum of four temperature presets per day, vacation mode, and battery backup protection against power failure for program settings.
- B. Zone Dampers: Provide and install zone damper system. System and components shall be by HVAC equipment manufacturer or approved for use with the HVAC equipment installed.

2.3 AIR FILTERS

- A. Disposable Filters: 1-inch thick fiberglass media with ASHRAE 52.2 MERV rating of 13 or higher.

2.4 REFRIGERATION COMPONENTS

- A. General Refrigeration Component Requirements:
 - 1. Refrigeration compressor, coils, and specialties shall be designed to operate with CFC-free refrigerants.
 - 2. Energy Efficiency: Equal to or greater than basis of design equipment.
- B. Refrigerant Coil: Copper tubes mechanically expanded into aluminum fins. Comply with ARI 210/240, "Unitary Air-Conditioning and Air-Source Heat Pump Equipment." Match size with furnace. Include condensate drain pan with accessible drain outlet complying with ASHRAE 62.1, current edition.
 - 1. Refrigerant Coil Enclosure: Steel, matching furnace and evaporator coil, with access panel and flanges for integral mounting at or on furnace cabinet and galvanized sheet metal drain pan coated with black asphaltic base paint.
- C. Refrigerant Line Kits: Factory pre-insulated annealed-copper suction and liquid lines factory cleaned, dried, pressurized with nitrogen, sealed, and with suction line insulated. Provide in standard lengths for installation without joints, except at equipment connections.
 - 1. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I, 1 inch thick.
- D. Refrigerant Piping: Comply with requirements in Section 230000.
- E. Air-Cooled, Compressor-Condenser Unit:
 - 1. Casing: Steel, finished with baked enamel, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
 - 2. Compressor: Hermetically sealed reciprocating or scroll type.

- a. Crankcase heater.
 - b. Vibration isolation mounts for compressor.
 - c. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
 - d. Two-speed compressor motors shall have manual-reset high-pressure switch and automatic-reset low-pressure switch.
 - e. Refrigerant: R-410A.
- 3. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with liquid subcooler.
 - 4. Fan: Aluminum-propeller type, directly connected to motor.
 - 5. Motor: Permanently lubricated, with integral thermal-overload protection.
 - 6. Low Ambient Kit: Permits operation down to 45 deg F.
 - 7. Mounting Base: Polyethylene or concrete.
- F. Capacities and Characteristics: see drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine factory-installed insulation before furnace installation. Reject units that are wet, moisture damaged, or mold damaged.
- C. Examine roughing-in for gas and refrigerant piping systems to verify actual locations of piping connections before equipment installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install gas-fired furnaces and associated fuel and vent features and systems according to NFPA 54.
- B. Suspended Units: Suspend from structure using threaded rods, spring hangers, and building attachments. Secure rods to unit hanger attachments. Adjust hangers so unit is level and plumb.
- C. Controls: Install thermostats at mounting height of 60 inches above floor.
- D. Wiring Method: Install control wiring in conduit in all locations. Conceal control wiring except in unfinished spaces.
- E. Install ground-mounted, compressor-condenser components on 4-inch thick, reinforced concrete base or on polyethylene mounting base; 4 inches larger on each side than unit. Coordinate anchor installation with concrete base.

3.3 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties. Connect gas piping with union or flange and appliance connector valve.
- B. Install piping adjacent to equipment to allow service and maintenance.
- C. Vent and Outside-Air Connection, Condensing, Gas-Fired Furnaces: Connect plastic piping vent material to furnace connections and extend outdoors. Terminate vent outdoors with a cap and in an arrangement that will protect against entry of birds, insects, and dirt. Follow manufacturer's instructions for arrangement of terminations.
 - 1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
 - 2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
 - 3. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - a. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - b. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 - c. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
 - d. Requirements for Low-Emitting Materials:
 - 1) Use CPVC solvent cement that has a VOC content of 490 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2) Use PVC solvent cement that has a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 3) Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 4. Slope pipe vent back to furnace or to outside terminal. Do not allow condensate to drip over walkways or where ice may cause a danger of slipping.
- D. Connect ducts to furnace with flexible connector.
- E. Connect refrigerant tubing kits to refrigerant coil in furnace and to air-cooled, compressor-condenser unit.
 - 1. Flared Joints: Use ASME B16.26 fitting and flared ends, following procedures in CDA's "Copper Tube Handbook."
 - 2. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
 - 3. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

3.4 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. Perform electrical test and visual and mechanical inspection.
 - 2. Leak Test: After installation, charge systems with refrigerant and oil and test for leaks. Repair leaks, replace lost refrigerant and oil, and retest until no leaks exist.
 - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation, product capability, and compliance with requirements.
 - 4. Verify that fan wheel is rotating in the correct direction and is not vibrating or binding.
 - 5. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Verify that vibration isolation and flexible connections properly dampen vibration transmission to structure.

3.5 STARTUP SERVICE

- A. Complete installation and startup checks according to manufacturer's written instructions and perform the following:
 - 1. Inspect for physical damage to unit casings.
 - 2. Verify that access doors move freely and are weathertight.
 - 3. Clean units and inspect for construction debris.
 - 4. Verify that all bolts and screws are tight.
 - 5. Adjust vibration isolation and flexible connections.
 - 6. Verify that controls are connected and operational.
- B. Adjust fan belts to proper alignment and tension.
- C. Start unit according to manufacturer's written instructions and complete manufacturer's operational checklist.
- D. Measure and record airflows.
- E. Verify proper operation of capacity control device.
- F. After startup and performance test, lubricate bearings and adjust belt tension.

3.6 ADJUSTING

- A. Adjust initial temperature set points.
- B. Set controls, burner, and other adjustments for optimum heating performance and efficiency. Adjust heat-distribution features, including shutters, dampers, and relays, to provide optimum heating performance and system efficiency.

3.7 CLEANING

- A. After completing installation, clean furnaces internally according to manufacturer's written instructions.
- B. Install new filters in each furnace within 14 days after Substantial Completion.

3.8 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain condensing units. A minimum of four hours training shall be provided. Obtain written certification from the Owner that training has been sufficient.

END OF SECTION 235416

SECTION 260000 - ELECTRICAL

PART 1 - BASIC ELECTRICAL REQUIREMENTS:

1.1 GENERAL

- A. All work included under this section shall be performed in accordance with the requirements of the contract documents and National Electrical Code 2020, and the New Jersey Uniform Construction Code.
- B. With the submission of his bid, contractor shall give written notice to the owner of any materials or apparatus believed inadequate or unsuitable, in violation of laws, ordinances, rules or regulations of authorities having jurisdiction, and any necessary items of work omitted. In the absence of such written notice, it is mutually agreed that the contractor has included the cost of all required items in his proposal for a complete project. This building is Historic and the installation shall maintain and improve the Historic appearance of the spaces. All wiring shall be concealed unless otherwise indicated. All locations of devices and conduit routes shall be laid out by the contractor and approved by the Architect and owner prior to rough-in or demolition work.
- C. All Electrical Drawings of Division 26 are schematic and diagrammatic.
 - 1. Symbols and diagrams are used to indicate the various items of work and the complete systems, but they do not necessarily have dimensional significance, neither do they necessarily include all related and subsidiary parts and equipment.
 - 2. The work is to be installed complete and ready for operation in conformity with the intent expressed on the Drawings and in the Specifications.
 - 3. Coordinate work with the requirements of the Architectural and Structural drawings for dimensions, locations and clearances.
 - 4. Locations of mechanical and electrical items which are exposed to view shall be taken from the Architectural Drawings where possible, or are to be located as directed by the Architect.
 - 5. If required for reasons of coordination, required relocation of components or modifications of size or routing shall be provided by the contractor at no additional expense.
- D. The entire Electrical installation shall be fully guaranteed for a period of one year.

1.2 WORK INCLUDED:

- A. The Contractor shall furnish all labor, materials, equipment, appliances, tools and accessories required for providing, installing, connecting, and testing the complete electrical systems and associated equipment, in accordance with these specifications and the applicable drawings. All items to be new and free from defects. The work shall include, but not be limited to, the following:
- B. Provide a complete electrical system including but not limited to the following:
 - 1. Modifications to the existing electrical distribution system.
 - 2. Feeders, branch circuit and control wiring.

3. Power and control wiring connections to all equipment.
 4. Disconnect switches, fuses.
 5. Grounding and bonding.
 6. Lighting fixtures, lamps and controls.
 7. Fire and Intrusion detection system and alarm.
 8. Conduit system for low voltage communication and camera system.
 9. Receptacles, switches and outlets.
 10. Excavation, backfilling, cutting, patching, etc.
 11. Temporary light and power.
 12. Telephone raceway, backboard systems and service conduits.
 13. Connections to equipment furnished under other specifications divisions or by the Owner.
- C. The Contractor shall furnish all labor, materials, tools, transportation equipment, services and facilities required for the complete, proper, and substantial installation of all electrical work. All fixtures, devices and equipment shown, noted or required on the drawings, and/or contained herein shall be connected from the source of electric power to the final connection, tested and made ready for satisfactory operation.
- D. Any appurtenances and/or accessories not specifically mentioned, but necessary to the operation of the systems shall be provided by this Contractor at no additional cost.
- E. The Contractor is to coordinate with other trades and Owner for equipment locations and clearances required for equipment.
- F. The Contractor hereby waives all claim to extra compensation for work performed and materials furnished beyond the scope of the Contract without written authorization by the Architect.
- G. The HVAC and Plumbing Contractors shall provide starters, etc. for all equipment they furnish, unless specifically indicated on the electrical drawings.
- H. The layout indicated on the drawings is diagrammatic. All work shall be accurately laid out on the jobsite, making adjustments as required to conform to the structural and architectural conditions and the work of other trades. Unless otherwise indicated, the arrangement, position, connections, etc. shown on the drawings shall be taken as practicable. The right is reserved by the Architect to make minor changes in locations and arrangements when required by job development without additional compensation to this Contractor.

PART TWO – MATERIAL AND INSTALLATION

2.1 RACEWAYS

- A. All conduit shall be run concealed. Conduits shall be exposed only where so indicated on the drawings or in unfinished areas such as boiler rooms. Contractor shall verify with the Architect acceptability of exposed conduit.
- B. Minimum conduit size shall be 1/2" unless noted otherwise on the plans.
- C. Conduit shall be as follows unless otherwise indicated on the drawings.

1. All elbows, conduit sweeps, bends, etc. required on rigid, non-metallic conduit (PVC) shall be rigid metal conduit.
 2. Conduit installed in or under the floor slab and exposed from the floor to a height of 8'-0" "above finished floor" shall be rigid metal, heavy wall galvanized steel. Threadless couplings will not be permitted, all couplings shall be threaded type.
 3. All other conduit shall be electric metallic tubing with steel compression type couplings and fittings.
 4. Final connections to motors and other vibrating equipment shall be made using a minimum 18" flexible conduit in dry locations and liquid tight flexible conduit in wet areas.
 5. If built-up roofing surfaces are penetrated after roofing has been applied, the waterproofing integrity shall be restored to the satisfaction of the Architect.
 6. Exposed conduit shall be laid out in the field with the cooperation of the Architect. Exposed conduit may only be installed with the prior approval of the material and routing by the Architect.
- D. Rigid Metal Conduit: Hot dipped galvanized, mild steel pipe, zinc coated threads with an outer coating of zinc bichromate, as manufactured by Triangle, Republic, Wheatland, or approved equal.
- E. Electric Metallic Tubing (EMT): Hot dipped galvanized, mild steel tube, zinc coated, as manufactured by Triangle, Republic, Wheatland or approved equal.
- F. Flexible Metal Conduit: Galvanized or zinc metalized steel, single strip interlocked construction as manufactured by Triangle, Anaconda, American Flexible Conduit, Electric-flex, or approved equal.
- G. Liquid Tight Flexible Metal Conduit: Galvanized steel core, single strip interlocked construction, with an extruded polyvinyl chloride covering as manufactured by Triangle, Carlon, Allied or approved equal.

2.2 CONDUIT FITTINGS

- A. Rigid Metal: Insulated metallic bushings shall be Thomas and Betts 1200 Series, Appleton, Crouse-Hinds, O.Z. or approved equal. Insulated grounding bushings shall be Thomas and Betts 3800 Series, Appleton, Crouse-Hinds, O.Z. or approved equal.
- B. Electrical Metallic Tubing: Insulated set screw fittings, EPT Thomas and Betts or approved equal.
- C. Flexible Metal Conduit: Insulated "Tite-Bite" fittings, Thomas and Betts, Steel City, or approved equal.
- D. Liquid Tight Flexible Metal Conduit: Insulated connectors with "O" rings shall be Thomas and Betts Series 5231, Steel City or approved equal.
- E. Conduit Outlet Bodies: Malleable iron fittings, Crouse-Hinds, Killark, or approved equal.

2.3 OUTLET, DEVICE, JUNCTION AND PULL BOXES:

- A. Boxes for concealed work shall be stamped galvanized steel as manufactured by Steel

City, Raco, or approved equal. Provide raised device covers to suit construction so that outlets are flush with finished surfaces. Boxes to be installed for vertical device mounting.

- B. Boxes for interior exposed work shall be made of malleable iron with threaded hubs.
- C. Boxes for exterior exposed work or where indicated as weatherproof shall be made of malleable iron with threaded hubs. Screws shall be stainless steel.
- D. Large junction and pull boxes shall be NEMA 1 screw cover.

2.4 WIRING

- A. Single conductor cables installed in conduit shall be used for feeders. Wire sizes #10 AWG and smaller shall be solid, #8 AWG and larger shall be stranded. All conductors shall be copper. Insulation shall be 600 volt Type THHN/THWN or XHHW rated 75 degrees C for dry or wet locations.
- B. Branch circuit wiring shall be steel jacketed, Type MC cable employing copper conductors with Type THHN/THWN insulation. Minimum wire size shall be #12 AWG. MC cable shall contain integral, insulated, equipment ground conductor.
- C. Solderless pressure type connectors shall be used throughout for splices and taps. Insulation equal to the wire insulation shall be applied at all splices and taps over the connector and adjoining wire.
- D. Control wiring, shall be individual copper conductors, #14 AWG THHN-THWN stranded installed in conduit.
- E. Wiring to recessed fixture and within fixture raceways shall match temperature rating of the fixture.
- F. Equipment Ground - Green conductor shall be used.
- G. Recessed lighting fixtures connections 6' maximum length: Flexible metal conduit, 3/8" with ground permitted.
- H. Conductors shall be continuous from origin to panel or equipment without splices. Where tap splices are necessary and approved, they shall be made with suitable connectors in junction boxes. All terminals and tap splices shall be made secure with approved solderless pressure type connectors. Tap splices shall be wrapped with insulating plastic tape in a manner suitable for circuit voltage.

2.5 WIRING DEVICES:

- A. Switches, receptacles and other wiring devices shall be specifications grade of type, size and rating indicated on the Contract Drawings.
- B. Lighting Controls:
 - 1. Refer to the lighting plans for control requirements or approved equal.
 - 2. Provide shop drawing of devices with wiring diagrams.

2.6 SUPPORTING DEVICES

- A. The Contractor shall furnish and install all the necessary steel for supporting lighting, fixtures, panels, starters, disconnects, etc. Kindorf, or approved equal, framing systems,

rods, channels, and fittings with galvanized ferrous metals will be permitted.

2.7 IDENTIFICATION

- A. Provide typewritten directories for panels, indicating use of each branch circuit and designating spare circuits. Handwritten directories are not acceptable.
- B. Provide nameplates for all control equipment, special control switches, special outlets or devices, disconnect switches and starters, and panelboards. Nameplates shall correspond to equipment designation as shown on drawings and in the case of panelboards, etc. shall indicate voltage rating of equipment. Equipment shall be labeled with source and circuit, etc. in accord with the 2020 National Electric Code.
- C. Nameplates shall bear notations exactly the same as the corresponding notations that appear on any required wiring diagrams, operating instructions and/or manuals.
- D. Nameplates shall be laminated plastic with white letters on a black background fastened with stainless steel or brass screws. Adhesive or glue will not be acceptable.

2.8 GROUNDING

- A. All grounding shall be in accordance with the requirements of the National Electric Code and the Utility Company.
- B. Equipment grounding conductor shall be provided for all feeders and branch circuits which are installed in non-metallic conduits, and all motor circuits. Also, such grounding conductors shall be provided in all raceways buried in earth or using any flexible conduit. The equipment ground will consist of a metallic connection to ground all the non-current carrying metal parts of the wiring system or apparatus connected to the system; this includes all metal raceways, outlet boxes, cabinets, switch boxes, motor frames and metallic enclosures for all electrical equipment.

2.9 LIGHTING AND POWER PANELS

- A. Existing panels shall be modified to suit the work of this contract utilizing circuit breakers to match the panel manufacturer.
- B. Circuit breakers shall be the bolt in type minimum 22,000 AIC and be arranged using double row construction. Breakers to be molded case, with inverse time delay and instantaneous circuit protection. Breaker mechanism to be toggle operated having quick make, quick break cover center switching. Arc extinction to be accomplished by means of DEION arc chutes.
- C. Bracing shall be equivalent to, or compatible with, the rated interrupting capacity of smallest overcurrent device in that panel.
- D. All exterior and interior steel surfaces of the panelboard shall be properly cleaned and finished with gray ANSI 61 paint over a rust inhibiting, phosphatized coating.
- E. Panelboards shall be mounted plumb with structure. Operating handle of highest device shall be not more than 6'-0" from floor and not lower than 5'-6". Conduits shall enter panel at right angles and be securely fastened with two locknuts and a bushing. Wires shall be wrapped around device screw head.
- F. Cabinets shall be of sufficient size to provide a minimum code required gutter space on all sides. All locks shall be keyed alike. Fronts shall be furnished with approved

adjustable trim clamps as the means for securing front to the box. Provided on the inside of each door shall be a directory frame and card having a transparent cover.

- G. Panels shall be General Electric, Square D, or approved equal.

2.10 OVERCURRENT PROTECTION DEVICES

- A. Switches shall be heavy-duty fused or unfused in NEMA 1 enclosure for indoor use. NEMA 3R for outdoor use.

2.11 LIGHTING FIXTURES AND LAMPS

- A. Submittals: Product Data for each type of lighting fixture indicated, arranged in order of fixture designation. Include data on features and accessories.
- B. Fixtures, Emergency Lighting Units, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- C. Finishes: Manufacturer's standard, unless otherwise indicated.
- D. Paint Finish: Applied over corrosion-resistant treatment or primer, free of defects.
- E. Metallic Finish: Corrosion resistant.
- F. Replace any fixtures damaged, lost or stolen during the construction of this project at no additional cost to the owner.
- G. Requirements for individual lighting fixtures: Refer to schedule on drawings. Where no fixture type is indicated, provide a \$300.00 material allowance per fixture. Installation is included with your bid.
- H. Set fixtures level, plumb, and square with ceiling and walls, and secure according to manufacturer's written instructions and approved submittal materials. Install lamps in each fixture.

2.12 FIRE / SECURITY CONTROL PANEL

- A. Provide a Simplex 12 Zone, expandable to 48 zones, Fire/Security Control Panel, surface mounted where shown on plans or approved equal by Ademco, Firelite or approved equal. Panel shall communicate with the Owner selected Central Station.
- B. Control panel shall have built-in battery back-up and shall provide up to 900 ma to power auxiliary devices. Voltage shall be regulated at 13.8 volts DC. Automatic system shutdown will occur at 7.5 volts DC to prevent false alarms.
- C. During alarm conditions, up to 2.5 amps of power shall be available to power auxiliary devices.
- D. Control panel shall be provided with a 2 sound driver.
- E. Control panel shall be provided with Six Stage lightning protection.
- F. Control panel shall be provided with delayed entry zone which will allow the user to enter the building and deactivate the system before the alarm sounds.
 - 1. Basic Alarm Performance Requirements: Unless otherwise indicated, operation of a manual station, automatic alarm operation of a smoke detector, or operation of a sprinkler flow device initiates the following:

2. Notification-appliance operation.
 - a. Identification at the FACP and the remote annunciator of the device originating the alarm.
 - b. Transmission of an alarm signal to the remote alarm receiving station.
 - c. Shutdown of fans and other air-handling equipment serving zone when alarm was initiated.
3. Alarm Silencing, System Reset and Indication: Controlled by switches in the FACP.

G. KEYPAD

1. Provide keypad as shown on the drawings. Key pad shall be provided with a built-in sounder for audible system signaling. Keypads shall operate via multiplex communications to provide total system indication and access code authorization over four conductors.
2. Operating range shall be from +320 to plus +1300F.

H. DOOR CONTACTS

1. Door contacts as shown on the drawings.
2. Magnetic, concealed, wide gap (up to 1 1/4") series contacts.
3. 1/4" diameter, moisture resistant, rhodium plated contacts tested to 10,000,000 cycles.

I. INSTALLATION

1. Wiring Method: Install 110 V system wiring in raceway. Install door sensors recessed with low-voltage system wiring concealed. Use listed plenum cable for low-voltage wiring. All wiring shall be installed concealed.
2. Wiring within Enclosures: Bundle, lace, and train the conductors to terminal points with no excess. Provide and use lacing bars and distribution spools.
3. Control Circuit Wiring: Install control circuits according to NFPA 70-90 and as indicated. Install number of conductors recommended by system manufacturer to provide control functions indicated.
4. Splices, Taps, and Terminations: Make splices, taps, and terminations on numbered terminal strips in junction, pull and outlet boxes, terminal cabinets, and equipment enclosures.
5. Tighten connections to comply with tightening torques specified in UL 486A.
 - a. Identification of Conductors and Cables: Color-code conductors and apply

wire and cable marking tape to designate wires and cables so they are uniformly identified and coordinated with system wiring diagrams throughout the system.

J. FIELD QUALITY CONTROL

6. Manufacturer's Field Service: Provide services of a factory-authorized service representative to supervise the field assembly and connection of components and system pretesting, testing, adjustment, and programming.
7. Program the system to suit Owner's requirements. Contractor shall provide all necessary software changes and materials from the system's manufacturer to provide a complete integrated Security System that communicates with a central station of the owner's choice.
8. Pretesting: Adjust the system and perform pretesting to verify conformance with specified requirements. Correct deficiencies by replacing malfunctioning or damaged items with new items. Retest until satisfactory performance and conditions are achieved.
9. Testing: Provide at least 10 days' notice of acceptance test performance schedule.
10. Operational Test: Perform operational system tests to verify conformance with specifications.
11. Inspection: Verify that units and controls are properly labeled and interconnecting wires and terminals are identified.
12. Retesting: Correct deficiencies and retest until the total system meets the requirements of the Specifications.
13. Prepare test and inspection reports.

END OF SECTION 260000

SECTION 314100 - SHORING AND BRACING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Extent of shoring and bracing work includes, but is not limited to, the following:
 - 1. Shoring and bracing as necessary to preserve and maintain the existing historic structure during construction.
 - 2. Maintenance of shoring and bracing.
 - 3. Removal of shoring and bracing, as required.

1.2 SUBMITTALS

- A. Layout Drawings: Provide signed and sealed drawings for review for shoring and bracing system deemed necessary for coordination and review by structural engineer.
- B. All shoring and bracing to be designed by a NJ Licensed Structural Engineer. See allowance for payment of engineering services.

1.3 QUALITY ASSURANCE

- A. Regulations: Comply with the most recent Building Code of the State of New Jersey and ordinances of governing authorities having jurisdiction.

1.4 JOB CONDITIONS

- A. Before starting work, check and verify governing dimensions and elevations. Survey condition of adjoining properties. Take photographs to record any prior settlement or cracking of structures, pavements, and other improvements. Prepare a list of such damages, verified by dated photographs, and signed by Contractor.
- B. Survey adjacent structures and improvements, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations. Locate datum level used to establish benchmark elevations sufficiently distant so as not to be affected by movement resulting from excavation operations.

1.5 EXISTING UTILITIES

- A. Protect existing active sewer, water, gas, electricity and other utility services and structures.
- B. Notify municipal agencies and service utility companies having jurisdiction. Comply with requirements of the local building department and governing agencies for protection, relocation, removal and discontinuing of services, as affected by this work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide suitable shoring and bracing materials, which will support loads imposed.

PART 3 - EXECUTION

3.1 SHORING

- A. Wherever shoring is necessary, locate the system to clear permanent construction.

3.2 BRACING

- A. Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move a brace, install new bracing prior to removal of original brace.
- B. Install internal bracing, if required, to prevent spreading or distortion to braced frames.
- C. Maintain bracing until structural elements are rebraced by other bracing or until permanent construction is able to withstand loads imposed.
- D. Remove bracing in stages to avoid disturbance to underlying soils and damage to structures, pavements, facilities, and utilities.
- E. Repair or replace, as acceptable to Owner, adjacent work damaged or displaced through installation or removal of shoring and bracing work.

END OF SECTION 314100

APPENDIX A – FINISH SCHEDULE

General Notes:

1. Preserve all existing finishes not to be disturbed by new construction. Provide proper protection during construction to include protection over all wood floors, stabilization of existing finishes such as plaster, paneling, and woodwork.
2. All finishes to be cut out or removed are to be marked out on site and reviewed with architect prior to removal.
3. Careful coordination of all new systems is to be completed prior to installation. This will include detailed coordinated shop drawings and a walk through to review and mark all new systems accompanied by the Architect and Engineers.
4. Contractor will be required to submit a room by room finish schedule.
5. Contractor is responsible for all cutting and patching of finishes necessary for all lighting, mechanical, electrical, and plumbing.
6. Contractor should anticipate the repair of all existing and missing finishes based on contractor's field observations. The drawings have provided a guide but do not quantify exactly the location of all finish repair work.
7. Woodwork is to be finished with a stain and clear wood finish as noted in the schedule. Mock-ups of all finished wood in each room will be required and every effort should be made to provide a consistent uniform finish to the woodwork.
8. Refer to Door and Window Schedules and Drawings for Doors, Hardware, Door Trim and Window work. All interior surfaces at windows and doors to be finished according to schedules in specifications below.
9. Contractor responsible for verifying all square foot areas and ceiling heights.
10. New wood trim. Refer to drawings for trim profiles or match profile within the space.
11. Assume all existing finishes to remain will be carefully cleaned using an appropriate cleaning technique that does not damage the finished surface. All proposed products for cleaning to be submitted for review to Architect and mockup cleaning samples prepared and reviewed on site prior to commencing work.
12. All GWB with veneer plaster and plaster surfaces are to be finished as noted in specification schedules below.
13. All surface mounted items including but not limited to thermostats, motion sensors, light switches, outlets, pull stations, exit and emergency lighting, signage, smoke and heat detectors and lighting are to be laid out for each room and carefully coordinated to minimize the visual impact. Color of item should match finish color onto which the item is being installed. All wall-mounted items should be carefully laid out to align and be discreetly located to minimize their visual impact on the room. See drawings for standards.
14. All new GWB in bathrooms, kitchen, and basement be Blue board grade for wet/damp areas.
15. All work on interior finishes must be completed by qualified contractors who submitted qualification credentials and have been accepted by the Architect as qualified based on their sub-contractor qualification form. Refer to trades requiring pre-qualification in general conditions.

Schedules to be referenced.

1. Carpet Specification 096816 3.3 Carpet Schedule
2. Wall Coverings Schedule Specification 097200 3.5A
3. Painting & Lead Safe Practices Specification 099113 3.10
4. Varnish/Staining schedule see Specification 099300 2.1B

Basement

Number:	001		
Room Name:	Crawl Space		
Sq. Footage:	550	Ceiling Height:	5'-6"
Floors:	Existing dirt floor to remain level. Rake up all debris, grade and install filter fabric and 3" min of stone. See Detail on drawings.		
Walls:	Brick- clean walls. Allow for selective repointing of brick walls. Area in base scope 100SF. Stone – Clean walls and remove all loose paint. Install masonry paint on stone walls		
Trim:	N/A		
Ceilings:	Exposed 1 st Floor Joists. Clean and vacuum joists, install (N) acoustic insulation and one hour fire rated GWB ceiling, prime, and paint.		
Baseboard:	N/A		
Special Notes:	Remove all piping, equipment, and debris. Firestop ceiling at all openings.		

Number:	002		
Room Name:	Mechanical		
Sq. Footage:	145	Ceiling Height:	6'-9"
Floors:	Existing concrete floor to be power wash cleaned. Patch all holes and minor damage.		
Walls:	Remove all miscellaneous attachments, equipment, and repair walls. (E) Painted brick walls: Remove all loose paint from brick walls. Prep, prime, and install masonry paint. (E) Wood Painted Bead Board partition wall and door to be cleaned and painted with primer and two finish coats of paint.		
Trim:	N/A		
Ceilings:	Existing ceiling to be removed. Install new one-hour fire rated GWB ceiling, prime, and paint.		
Baseboard:	N/A		
Special Notes:	Fire stop ceiling at all openings. Clean and paint (E) wood shelves on west wall. Pie storage box to be carefully removed , salvaged and returned to owner.		

Number:	003		
Room Name:	Room with stairs to First Floor.		
Sq. Footage:	148 150	Ceiling Height:	6'-8"

Floors:	Prime & paint Existing concrete floor to be power washed. Patch all holed and minor damage.
Walls:	(E) Painted brick walls. Remove all loose paint from walls. Prep, prime, and install masonry paint. (E) Painted wood beadboard partition wall- clean, prep, prime & paint with two finish coats. (E) Plaster wall- clean, prime, and paint. (E) Painted GWB – Clean and paint two finish coats. Remove all surface mouthed mounted piping and equipment. At stair remove all pink reg board and install new GWB.
Trim:	Painted wood- clean, prime, and paint
Ceilings:	Exposed 1 st Floor Joists. Clean joists, install aeoustic insulation and (N) one hour fire rated GWB ceiling, prime, and paint including at stair.
Baseboard:	N/A
Special Notes:	Stairs – clean all painted wood stair surfaces. Make minor repairs. Add sand to paint for stair treads to create nonslip surface. Stone sink – power wash sink. Black lally columns – lightly sand and paint.

Number:	004		
Room Name:	Room with (N) lift.		
Sq. Footage:	176 180	Ceiling Height:	7'-0"
Floors:	(E) Concrete floor power wash. Patch holes in concrete floor. Remove concrete pad from old boiler.		
Walls:	(E) Stone wall with parging and paint. Remove all loose parging and paint. Rake out and repoint open joints. Allow 100 SF. Apply masonry paint. GWB masonry wall, prime and paint. Remove (E) GWB and insulation at exterior wall around windows.		
Trim:	Painted wood – clean, prime, and paint.		
Ceilings:	Exposed 1 st Floor Joists. Clean joists, install (N) one hour fire rated GWB ceiling, prime, and paint.		
Baseboard:	N/A		
Special Notes:	Repair with GWB new basement wall jambs at openings where new basement windows installed. Prime and paint. Restore window jamb trim. Paint and prime.		

First Floor

Number:	RM 100		
Room Name:	Front Porch		
Sq. Footage:	340	Ceiling Height:	
Floors:	Lightly sand existing painted wood deck boards and apply primer and two finish coats with non-slip sand paint finish.		
Walls:	Clapboard- All clapboard to be removed, stripped of all paint, repaired, and painted.		
Trim:	N/A		
Ceilings:	Beadboard ceiling. Clean, remove biogrowth, prep, prime, and paint.		
Baseboard:	N/A		

Special Notes:	All columns, balustrades, and trim to be lightly sanded, prep, prime , and painted with two finish coats.		
Number:	RM 101 – See A200 for additional information.		
Room Name:	Entry Hall		
Sq. Footage:	57 plus stair -60 excluding stairs.	Ceiling Height:	8'-8 1/2" +/-
Floors:	Wood parquet floor. Prep, lightly sand, and apply 2 coats of varnish.		
Walls:	Wallpaper – Remove all existing wallpaper, repair plaster wall, and install new wallpaper.		
Trim:	Strip all painted wood to bare wood, prep, and apply stain clear finish to match (E) .		
Ceilings:	Repair (E) plaster ceiling, prime, and paint. Repair as needed.		
Baseboard:	See trim category above.		
Special Notes:	Stairs: strip all woodwork at stairs down to bare wood. Varnish/Stain all woodwork at stairs including treads, risers, runners and paneling - Install 27" wide carpet runner. Cast iron grate. Prep & paint high gloss black.		

Number:	RM 102		
Room Name:	Period Parlor/Event Space		
Sq. Footage:	250	Ceiling Height:	8'-5 1/4"
Floors:	Lightly sand and apply two coats of varnish. Carpet over center part of wood floor. Size of carpet to extend 2" beyond the undecorative portion of wood floor. Decorative parquet to remain exposed.		
Walls:	Remove existing wallpaper and repair plaster walls. Prep surface and install new Wallpaper.		
Trim:	All existing painted wood trim and paneling to be stripped of all paint to bare wood and stained.		
Ceilings:	Existing plaster ceiling to be cleaned, repaired, and wallpaper installed.		
Baseboard:	Same as trim.		
Special Notes:	Pocket doors to be stained on this room side.		

Number:	RM 102A		
Room Name:	Data closet.		
Sq. Footage:	26	Ceiling Height:	6'-0"
Floors:	Carefully document and remove each historic floor layer to be coordinated with Architect. Woven carpet to be salvaged and used to make carpet replication for room 102. Clean wood floor and leave unfinished.		
Walls:	(E) Beadboard. Lightly clean and preserve (E) wall mounted hardware and graffiti.		
Trim:	N/A		

Ceilings:	(E) Beadboard lightly clean.
Baseboard:	NA
Special Notes:	N/A

Number:	RM103 See HE-A205		
Room Name:	South Porch		
Sq. Footage:	95	Ceiling Height:	8'-2 1/4"
Floors:	Repair existing wood floor. Sand, prep narrow board wood floor and wood thresholds, apply varnish/stain.		
Walls:	(North Wall) Brick - repaint to match clapboard color. Clapboard – prime and paint.		
Trim:	Balustrade, soffits and columns – strip, prep, prime and paint to match exterior trim color.		
Ceilings:	New beadboard painted ceiling.		
Baseboard:	Strip paint off baseboard at brick fireplace and varnish/stain.		
Special Notes:	New mahogany cap to be varnished and stained to match floor.		

Number:	RM 104 – See A203 for additional information.		
Room Name:	Cultural Heritage and Archive Library – Period of significance 1960's		
Sq. Footage:	195	Ceiling Height:	8'-8 1/4"
Floors:	Existing wood narrow board floor. Lightly sand, and apply two coats of varnish.		
Walls:	Wallpaper on existing plaster walls to be removed. Repair all plaster walls & install new wallpaper.		
Trim:	All existing painted wood to be painted. All unpainted wood to be cleaned and protected.		
Ceilings:	(E) existing texture ceiling to be removed and apply veneer plaster coat, repair (minor), prime & paint.		
Baseboard:	Prep, prime, and paint.		
Special Notes:	North wall painted. Built in cabinets to be lightly sanded and painted. Natural wood countertop to be cleaned and protected.		

Number:	RM105		
Room Name:	Butler's Pantry		
Sq. Footage:	30	Ceiling Height:	8' – 9 5/8"
Floors:	Remove linoleum floor, install new tile floor.		
Walls:	Remove (E) wallpaper on (E) plaster & (N) GWB on west wall – clean, prime, and paint all walls.		

Trim:	All painted trim to be stripped of paint to bare wood and stained strong brown (7.5 YR 4/6. Varnish cabinets after staining. Remove wallpaper.
Ceilings:	(E) Wallpaper over Plaster – Remove wallpaper, clean, prime, and paint plaster ceiling.
Baseboard:	See trim.
Special Notes:	Pantry cabinets (including all interior spaces) strip all paint to bare wood, prep and varnish/stain cabinets. Clean glass.

Number:	RM106 – See A205		
Room Name:	Barrier Free Restroom		
Sq. Footage:	45	Ceiling Height:	7'-11"
Floors:	(N) tile. See A521. Remove existing tile flooring, install new plywood sub-floor & install new tile.		
Walls:	Wainscot: remove existing tile, repair wall & install (N) tile. Plaster wall above: prep, prime & paint.		
Trim:	All (E) painted wood trim to be cleaned, primed, and painted.		
Ceilings:	Install (N) GWB ceiling, prime and paint.		
Baseboard:	N/A		
Special Notes:	Floor threshold – install new Barrier Free threshold. See 2/A521.		

Number:	RM107 – Most work completed in previous phase.		
Room Name:	West Porch		
Sq. Footage:	147	Ceiling Height:	7'-6 1/4"
Floors:	Existing wood floor replaced in previous phase. No work. Lightly sand and apply nonslip paint finish.		
Walls:	N/A Strip all clapboard at wall, prime and paint.		
Trim:	N/A Refinish trim around door. Repaint all balusters and remove corrosion staining. (Strip prime and paint all soffits and trim work at ceiling and cornice.)		
Ceilings:	Prep, prime, and paint beadboard ceiling.		
Baseboard:	N/A		
Special Notes:	N/A Fill all holes, prep, prime and paint. Clean all rust staining from wood balustrades.		

Number:	RM108A See A207		
Room Name:	Catering Kitchen		
Sq. Footage:	110	Ceiling Height:	7'-5 5/8"
Floors:	Remove all € flooring and salvage narrow T&G floor and install (N) plywood sub-floor and (N) tile.		
Walls:	(E) plaster or All new GWB – Prep, prime, and paint.		

Trim:	Stain trim to match (N) kitchen cabinets.
Ceilings:	(N) GWB Ceiling, prep, prime, and paint. (Including at stair)
Baseboard:	Stain trim to match (N) Kitchen Cabinets.
Special Notes:	See A207 for additional finish/product information. See RM003 for stairs to basement.

Number:	RM108B – See A701		
Room Name:	Lift Lobby		
Sq. Footage:	85	Ceiling Height:	7'-7"
Floors:	See 3/A701		
Walls:	See 3/A701		
Trim:	See 3/A701		
Ceilings:	See 3/A701		
Baseboard:	See 3/A701		
Special Notes:	See 3/A701		

Number:	RM109		
Room Name:	Visitor Center		
Sq. Footage:	230	Ceiling Height:	8'-6 3/4"
Floors:	Lightly sand floors and apply two coats of varnish to wood floors.		
Walls:	(E) Plaster walls prime & paint.		
Trim:	All wood trim including chair rail: Remove all paint down to bare wood; finish with linseed oil paint and oil varnish.		
Ceilings:	€ Plaster ceiling: Prep, prime and paint. Ceiling molding (see trim)		
Baseboard:	Same as trim.		
Special Notes:	Linseed Paint all trim, interior sash and door faces. (N) Window sash to be stripped and repainted with linseed oil paint. All doors to have same finish as windows and trim. See allowance for window treatments.		

Second Floor

Number:	RM201		
Room Name:	Upper Hall		
Sq. Footage:	163	Ceiling Height:	7'-6 1/4" +/-

Floors:	Lightly sand and apply two coats of varnish to existing parquet floor.
Walls:	(E) plaster walls, remove existing flocked wallpaper down to plaster wall, clean and repair wall and install new wallpaper.
Trim:	Strip and stain all painted wood trim, same as Room 101.
Ceilings:	Remove all (E) ceiling tile & plaster & install new veneer plaster ceiling & install Wallpaper at Ceiling and Ceiling Border
Baseboard:	See wood trim.
Special Notes:	See special notes RM101. Stairs install (N) Carpet runner over stairs. Clean, lightly sand, and stain trim including stairs, balustrades, and paneling.

Number:	RM202		
Room Name:	Office		
Sq. Footage:	229	Ceiling Height:	7'-5"
Floors:	Clean existing wood floor to remove all black staining lightly sand and varnish exposed-Protect wood floor. Install woven area rug to cover wood floor in center area to cover wide boards with 2" overlap. Secure to wood floor.		
Walls:	(E) Plaster walls – Prep, prime, and paint. This includes repair where partition is removed.		
Trim:	Clean, prep, prime and paint all trim.		
Ceilings:	(N) veneer plaster ceiling, prep, prime, and paint.		
Baseboard:	Clean, prep, prime, and paint.		
Special Notes:	Wood plaster corner beads to be prepped, primed, and painted. –N/A		

Number:	RM203		
Room Name:	Office		
Sq. Footage:	183	Ceiling Height:	7'-6 3/8"
Floors:	Clean and protect wood board floor. Install (N) woven area rug offset 2'-6" from room walls, secure to wood floor. Lightly sand and varnish exposed wood floor.		
Walls:	Remove all existing paneling. (E) Plaster walls to be restored. Prep, prime, and paint.		
Trim:	Clean, prep, prime, and paint all existing wood trim.		
Ceilings:	(E) Ceilings removed. (N) Veneer plaster ceiling. Prep, prime, and paint.		
Baseboard:	Clean, prep, prime, and paint.		
Special Notes:	N/A		

Number:	RM203A		
Room Name:	Sleeping Porch		

Sq. Footage:	48	Ceiling Height:	
Floors:	Remove (E) carpet, Restore wood floor. Assume 20% new narrow wood boards. Sand to bare wood, prep & varnish.		
Walls:	(E) Painted bead board. Assume 50% replacement. Strip all paint to bare wood, prep, stain, and varnish. (E) clapboard to be stripped to bare wood, prep, prime and paint.		
Trim:	Prep, prime, and paint columns, soffits and all trim below ceiling.		
Ceilings:	Install 100% new bead board ceiling to match existing. Prep, stain, and varnish.		
Baseboard:	See Trim.		
Special Notes:	Prior to work complete structural framing repairs SSD. Clean out all debris from between exposed framings prior to installing bead board ceiling finish.		

Number:	RM204 See A205		
Room Name:	Restroom		
Sq. Footage:	56	Ceiling Height:	7'-4 5/8"
Floors:	Restore (E) floor tile, clean, and regrout. Repair tile where alterations noted.		
Walls:	Wainscott: Retain tile and add additional tile. See A205. Plaster wall above, remove all wall paper, prep, prime, and paint.		
Trim:	N/A		
Ceilings:	Prep, prime, and paint new GWB ceiling.		
Baseboard:	See wainscotting.		
Special Notes:	N/A		

Number:	RM205		
Room Name:	Office		
Sq. Footage:	188	Ceiling Height:	8'-6 7/8"
Floors:	Clean and protect wood floors. Install woven rug over existing wood floor, offset 1'-0" from perimeter of walls. Secure to wood floor.		
Walls:	(E) Plaster wall: prep, prime, and paint.		
Trim:	Prep, prime, and paint.		
Ceilings:	Remove all (E) wallpaper. € plaster ceiling. Clean, prep, prime, and paint.		
Baseboard:	Prep, prime, and paint.		
Special Notes:	Step from 201- Sand wood treads and install varnish with sand nonslip finish. Staircase: Clean, prep, prime and paint balustrade. Remove carpet, strip floor stair treads and risers, varnish with sanded nonslip finish. Prep, prime, and paint stair handrail.		

Number:	RM206		
Room Name:	Office		
Sq. Footage:	230	Ceiling Height:	7'-5 ½"
Floors:	Clean existing wood floor to remove all black staining lightly sand and varnish exposed-Protect wood floor. Install woven area rug to cover wood floor in center area to cover wide boards with 2" overlap. Secure to wood floor.		
Walls:	(E) Plaster walls – Prep, prime, and paint.		
Trim:	Clean, prep, prime and paint all trim.		
Ceilings:	(N) veneer plaster ceiling, prep, prime, and paint.		
Baseboard:	Clean, prep, prime, and paint.		
Special Notes:	Wood plaster corner beads to be prepped, primed, and painted.		

Third Floor

Number:	RM301 See A113 for repairs.		
Room Name:	Storage		
Sq. Footage:	254	Ceiling Height:	7'-5"
Floors:	Clean narrow tongue and groove wood floor and make necessary repairs. Stain and varnish.		
Walls:	Clean wood bead board		
Trim:	Clean wood bead board		
Ceilings:	Clean wood bead board ceilings and make necessary repairs.		
Baseboard:	Clean wood bead board and make necessary repairs.		
Special Notes:	Stairs. Resecure and paint wood stair railing. Restore existing finishes as necessary.		

Number:	RM302		
Room Name:	Mechanical		
Sq. Footage:	369	Ceiling Height:	7'-5"
Floors:	Clean		
Walls:	Clean		
Trim:	N/A		
Ceilings:	Clean		
Baseboard:	N/A		
Special Notes:	Mechanical Room. All cuts in floor for ductwork to be completed by carpenter, not mechanical sub-contractor.		