PROJECT MANUAL

First Baptist Church in Newton
Tower Restoration

Newton, MA

Bid Documents
May 16, 2024

Engineer:
Structures North Consulting Engineers, Inc.
60 Washington Street
Salem, MA 01970
978-745-6817

Architect:
Scott B. Aquilina, AIA
1253 Commonwealth Avenue
Newton, MA 02465
617-943-4079

Please direct all project correspondence to:
Sbaquilina@gmail.com

TABLE OF CONTENTS

Specifications

SECTION 00 10 00 - INVITATION TO BID

First Baptist Church in Newton, a.k.a. FBCN or the Owner, 848 Beacon Street, Newton, MA, requests bids for the structural stabilization and masonry restoration of their 1888 tower. The tower and the adjacent church buildings are listed in the National and State Register of Historic Places and are governed under a Preservation Restriction with the Massachusetts Historical Commission.

Special Requirements

The project may be partially funded with grants from the City of Newton Community Preservation Act program (CPA) and the Massachusetts Preservation Projects Fund through the Massachusetts Historical Commission and other grant programs yet to be confirmed. All work must be performed in accordance with the documents prepared jointly by Scott B. Aquilina, AIA and Structures North Consulting Engineers Inc. and meet the Secretary of Interior's *Standards for the Treatment of Historic Properties*.

While the project may be partially funded through public agencies, it is not subject to any specific statutory requirements, either under M.G.L. c. 30B or M.G.L. c.149. FBCN has nevertheless determined that a fair, open competitive process assures best value to the public. Accordingly, the terms of this Invitation for Bid (IFB) set forth all the rules of this procurement. There are no Filed Sub Bids, Chapter 149 procedures, or Prevailing Wage requirements. The Massachusetts laws and regulations may be referred to for guidance, but they shall not be binding on this IFB, the terms of which may be modified or waived if it is in the best interests of FBCN or the City.

While the structural masonry restoration is the primary focus of the project, the scope of work includes masonry cleaning, roofing, metalwork, carpentry, painting, and limited electrical. The Bidder on this contract should include these scopes of work except, as noted in the drawings, the replacement of existing porch roofs which will be under a separate contract. Paving and landscaping scope as indicated on the drawing is to be included from this bid. The Bidder must, however, include the coordination of this work in the sequence of construction on site.

Licensing and Bonds

Bidders shall be properly licensed under the laws governing their respective trades and be able to obtain insurance and bonds required for the Work. The successful Bidder will be required to furnish a Performance Bond and a Labor and Materials Payment Bond, each equal to 100 % of the Construction Contract Amount, as required by the Contract Documents.

ACCESS TO BID DOCUMENTS

Scott B. Aquilina, AIA is the Owner's Project Manager and Designated Representative. Bidding documents may be obtained by emailing Scott Aquilina at sbaquilina@gmail.com as of May 16, 2024.

PRE-BID ACCESS

The Project Site is at 848 Beacon Street, Newton, MA and may be accessed by applying to Scott Aquilina at sbaquilina@gmail.com.

PRE-BID MEETING

A mandatory pre-bid meeting and site inspection will be held at 848 Beacon Street, Newton on Monday, May 20, 2024 at 11:00 AM.

REQUESTS FOR INFORMATION

Requests for Information will be accepted until 5pm, Thursday, May 23rd and should be directed to sbaquilina@gmail.com and copied to jwathne@structures-north.com. Questions will be answered in memo format via email to all bidders by 5pm, Monday, May 27th.

ACCEPTANCE

All bids must be submitted prior to 5 pm on Friday, May 31, 2024 to be eligible for consideration. Bids shall be submitted by email to the Architect at sbaquilina@gmail.com and, simultaneously, Project Engineer at jwathne@structures-north.com. Bids shall be submitted as pdfs per the requirements of the FORM FOR GENERAL BID, Section 00 40 00 with the required

Construction Schedule, Schedule of Alternates and Qualifications Statement.

BID PROPOSALS MUST BE:

- Clearly labeled "Bid Proposal for First Baptist Church in Newton Tower Restoration."
- Endorsed with the name and address of the Bidder.
- Addressed to the Richard Ransom, Tower Restoration Committee Chair, First Baptist Church in Newton

BID PROPOSALS SHALL BE ACCOMPANIED BY:

(1) A fully executed FORM FOR GENERAL BID, Section 00 40 00
(2) A proposed construction schedule indicating site mobilization and staging, completion of work of the Base Bid and any accepted Alternates; demobilization; and site cleanup.
(3) Unit Costs and Schedule of Alternates as outlined below.
(4) Qualification Statement, Section 00 23 00,
including firm qualifications, company references, and resumes of key personnel to be assigned to the project for the full duration of the work.

EVALUATION OF BID PROPOSALS

Bids shall be evaluated on the basis of price, previous experience with similar types of masonry restoration projects, ability to perform the work in a timely manner, company references and resumes of key personnel to be assigned to the project. As used herein, the term "lowest responsible and eligible Bidder" shall mean the Bidder (1) whose bid is the lowest of those bidders possessing the skill, ability and integrity necessary for the faithful performance of the work; (2) who has met all the requirements of the IFB; and (3) who shall certify that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work.

First Baptist Church in Newton reserves the right to waive any informalities in or to reject any or all proposals if it be in their interest to do so. In inviting bid proposals, First Baptist Church in Newton shall reserve the right to reject any proposal, if it determines that such bid does not represent the proposal of a person or entity competent to perform the work as specified; or that fewer than three such proposals were received and the proposals are not reasonable for acceptance without further competition.

TERMS

The term of the awarded contract shall extend from the time of execution for approximately thirty (30) months but incorporate the full term required for Project completion.

TAXES

The Owner is a register 501(c)(3) entity and is exempt from payment of the Massachusetts Sales Tax.

WORK UNDER SEPARATE CONTRACTS AND BY OWNER: The Owner may do other work during construction with his own forces, or by separate contract.

END OF INVITATION TO BID

SECTION 00 15 00 - SPECIAL INSTRUCTIONS TO BIDDERS

BID PROPOSALS shall be accompanied by:

(1) A fully executed **FORM FOR GENERAL BID, Section 00 40 00**

(2) A **proposed construction schedule** indicating project staging, completion of work of the Base Bid and any accepted Alternates; demobilization; and site cleanup.

(4) Qualifications and References as requested in **Qualification Statement, Section 00 23 00**.

ADDENDA AND INTERPRETATIONS
Interpretation of all questions raised which, in the Engineer's opinion, require interpretation, will be sent as addenda to the Request for Design-Build Proposals in writing to all RFP document holders. Oral interpretations given to prospective bidders will have no standing.

It shall be the sole responsibility of the bidders to ascertain the existence of any and all addenda issues, whether or not the addenda is presented or mailed to or received by the bidder.

BID PRICE WORDS AND NUMERALS
In the event of a discrepancy between the numerals and the written words of a bid price, if the intent of the bidder is not clear as determined by the Owner's Agent, the written word shall prevail.

EXAMINATION OF SITE AND DOCUMENTS
Before submitting bids, each bidder shall visit the site and shall examine all contract documents, inspect and be familiar with them and the conditions under which work will be carried out. Neither the Owner nor the Owner's Agent will be responsible for errors, omissions and / or charges for extra work arising from the Contractor's failure to familiarize himself with contract documents or existing site conditions.

By submitting a bid, the Contractor agrees and warrants that he *has* examined the site and the contract documents, that he is familiar with the conditions and requirements of both and where they require, in any part of the work, a given result to be produced, that the contract documents are adequate and that he will produce the desired result.

COMMENCEMENT OF CONTRACT
The contract time commences immediately from the date that the executed copy of the Contract is submitted to the Contractor, or within such other period as the Owner's Agent may authorize in writing.

COMPLETION TIME
The Owner’s intent is for completion of Phase 1 (structural stabilization) by September 2025 and Phase 2 (project completion) by September 2026.

END OF SECTION

SECTION 00 23 00 - QUALIFICATION STATEMENT

In order to be eligible and responsible to bid on this project, General Bidders shall have a minimum of ten years of experience in the restoration of historic buildings, including structural reinforcement and masonry restoration of the scope described herein, to buildings of a similar age, size and scale as F B C N , and shall have completed at least three similar projects in the past five years, including at least three buildings on the Massachusetts State Register of Historic Places.

All bids shall be accompanied by a reference list of similar projects and resumes of key personnel to be assigned for the full duration of the project. All masonry repairs performed as work of this Contract shall be directed by at least one person who understands the specified requirements and the materials and methods needed for their correct execution; and shall be present at all times during the execution of the work of these Sections.

Submitted to: First Baptist Church in Newton

By (print name clearly): _____
Signature: _____

Principal Office: _____
Street City State Zip

The signer of this Qualification Statement guarantees the truth and accuracy of all statements and of all answers to questions hereinafter made.

1. How many years has your organization been in business as a contractor under your present business name?

   _____

2. How many years of experience in construction work has your organization had

   (a) as a Prime Contractor? _____ (b) as a Sub-Contractor? _____

3. Have you ever failed to complete any work awarded to you? _____

   If so, name the project and location, and state the reason for failure to complete:

   _____

   _____

4. List your references:

_____

_____

_____

_____

_____

_____

5. What similar projects has your organization completed? Be specific. Identify which projects are listed in the National or State Register of Historic Places.

Project Name	Contract Amount	Class of Work	Date Completed	Owner's Name and Address	Phone Number

_____

_____

_____

_____

_____

_____

_____

_____

_____

6. What is the construction experience of the principal individuals of your organization? Identify which individuals have worked on projects listed in the National or State Register of Historic Places.

Individual's Name	Present Position in Company	Years of Construction Experience	Type of Work	In What Capacity

END OF QUALIFICATION STATEMENT

SECTION 00 40 00 – SAMPLE FORM FOR GENERAL BID

The final BID FORM will be issued following the Pre-Bid Conference and issuance of any Addenda.

By submitting this bid the undersigned represents to the Owner:

- that he/she has examined and understands the Advertisement for Bids, Instructions to Bidders, contract forms, General Conditions of the Contract, Drawings, Specifications and all other Contract Documents, and has examined the site, as defined therein;
- that this bid is made with distinct reference and relation to all said Contract Documents;
- that in regard to the conditions affecting the work to be done and the labor and materials needed, this bid is based upon his/her own investigation and research in addition to any drawings, surveys, measurements, dimensions, calculations, estimates, or other tests or representations of any employee, officer, agent or consultant of the Owner.

A bidder wishing to amend this bid after transmittal to the Owner may do so only by withdrawing this bid and resubmitting another bid prior to the time for opening bids.

Submitted to: First Baptist Church Newton, 848 Beacon Street, Newton, MA. as directed in Section 00100 - Invitation to Bid, via email to:

Structures North Consulting Engineers, Inc.
60 Washington St, Salem, MA 01970
Attn: jwathne@structures-north.com

and

Scott B. Aquilina, AIA
1253 Commonwealth Ave, Newton, MA 02464
Attn: sbaquilina@gmail.com

A. The Undersigned proposes to furnish all labor and materials required to complete all of the work for the First Baptist Church Newton Tower Restoration, in accordance with the accompanying Drawings, Specifications and Addenda, prepared jointly by Structures North Consulting Engineers Inc. and Scott B. Aquilina, AIA for the Contract Price specified below, subject to additions or deductions according to the terms of the Specifications.

B. THIS BID INCLUDES **ADDENDA** NUMBERED: _____

C. PROPOSED PRICING AS FOLLOWS:

1. **BASE BID:**

Item #U1: _____sf @_____= _____

Item #U2: _____sf @_____= _____

Item #U3: _____sf @_____= _____

Item #U4: _____cf @_____= _____

Item #U5: _____lf @_____= _____

Item #U6: _____units @_____= _____

Item #U7: _____cf @_____= _____

Item #U8A: _____anch @_____= _____

Item #U8B: _____anch @_____= _____

Item #U8C: _____anch @_____= _____

Item #U8D: _____anch @_____= _____

Item #U8E: _____anch @_____= _____

Remainder of work by the Lump Sum = _____

TOTAL BASE BID = **$**_____

D. ADD ALTERNATE PRICING AS FOLLOWS:

1. **ALTERNATE #A1:**

Item #U1: _____sf @_____= _____

Item #U2: _____sf @_____= _____

Item #U3: _____sf @_____= _____

Item #U4: _____cf @_____= _____

Item #U5: _____lf @_____= _____

Item #U6: _____units @_____= _____

Item #U7: _____cf @_____= _____

Item #U8A: _____anch @_____= _____

Item #U8B: _____anch @_____= _____

Item #U8C: _____anch @_____= _____

Item #U8D: _____anch @_____= _____

Item #U8E: _____anch @_____= _____

Remainder of work by the Lump Sum = _____

TOTAL ALTERNATE #A1 = **$**_____

1. **ALTERNATE #A2:** $_____

2. **ALTERNATE A3:**

Item #U1A3: _____sf @_____= _____

Item #U2A3: _____sf @_____= _____

TOTAL ALTERNATE #A3 = **$**_____

3. **ALTERNATE #A4:**

Item #U1A4: _____sf @_____= _____

Item #U2A4: _____sf @_____= _____

TOTAL ALTERNATE #A4 = **$**_____

D. **PERFORMANCE GUARANTEE**: The undersigned agrees that, if he/she is selected as General Contractor, he /she will within ten days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the Awarding Authority, execute a contract in accordance with the terms of this bid.

E. The undersigned further certifies under penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used herein the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity.

Date _____ _____
(Print Name of Bidder)

Social Security Number or
Federal Identification
Number: _____

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

Telephone: (____) _____ _____
(Business Street Address)

_____
(City, State and Zip Code)

END OF SECTION 00 40 00 - FORM FOR GENERAL BID

SECTION 01 01 00 - SUMMARY OF WORK

Portions of this project were detailed to utilize a unique and specific proprietary system to stabilize the lower portion of the tower. The Contractor may propose or devise an alternate system that achieves the same result as the specified proprietary system with the same level of safety but that does not infringe upon any of the patents or restricted trade secrets of the system specified.

PART 1- GENERAL

1.1 GENERAL REQUIREMENTS

A. All work shall comply with the Massachusetts State Building Code and referenced standards.

B. All work shall be coordinated between related trades.

C. Contractor shall field verify all existing conditions and dimensions and shall be responsible for dimensional coordination. Notify the Architect and Engineer of any and all discrepancies.

D. The contractor shall be responsible for all temporary shoring and guying of the existing and new structure during the work, and for temporary protection of the surrounding environs, including the all elevation of the tower facing low and high roofs and low and high windows of the adjacent church.

E. The Contractor shall be solely responsible for all means and methods of construction employed on this project, and for all temporary bracing, support, and protection of the existing structure. Any sequences of work or methods indicated or implied in the contract documents are present only as assumptions on which the design of the permanent installations were based and are to be considered as suggested options for review by the contractor. Following review of existing conditions and the scope of work, the contractor shall submit his own statement of means and methods as well as schedule to the Engineer and shall keep the Engineer abreast of all progress and the beginning and completion of each phase or item of work.

F. The Contractor shall be solely responsible for maintaining the safety and stability of the structure and all adjacent structures during all phases of the work and shall correct any defects or damage which results from his actions or failures to act.

G. The Contractor shall erect a fence to secure the entire work area and provide for construction vehicle access and parking and designed lay down area as indicated in the drawings. Full access to public sidewalks and entry ramps shall be maintained at all times.

H. General work hours shall be 7am to 5pm Monday through Saturday. The Owner reserves the right to arrange for quiet hours during these times by prior arrangement.

I. The Contractor shall clean-up the property at the end of each day. Maintain site in a clean, unencumbered fashion from the end of work on Friday to the start of work on Monday.

J. The Contractor shall protect the property, the street, sidewalk and abutters' properties from any water spray, spatter or windblown soil or mortar materials.

K. The Contractor shall submit a weekly schedule to the Owner for their use, along with an overall project schedule updated on a monthly basis.

L. The adjacent doorways and windows under the north and east porches to the church shall be enclosed to prevent dust from entering into the interior.

M. All work shall meet applicable requirements of the Secretary of the Interior's Standards for Historic Preservation. The contractor shall be responsible for the treatment, protection and restoration of all historic finishes affected by the structural work.

1.2 DRAWINGS

A-100 SITE PLAN	S-101 NORTH AND EAST TOWER ELEVATIONS
A-200 GROUND FLOOR PLANS	S-102 SOUTH AND WEST TOWER ELEVATIONS
A-201 STEP AND ROOFPLANS	S-103 TOWER INTERIOR SECTIONS
A-202 TOWER PLANS	S-201 TOWER PLANS
A-203 TOWER PLANS	S-202 TOWER PLANS
A-300 SOUTH AND EAST ELEVATIONS	S-203 TOWER PLANS
A-301 NORTH AND WEST ELEVATIONS	S-301 SECTIONS AND DETAILS
A-302 SECTION AT EAST PORCH	S-302 SECTIONS AND DETAILS
A-303 SECTION AT NORTH PORCH	S-303 SECTIONS AND DETAILS
A-400 ENLARGED TOWER SECTIONS	TS-101 STATIC FRAME ELEVATIONS
A-401 ENLARGED TOWER SECTIONS T	TS-102 STATIC FRAME ELEVATIONS
A-500 MISC. DETAILS	E-100 ELECTRICAL

1.3 SPECIFICATION SECTIONS

Section 00 10 00	Invitation to Bid
Section 00 15 00	Special Instructions to Bidders
Section 00 23 00	Qualification Statement
Section 00 40 00	Form for General Bid
Section 01 01 00	Summary of Work
Section 01 30 00	Submittals
Section 01 50 00	Temporary Facilities
Section 02 05 00	Structural Dismantling and Demolition
Section 02 21 00	Shoring, Bracing and Structural Pre-loading.
Section 03 30 00	Cast in Place Concrete
Section 04 20 00	Masonry Cleaning
Section 04 30 00	Masonry Restoration
Section 04 50 40	Low Pressure Grouting of Stone Masonry Assemblies
Section 05 10 00	Structural Metals
Section 06 10 00	Rough Carpentry
Section 06 20 00	Finished Carpentry
Section 07 6 0 00	Copper Roofing and Flashing

Section 09 90 90	Painting
Section 09 95 00	Staining and Transparent Finish
Section 13 10 00	Lighting Protection
Section 13 40 00	Cathodic Protection System
Section 31 63 33	Drilled Micropiles
Section 32 23 00	Excavation and Backfill

PART 2- PRODUCTS

2.1 PROVIDE: Products as indicated in the respective specification sections that are referenced in the description of work.

PART 3- EXECUTION

3.1 GENERAL SCOPE OF WORK, MEASUREMENT AND PAYMENT:

A. General- Perform all work in accordance with the drawings and specifications under the respective Base Bid or Alternates for this contract, which will include at least the following items of work along with all incidental work required for the completion of these items in conformance with this Specification and all referenced documents and drawings:

1. All work as detailed on the Contract Drawings and in the Specifications, including all labor, materials and incidental items required for completion of the work.

2. Protection of all structural, architectural, landscape, window, door and roofing elements and adjacent structures to remain.

3. Erection of a protection system for passersby along the public way including a secured fence along the full perimeter of the project work site.

4. Protection of and dust barrier for windows and doors under the north and east porches within the work zone.

5 All specified masonry, flashing and sealant work.

6 All necessary staging, protection and site storage.

5. Provision and maintenance of all necessary temporary sanitary equipment which shall be located per FBCN approval.

6. Protection of all trees.

7. Protection of all existing masonry and paved surfaces.

8. Restoration of lawn in the work zone.

9. Returning of the premises to a clean, orderly and attractive condition following completion of the work.

10. Coordination with the church to avoid scheduled special events and funerals on weekdays and Saturdays.

11. All construction staging, permits and police details are required.

12. Clear access to the handicapped entry ramp and from required emergency exits must be maintained at all times unless as authorized by Owner.

B. All shall be performed for the Lump Sum, excluding the unit cost items listed below.

Unit Cost Items:

Item #U1- Cutting and pointing of exposed exterior stonework to a depth of at least 2.5 times the joint width and an assumed average depth of up to 3", measured by the gross square foot.

Item #U2- Deep cutting and pointing of exposed exterior stonework to a depth of at least 2.5 times the joint width and an assumed average depth of 3" or greater, measured by the gross square foot.

Item #U3- Deep cutting and pointing of exposed interior stonework to a depth of at least 2.5 times the joint width and an assumed average depth of 3" or greater, measured by the gross square foot.

Item #U4- Dismantling and reconstruction of ashlar stonework, including replacement of any irreparably damaged non-dressed stone units, scabbling of back-up construction, tying of the re-stones and filling of the collar joint with restoration grout measured by the gross square foot.

Item #U5- Jet-cleaning, pointing, steaming and grout injection of stone masonry via plunge-drilled ports and/or port anchors, including temporary dunnage system as required to resist internal grouting pressures (attributable on a pro-rata basis as an incidental to this work), measured by the gross cubic foot of masonry injected.

Item #U6- Repair of cracked stone units by pinning and adhesive injection of the cracks measured by the repaired stone unit.

Item #U7- Excavation, jet-cleaning, pointing and grout injection of cracks in the stone masonry measured by the lineal foot of crack.

Item #U8A- Proving and installing V-1 anchors, including all core drilling, sock inflation and surface finishing.

Item #U8B- Proving and installing V-2 anchors, including all core drilling, sock inflation and surface finishing.

Item #U8C- Proving and installing V-3 anchors, including all core drilling, sock inflation and surface finishing.

Item #U8D- Proving and installing V-4 anchors, including all core drilling, sock inflation and surface finishing.

Item #U1A3/A4- Provide cost per square foot for wood roof decking (exposed, stained)

Item #U2A3-A4E- Provide cost per linear foot for wood structural framing (custom tooled, stained)

Unit Prices shall include the respective shares of Division 1 costs. No separate increase or decrease in Division 1 costs shall be made for changes in unit quantities, rather, they shall be included in the unit prices themselves.

3.2 BASE BID WORK AND ALTERNATES:

A. Base Bid Work: All work specified, called for and/or noted in the Contract Drawings and Specifications shall be performed under the Base Bid, including a pro-rata share of all incidental work and all items listed in Part 3.1/A of this Section, unless specifically described as Alternate Work below.

B. Alternate #A1 - All masonry restoration above El. 46'-6" per Structural Drawings.

C. Alternate #A2 - All architectural work on Sheets A200 – A500 and E100 scope.

D. Alternate #A3 - Provide new sheet copper roofing and flashing at north and south porches. Assume 50% replacement of custom wood decking and 15% of custom wood framing.

E. Alternate #A4 - Provide EPDM roofing and flashing at north and south porches. Assume 50% replacement of custom wood decking and 15% of custom wood framing.

END OF SECTION

SECTION 01 30 00 - SUBMITTALS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. DIVISION 0 and DIVISION 1 as listed in the TABLE OF CONTENTS, are hereby made part of this Section by reference thereto.

B. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 SUBMITTAL PROCEDURES

A. Schedule submittals to expedite the Project. Submit submittals to the Architect promptly via email at sbaquilina@gmail.com or, if required to be mailed, to Scott B. Aquilina, AIA, 1253 Commonwealth Ave, Newton, MA 02465.

B. Coordinate the submission of related items.

C. Identify the Project, Contractor, Subcontractor and supplier.

D. Apply Contractor's stamp, signed or initialed to certify that review, verification of Products required, field dimensions, adjacent construction work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

E. Owner shall have final approval of all submittals.

1.3 CONSTRUCTION PROGRESS SCHEDULES

A. Submit the initial Construction Progress Schedule within seven calendar days after date of the Owner-Contractor Agreement.

B. Submit revised Construction Progress Schedules with each Application for Payment, identifying all changes since previous version.

1.4 PRODUCT DATA

A. Submit three copies plus any additional copies which the Contractor requires. One copy will be retained by the Engineer.

B. Mark each copy to identify applicable products, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.

1.5 PROPOSED EQUIVALENTS

A. This project has been detailed to utilize a unique and specific proprietary system to stabilize the lower portion of the tower. The Contractor may propose or devise an alternate system that achieves the same result as the specified proprietary system with the same level of safety but that does not infringe upon any of the patents associated with this system.

1.6 SUBMITTAL PROCEDURE FOR PROPOSED EQUIVALENTS

A. Product Data: Submit system manufacturer's data describing the proposed alternative system components and materials to be used on this project.

B. Representative Projects: Submit at least three examples of projects of similar scope on which the proposed alternative system components and materials have been used.

C. Certifications: Submit system manufacturer's certification of compliance with the designated standards and specifications set forth herein for each of the proposed alternative system components and materials to be furnished hereunder.

END OF SECTION

SECTION 01 50 00 - TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. DIVISION 0 and DIVISION 1 as listed in the TABLE OF CONTENTS, are hereby made part of this Section by reference thereto.

B. Coordinate work with that of all other trades affecting or affected by the work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 PROJECT CONDITIONS

A. Smoking is expressly prohibited inside any part of the building.

1.3 ELECTRICITY

A. Electrical service is available at the site. Cost to be borne by FBCN.

1.4 TELEPHONE

A. Contractor shall provide telephone communication as cell phone, office phone, or home phone, but must provide a means of reaching the Contractor any weekday between 8:00 A.M and 5:00 P.M.

1.5 WATER

A. Water service is available at the site.

1.6 SANITARY FACILITIES

A. Provide and maintain a portable toilet outside the building, located as designated by the Owner's Agent.

1.7 SECURITY

A. Provide secure barriers to prevent unauthorized entry to construction areas and the building interior, and to protect the building and contents from vandalism, damage, tampering and theft through the entire construction period. Do not leave the building unsecured at any time. Do not admit any unauthorized persons into the building at any time. Entry into the building for access to building systems must be arranged through the Owner.

1.8 STAGING

A. Furnish and assemble all necessary hoisting, staging and scaffolding facilities.

1.9 STORAGE

A. Store materials and equipment where designated by the Owner's Agent. Where stored materials and equipment are of value or attractive for theft or vandalism, take measures to secure the materials.

1.10 PROGRESS CLEANING AND WASTE REMOVAL

A. Utilize all measures necessary to contain dust and debris within the immediate work area of the building. Prevent dust and debris from entering the interior of the building.

B. Maintain the site in a clean and orderly condition, free of waste materials, debris, and rubbish.

C. Collect and remove waste materials, debris, and rubbish from site daily and dispose lawfully off-site. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold waste materials more than seven days during normal weather, or for more than three days when the temperature is expected to rise above 80F. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly.

1.12 REMOVAL OF TEMPORARY FACILITIES

A. Remove temporary utilities, equipment, facilities, materials upon completion of the Project. Clean and repair damage caused by the installation or use of temporary work.

END OF SECTION

SECTION 02 05 00 - STRUCTURAL DISMANTLING AND DEMOLITION

PART 1 - GENERAL

1.1 INCLUDED IN THIS SECTION

A. Dismantling of exterior ashlar stonework and trim which is to be re-used.

B. Demolition of existing Belfry deck and wood sheathing.

C. Dismantling of wood rafters, joists and trim.

1.2 RELATED SECTIONS

A. Section 02 21 00 - Temporary Shoring, Bracing and Protection

B. Section 04 30 00 - Masonry Restoration

1.3 REFERENCES

A. Comply with all applicable demolition standards of the Massachusetts Department of Public Works.

B. Comply with all applicable OSHA requirements.

1.4 SUBMITTALS

A. Submit certificates attesting to legal disposal of refuse materials if requested by the Architect.

1.5 PROTECTION

A. Provide for the uninterrupted safety of workers and adjacent structures to remain as well as the general public during all phases of the work. Provide warning signs, and barricades as required to maintain a separated, safe, secure site.

B. Protect all elements which are to remain and all historic elements to be retained and/or re-set. Do not dismantle anything other than what is specifically indicated on the Contract Documents unless specifically requested to do so in writing by the Architect.

PART 2 - PRODUCTS AND MATERIALS

2.1 PROVIDE PRODUCTS AND MATERIALS: which are incidental to the dismantling and demolition work, disposing of these or salvaging them for re-use as best suits the project conditions.

PART 3 - EXECUTION

1.1 SITE REVIEW: Perform full review of site to verify extent of dismantling and to plan for coordination with other trades.

1.2 DISMANTLE (REMOVE FROM PRESENT POSITION) THE FOLLOWING:

A. Masonry that has been designated to be removed.

B. Masonry that has loosened or shifted that is immediately contiguous to the designated removal.

C. Carpentry that is scheduled to be re-used.

1.3 DISMANTLING OPERATIONS

A. Carefully study each item to be dismantled and determine the safest, least disturbing and potentially damaging method of disassembly.

B. Dismantle the specific items and store items designated for re-use or salvage in a safe place.

C. Notify the Engineer immediately if any damage has occurred to any of the dismantled items and propose appropriate methods of repair.

1.4 DEMOLITION OPERATIONS

A. Examine areas and conditions under which the Work will be performed. Correct conditions which are detrimental to the timely and proper completion of the work. Proceed only when unsatisfactory conditions have been corrected.

B. Protect items in or near the work that are to remain.

C. Minimize noise and dust. Provide wetting and protection as required.

D. Prevent accumulation of debris on the site. Remove refuse or salvaged items on a continuous, on-going basis.

E. Do not demolish any elements on which other elements depend for their stability without directly supporting them by another means. Proceed with all dismantling work in an incremental fashion to avoid destabilizing the structure.

F. Return site to neat, tidy condition following dismantling operations.

END OF SECTION

SECTION 02 21 00 - TEMPORARY SHORING, BRACING AND STRUCTURAL PRE-LOADING

PART 1 - GENERAL

1.1 INCLUDED IN THIS SECTION

A. Detailing and installation of all required temporary shoring, bracing and support to enable the specified masonry reconstruction and restoration to be completed in a safe and expedient manner and protection of existing masonry, roofs, windows and doors as indicated on the drawings.

1.2 REFERENCES

A. Comply with the following standard material specifications that apply to the materials used.

1.3 SUBMITTALS

A. Submit the following items to the Architect for review:

1. Drawings showing shoring, bracing, and temporary supports.
2. A written sequence of all phases of significant structural operations and related temporary support.
3. Structural pre-loading procedures and equipment.
4. Documentation of Jacking System provider experience and a list of completed projects, along with references.
5. Logs of pre-loading jack adjustments and monthly or weekly confirmation of exerted loads.

1.4 QUALITY ASSURANCE

A. Comply with all referenced standards for the products employed.

B. Schedule all appropriate site visits and inspections.

C. All work shall be executed by a company and personnel that have at least ten years of demonstrated experience in the design, installation, use and maintenance of large scale, high capacity structural jacking systems.

PART 2 - PRODUCTS

2.1 MATERIALS AND PRODUCTS- MISCELLANEOUS

A. Products and materials that are appropriate to the application and permitted by the Massachusetts State Building Code.

2.2 PRE-LOAD JACKING SYSTEM

A. Jacking system shall consist of eight hydraulic jacks of at least 20 ton capacity supported on static frame beams needled through tower windows.

B. Jacks shall be individually controlled collectively equalized by a center console to provide a constant upward load as indicated on the Structural Drawings.

C. Jackings shall have load cells that clearly indicate the applied upward forces on each one and shall be able to be locked into position for up to 18 months at a time with the possibility of occasional adjustment.

D. Jacks shall be adjusted and equalized based upon force and pressure rather than distance of travel.

E. Jacks shall be sized to be able to extend at least 4" beyond their fitted but unloaded positions in order to counter the defections of the static loading frame beams.

PART 3 - EXECUTION

3.1 TEMPORARY SHORING AND BRACING

A. The contractor shall be solely responsible for all means and methods of construction employed on this project including all temporary bracing, support and protection of the existing Structure. Contractor shall be prepared to retain the services of a Massachusetts registered professional structural engineer at his own expense if necessary in order to maintain safe and stable conditions on the project. Any sequences of work or methods indicated or implied in the Contract Documents are present only as assumptions on which the design of the permanent installations are based and are to be considered as a suggested option for review by the contractor.

B. Field Survey and Analysis:

1. Field-verify indicated shoring locations and measure all existing geometry and note existing conditions. Locate points of attachment and support that will best suit progress of work.
2. Perform a structural analysis of the areas affected by the work and determine loads on temporary shoring, bracing and support system.

C. Design Shoring, Bracing and Protection:

1. Shoring and bracing shall be designed to maintain the stability and existing elements without deflection during work. Design shall be in accordance with gravity dead, live and wind load resistance requirements of the Massachusetts State Building Code and referenced standards.

2. Shoring and bracing shall be sufficient for existing and new material loads and anticipated

construction loads.

3. Shoring and bracing shall allow for distribution of loads to supporting structure and shall limit all movement to less than 1/16" at full loading. Stresses on supporting structure shall not exceed safe, commonly allowable stresses for the materials in consideration of their age and conditions. Bending members shall allow deflections of not more than the span lengths divided by 720 at full loading.

4. Protection shall be detailed to protect the remaining structure, its contents, and the immediate environs against damage from falling projectiles, debris and/or soiling that is related to or a result of any of the operations that are part of this project. This shall include barricades, shields, tarpaulins, scrims and restraining devices, along with any other devices and structures as may be needed to provide safe protection. All structures shall be detailed and constructed to withstand all possible live, snow, wind and impact loads without failure.

D. Construct shoring, bracing and protection in accordance with approved submittals and proper and standard construction practice. Work shall be installed so as not to permanently mar or stain the exposed stone faces of the structure.

E. Maintenance: Maintain shoring, bracing and support in a safe condition during all phases of work.

F. Removal: Remove all shoring and bracing after surrounding work is complete and masonry has adequately cured to support itself. Remove all temporary inserts and clean all contact surfaces and plug all holes per applicable requirements of Section 04 30 00 –Masonry Restoration and Reconstruction.

3.2 STRUCTURAL PRE-LOADING

A. Review the shop drawings of the structural steel Static Loading Frame, along with the existing building conditions to confirm bearing surfaces, clearances, support conditions and alignments.

B. Install jacks, hydraulic lines and load cells.

C. Pressurize jacks to specified loads in an incremental manner, monitoring hydraulic pressures and travel distances and confirm equalization of applied loads.

D. Check applied loads at least once per month during periods when masonry reconstruction and grouting work is not underway below the static frame, and on a weekly basis when masonry reconstruction and grouting work is being executed below.

E. At the end of the required curing period following completion of masonry work, slowly and gently release and then remove the jacking system.

END OF SECTION

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.0 GENERAL PROVISIONS

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

B. Attention is directed to the existing conditions at the site. The Contractor shall become thoroughly familiar with the existing conditions in order to assess the scope of work required.

1.1 WORK INCLUDED

A. New concrete slab infil infills.

B. New concrete footings.

1.2 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ACI 302 - Guide for Concrete Floor and Slab Construction.

C. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.

D. ACI 305R - Hot Weather Concreting.

E. ACI 306R - Cold Weather Concreting.

F. ACI 308 - Standard Practice for Curing Concrete.

G. ACI 318 - Building Code Requirement s for Reinforced Concrete.

H. ANSI/ASTM D1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

I. ASTM C33 - Concrete Aggregates

J. ASTM C94 - Ready-Mixed Concrete

K. ASTM C150 - Portland Cement

L. ASTM C260 - Air Entraining Admixtures for Concrete

M. ASTM C494 - Chemicals Admixtures for Concrete

N. ACI SP-66 - American Concrete Institute - Detailing Manual

O. ANSI/ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement

P. CRSI - Concrete Reinforcing Steel Institute - Manual of Practice

Q. CRSI - Placing Reinforcing Bars.

1.3 SUBMITTALS

A. Product Data: Provide product data for all accessories, admixtures and inserts.

B. Concrete Mix designs.

C. Shop Drawings: Fully show all bar sizes, spacing, locations, and quantities of reinforcing steel and wire fabric. Provide bending and cutting schedules.

D. Field quality-control test and inspection reports.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301.

B. Conform to ACI 305R when concreting during hot weather.

C. Conform to ACI 306R when concreting during cold weather.

D. Detailing and construction of formwork, shoring and bracing shall be sufficient to maintain required alignments and surfaces. All work shall conform to ACI 318 and ACI 301, the Massachusetts State Building Code, and accepted construction practice.

E. Reinforcing steel detailing and installation shall be in accordance with CRSI - Manual of Standard Practice, ACI SP-66, and ACI 318.

F. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field-Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.

2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

G. Concrete Testing Service: The Owner will engage a qualified independent testing agency to perform material evaluation tests and to verify concrete mixtures. Materials and workmanship shall be subjected to inspection and testing in mill, shop and/or field by Designer and/or Testing Agency. Such inspection and testing shall not relieve Contractor of his responsibility to provide his own inspection, testing, and quality control as necessary to furnish materials and workmanship in accordance with requirements of this section.

1. During progress of work, provide free and safe access to work at all times to Engineer and Testing Agency so as to make possible proper inspection of work.

2. Notify Engineer and Testing Agency prior to start of any phase of concrete work so as to afford them reasonable opportunity to inspect work. Such notification shall be made at least 24 hours in advance for concrete placements and at least 36 hours in advance for other inspections.

1.8 MOCK-UPS

A. Provide a 24" x 24" x 12" thick mock-up of concrete slab infill color, surface finish, scoring and edge tooling for review and approval by the Engineer. Mock-up shall match the color, surface texture and edge tooling of the original slab construction at a location selected by the Engineer. All completed work shall match the mock-up. Work that does not match the mock-up shall be removed and replaced with work that does.

PART 2 - PRODUCTS

2.0 CONCRETE MATERIALS

A. Cement: ASTM C150.

B. Fine and Coarse Aggregates: ASTM C33.

C. Water: Clean and not detrimental to concrete.

2.1 ACCESSORIES

A. Bonding Agent: Two component modified epoxy resin.

2.2 ADMIXTURES

A. Air entraining admixture: ASTM C260, Darex series by W.R. Grace & Co., Connecticut or approved equivalent.

B. Corrosion Inhibitor: Calcium nitrite based corrosion inhibitor, DCI series by W.R. Grace & Co., Connecticut or approved equivalent.

C. Shrinkage reducer: Eclipse by W.R. Grace & Co., Connecticut or approved equivalent.

D. Water Reducing: ASTM C494 Type A, WRDA series by W.R. Grace & Co., Connecticut or approved equivalent.

E. No admixtures shall contain calcium chloride.

2.3 REINFORCEMENT AND ACCESSORIES

A. Reinforcing Steel: ASTM A615, 60 ksi yield grade; deformed billet steel bars, epoxy coated in accordance with ASTM A775..

B. Tie Wire: Minimum 16 gage annealed type, hot dip galvanized.

C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic coated steel type; size and shape as required.

D. Fabricate concrete reinforcing in accordance with CRSI Manual of Practice, ACI SP- 66, ACI 318.

E. Locate reinforcing splices, not indicated on drawings, at point of minimum stress.

2.4 CONCRETE MIX

A. Standards: Mix concrete in accordance with ACI 304. Deliver concrete in accordance with ASTM C94. Select proportions for normal weight concrete in accordance with ACI 301 Method

B. Mix Requirements:

1. Cast in Place Concrete mix shall have the following properties/ additives:

Compressive Strength (28 day)	5000 psi for slab infill concrete
	4,000 psi for footing concrete
Water/Cement Ratio (maximum)	0.40 by weight for exterior concrete
Aggregate Size	1-1/2” maximum
Air Entrainment	4% to 6% percent
Water Reducing Agent	As Required
Slump	To suit placement

2. Use accelerating admixtures in cold weather when approved by Engineer but do not relax other cold weather concrete placement requirements.

3. Do not use calcium chloride - containing admixtures.

4. New slab infil concrete shall match the original concrete (at selected location) and the approved mock-up in paste color and aggregate size and color. Mix shall contain a blend of white and gray Portland cement as well as mineral oxide pigments as need to obtain the required color match.

5. The use of mineral additives or supplements such as ground granulated Blast Furnace Slag, Fly Ash, Silica Fume or Micro Silica are strictly prohibited.

6. Fine and coarse aggregates shall comply with the applicable paragraphs contained in the MassDOT Standard Specification for Highways and Bridges, Section M4.

7. Preformed ⅜-inch expansion joint filler shall conform to the requirements of AASHTO M 33.

2.5 FORMING AND CURING MATERIALS AND ACCESSORIES

A. Smooth-faced wooden boards of Douglas Fir or Spruce species to result in the same surface planarity and finish as the original cast-in-place concrete pier, coping and wall elements. Provide chamfers at all vertical corners to match the original.

B. Form Ties: Stainless steel wire, where needed, run through small holes drilled in the forms and cut flush with the concrete surface when the forms are removed.

C. Form Release Agent: Colorless mineral oil which will not stain concrete, or absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.

D. Type 2 Liquid Membrane-Forming Compounds for Curing Concrete shall be used in accordance with ASTM C309 - 58 or AASHTO M 140-57 or the latest revisions thereof.

2.6 WATERPROOFING MATERIALS AND ACCESSORIES

A. Waterstop: Equal or equivalent to VOLCLAY WATERSTOP RX101.

B. Waterproofing Membrane System and Components: Adhered Sheet Membrane system equal or equivalent to the BITUTHENE system as manufactured by the W. R. Grace Co., as specified under Section 07 13 26: Sheet Membrane Waterproofing

E. Sealant for Sealing Joints where indicated:

1. Provide 2-component polyurethane complying with ASTM C-920 and Federal Specification TT-S-00227.

2. Sealant shall be equal or equivalent to the Sika or Tremco product lines.

PART 3 - EXECUTION

3.0 PREPARATION

A. Bonding: Prepare previously placed concrete and/or existing masonry by roughening to an amplitude of greater than 1/4" and cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

3.1 ERECTION OF FORMWORK

A. Hand-trim sides and bottom of earth forms where used. Remove loose soil prior to placing concrete.

B. Erect formwork, shoring and bracing in accordance with ACI 301 to achieve required geometry and stability.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Align joints and make watertight. Keep form joints to a minimum. Provide chamfer strips on external corners of foundation walls. Maintain tolerances required by ACI 301.

D. Apply form release agent on formwork in accordance with manufacturer's recommendations. Do not apply form release agent where concrete surfaces will receive applied coverings which are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

E. Clean forms as erection proceeds and clean formed cavities of debris prior to placing concrete. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports. Do not allow ice or snow to accumulate within forms, but remove manually if this accumulates. Do not use de-icing salts and do not use water to clean out forms in cold weather conditions. Use compressed air or other means to remove foreign matter.

F. Do not reuse wood formwork more than 2 times for concrete surfaces to be exposed to view.

3.2 PLACEMENT OF REINFORCING STEEL

A. Place, support and secure reinforcement against displacement. Do not deviate from required position. Do not displace or damage vapor barrier where present. Accommodate placement of formed openings and inserts.

3.3 CONCRETE PLACEMENT

A. Place concrete in accordance with ACI 304 or ACI 301. Notify Engineer a minimum of 24 hours prior to commencement of operations.

B. Ensure reinforcement, inserts and embedded parts are not disturbed during concrete placement.

C. Maintain records of concrete placement: Record date, location, quantity, air temperature, and test samples taken.

D. Place concrete continuously between predetermined expansion, control, and construction joints. Do not interrupt successive placement; do not permit cold joints to occur.

3.4 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

B. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

3.5 CONCRETE FINISHING, CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

B. The finish of exposed concrete, such as at slab infills, is to be reviewed and approved by the Engineer.

C. Finishes of Exposed Concrete Slab Infill Surfaces shall match surface finish, scoring and edge tooling of the existing slab being filled. Cover and moist cure concrete for at least 7 days.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports. Such testing and inspection shall not relieve the General Contractor from responsibility to provide quality control.

B. Testing agency will report inspection results promptly and in writing to Contractor and Designer.

C. Test Cylinders: Three concrete test cylinders will be taken for each day's batch.

D. One additional test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.

E. One slump test will be taken for each set of test cylinders taken.

F. Remove and replace work that does not comply with specified requirements.

G. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements. This testing will be paid for by the General Contractor.

H. All exposed work shall match approved mock-ups.

3.7 INSTALLATION OF FLEXIBLE SEALANTS

A. Provide backer rod and sealant where indicated on the Drawings.

B. Install backer rod and sealant in strict accordance to manufacturer's instructions. Use primer where recommended by manufacturer.

C. Size backer rod for each joint size.

D. Install sealant to the depth recommended by the manufacturer for each width of joint. Joint profile shall match adjoining mortar profile. Face of joint shall be sanded so that color and texture shall match adjoining mortar joints.

E. Sealant at backer rod shall be installed at all locations indicated on Drawings and at all locations subject to structural or thermal movement.

END OF SECTION

SECTION 04 20 00 - MASONRY CLEANING

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. Attention is directed to the existing conditions at the site. The Contractor shall become thoroughly familiar with the existing conditions in order to assess the scope of work required.

1.02 SECTION INCLUDES:

A. Work Included: Cleaning existing masonry both brick, granite and sandstone.

B. Remove:
   1. Dirt and soil
   2. Organic growth
   3. Efflorescence and lime
   4. Carbon encrustation and soot
   5. Residue from mortar or grout
   6. Rust and metallic stains
   7. All other non-masonry substances, stains, and contamination

1.03 RELATED SECTIONS

A. Section 04 30 00 – Masonry Restoration

1.04 SUBMITTALS:

A. Product Data: Manufacturer's data including instructions, recommendations, and restrictions.

1.05 QUALITY CONTROL:

A. Observation: Perform quality control under direct observation of the Architect.

B. Written Records: Provide detailed written records for each test, condition, substrate, and contamination type.

1. Record product used, concentration, techniques, dwell time on surface, tools used, water temperature, water pressure and other relevant information.

C. Cleaner/Remover Testing: Before creating mockups and before production cleaning/removal, test cleaners/removers, cleaner/remover concentrations, and cleaning techniques on small test samples at inconspicuous locations approved by the Architect.

1. Repeat cleaner testing until successful cleaning is achieved, as judged by the Owner and Architect.

D. Cleaning/Removal Mockups: Provide mockups at the earliest possible time and before ordering production quantities of cleaning and removal materials.

1. Mockup Locations and Solar Orientations: Comply with Architect's directions.
2. Mockup Size and Quantities: Provide minimum 3-foot x 6-foot mockups for each condition, each substrate, and each contamination type included in this section
3. Workers: Use the same workers for both mockups and production cleaning/removal.
4. Repeat Successful Cleaner/Remover Testing: Use the same products, concentrations, techniques, dwell time on surface, water temperature, water pressure and tools.
5. Adverse Reactions: Allow mockups to dry for at least seven days to allow time for adverse reactions to become evident.
6. Repeat Mockups: Repeat mockups until successful cleaning/removal is achieved, as judged by the Owner and the Architect.
7. Update Records: Update written records to record changes from successful cleaner/remover testing, if any.
8. Protect: Protect approved mockups from damage and modification.
9. Disposition: Approved mockups shall be incorporated into the completed Project.

1.06 DELIVERY, STORAGE, HANDLING:

A. Comply with Division 1 General Requirements and manufacturer's instructions and recommendations.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

A. Diedrich Technologies, Inc.., www.diedrichtechnologies.com

B. EaCo Chem, Inc., www.eacochem.com

C. Hydrochemical Techniques, Inc., www.hydroclean.com

D. Prosoco, Inc., www.prosoco.com

2.02 MASONRY CLEANING AND REMOVAL MATERIALS:

A. Cleaners and Removers: Provide cleaners and removers specifically manufactured for each substrate and soiling condition. Contact manufacturer to determine specific product to be used on each substrate.

B. Water: Clean, potable, and free of deleterious materials.

1. 180 Degrees F Water: Required for removal of paint, tar, and asphalt.

C. Brushes: Soft bristle with fiber type recommended by manufacturer for each product used.

D. Pressure Cleaning Equipment:

1. Water Pressure at Contact Point of Material: ≤500 psi. Testing shall be completed prior to full washing to confirm pressure washing practices do not damage masonry or mortar with high pressure water.
2. Spray Tip: ≥15 degree spread.
3. Water Flow Rate: 3 to 6 gallons per minute.

PART 3 - EXECUTION

3.01 MASONRY CLEANING:

A. All materials and methods used for cleaning shall be the gentlest possible available. The objective of cleaning any masonry is to preserve the material and not to make the material look new or pristine.

B. Comply with cleaner manufacturer’s instructions and recommendations.

C. Repeat cleaning procedures successfully used on “Cleaning/Removal Mockups”.

1. Workers: Use the same workers for both mockups and production.

D. Pre-wet surfaces to be cleaned.

E. Mix product with water if recommended by the manufacturer.

F. Apply cleaner/remover by hand with soft brush.

G. Work cleaner/remover into all cracks, crevices, and details.

H. Gently agitate the surface and lift contamination.

I. Allow cleaner/remover to remain on the surface for time period recommended by the manufacturer.

J. Do not allow cleaner/remover to dry on the surface.

K. Rinse thoroughly and completely with specified water and pressures.

L. Keep spray nozzle ≥8 inches from the surface.

M. Repeat cleaning/removal until acceptable results are achieved.

N. Do not damage substrates.

1. Removal of soil and stains is expected to change appearance.
2. Do not “bleach”, streak, or change actual substrate colors.

O. Protect finished areas from bleaching, streaking, and re-soiling/re-staining.

P. Do not allow cleaning products to wash into surrounding natural water sources.

Q. Alternate methods, such as sandblasting or walnut shell blasting may be used if successfully use and approved on “Cleaning/Removal Mockups”. Such methods must be approved prior to production and shall be avoided on sandstone.

1. Workers: Use the same workers for both mockups and production.

END OF SECTION 04 20 00

SECTION 04 30 00 - MASONRY RESTORATION

Portions of this project were detailed to utilize a unique and specific proprietary system to stabilize the lower portion of the tower. The Contractor may propose or devise an alternate system that achieves the same result as the specified proprietary system with the same level of safety but that does not infringe upon any of the patents or restricted trade secrets of the system specified.

PART 1 - GENERAL

1.1 INCLUDED IN THIS SECTION

A. The following items of work as described in the construction documents:

1. Dismantling of existing masonry construction and reconstruction with new back-up construction and re-set outer leaf.
2. Dismantling of projecting masonry elements, repair of remaining back-up construction and Removal of exterior leaf of stonework, restoration of rubble back-up construction, and re- setting of exterior leaf and trim.
3. Deep cutting of masonry, pinning and grouting of voids, re-setting of loose stones and repointing.
4. Cutting and pointing of stonework to remain in place.
5. Repair of structural through wall cracks.

1.2 SCOPE OF WORK

A. The base bid shall include all masonry work, the nature and quantities of which are detailed and described herein and on the Contract Drawings.

B. The masonry Contractor shall be responsible for coordinating and insuring that all flashing and weep holes are installed.

1.3 RELATED SECTIONS

A. Section 02 05 00 - Structural Dismantling and Demolition

B. Section 02 21 00 – Temporary Shoring, Bracing and Protection

C. Section 03 30 00 – Cast-in-Place Concrete

D. Section 04 50 40 – Low Pressure Grouting of Stone Masonry Assemblies

1.4 REFERENCES

A. ACI 530 - Building Code Requirements for Masonry Structures.

B. ACI 530.1 - Specifications for Masonry Structures.

C. ASTM A82 - Cold-Drawn Steel Wire for Concrete Reinforcement.

D. ASTM A123 - Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products.

E. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate.

F. ASTM A525 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process.

G. ASTM A580 - Stainless and Heat-Resisting Steel Wire.

H. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

I. ASTM B370 - Copper Sheet and Strip for Building Construction.

J. ASTM C90 - Load-Bearing Concrete Masonry Units.

L. ASTM C157- Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete

M. ASTM C216 - Facing Brick (Solid Masonry Units Made From Clay or Shale).

N. ASTM C652 - Hollow Brick (Hollow Masonry Units Made From Clay or Shale).

O. ASTM C1713 – Mortars for the Repair of Historic Masonry

P. IMIAC - International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Cold Weather Masonry Construction.

1.5 SUBMITTALS

A. Submit the following items to the Engineer for review:

1. Test reports required as per paragraph 1.6 - Quality Control.

2. Grout mix design where needed.

3. Samples of new structural pointing and patching mortars and grouts cured in same fashion as will be applied to structure.

4. 24”x24” raking (joint cutting) test/sample patches (as preparation for repointing work) to be provided by the Contractor at exterior and interior wall surfaces and located as agreed with Engineer on site. No raking or joint cutting shall be started until samples are approved.

5. 24”x24” pointing / repointing test/sample patches to be provided by the Contractor at exterior and interior wall surfaces and located as agreed with the Engineer on site. No

repointing shall be started until samples are approved.

1.6 QUALITY CONTROL

A. Comply with all referenced standards for the products employed.

B. Coordinate times of Special Inspections to comply with International Existing Building Code.

C. During periods of cold or questionable weather, keep a log of work including air temperature and weather conditions, work started and completed per day, and tests taken. No work shall be done when the ambient temperature of the structure or the air is less than 40 degrees F and rising.

D. Produce mortar and grout samples in the form of 2" x 2” x 2” flat slabs, placed against wooden side forms and backing, for easy removal of cured sample. Provide 8 samples per mortar and grout type taken on different days and cured under conditions that match field conditions to testing laboratory for compression testing. Provide at least four 2" x 2" x 2" field cut samples of existing mortar to the testing laboratory for comparative compression testing. Contractor shall arrange for and pay for all testing and shall submit results at 7 days and at 28 days to the Architect. Adjustments in mix and re-tests shall be made as required at no additional cost to the Owner. Test existing mortar samples and trial mixes at least three weeks before commencing masonry work.

E. Masonry Contractor shall be a qualified, well-referenced brick and stone mason with at least 10 years of experience in stone construction, repair, and restoration.

PART 2 - PRODUCTS

2.1 MASONRY UNITS

A. Stone: Re-used original granitic stone units, repaired as needed in accordance with this Section.

B. Clay Brick: New fired clay units meeting ASTM C62, Grade SW, Low Absorption. Minimum strength shall be 4,000 psi, maximum water absorption shall be 8%.

2.2 MORTAR AND GROUT

A. Provide the appropriate MORTAR formulations in accordance with the following:

1. Mortar for exposed masonry for CONCEALED REPOINTING AND RE-SETTING OF STONEWORK shall be 1 part type I or II Portland Cement, 1 parts Hydrated Lime and 6 parts Bulked Sand. Sand shall be properly selected and blended to match the color, texture and appearance of the existing mortar sand, and when used,

Portland Cement shall be a combination of white and gray cement that bests suits the color matching of the existing mortar binder. Where additionally needed, up to 10% by mineral oxide pigment by weight of binder may be added to best match the color of the original mortar. Pigments shall be chemically pure mineral oxides, alkali proof and light fast, and shall be equal or equivalent to "Solomon Grind" as manufactured by Chem Services Inc, of Springfield, IL. Comply with the ASTM C1713 "Proportion Specification".

2. Mortar for exposed masonry for EXPOSED REPOINTING AND RE-SETTING OF STONEWORK shall be 1 part type I or II Portland Cement, 1 parts Hydrated Lime and 6 parts Bulked Sand. Sand shall be properly selected and blended to match the color, texture and appearance of the existing mortar sand, and when used, Portland Cement shall be a combination of white and gray cement that bests suits the color matching of the existing mortar binder. Where additionally needed, up to 10% by mineral oxide pigment by weight of binder may be added to best match the color of the original mortar. Pigments shall be chemically pure mineral oxides, alkali proof and light fast, and shall be equal or equivalent to "Solomon Grind" as manufactured by Chem Services Inc, of Springfield, IL. Comply with the ASTM C1713 "Proportion Specification".

B. Provide the appropriate GROUT formulations in accordance with the following:

1. Grout for GROUTED REINFORCED CONCRETE UNIT MASONRY shall be 3,000 psi strength at 28 days; 8 10 inches slump; premixed type in accordance with ASTM C94 or mixed in accordance with ASTM C476 Coarse or Fine grout.
2. Restoration Grout for CAVITIES AND COLLAR JOINTS shall be VoidSpan PHLc Gravity Feed Grout as supplied by VoidSpan Technologies, LLC of Salem, MA.

C. Coarse Aggregate For Grout:

1. For CMU CELL FILLING GROUT: ASTM C-33, 3/8" dia. minimum gravel or stone.

2. For RESTORATION GROUT shall be VoidSpan "EXTEND" Vacuum Saturated Expanded Shale (VSES) added at a rate of up to 2 parts aggregate to 1 part grout for placements of greater than 3" in width.

D. Portland Cement: Type I, II or IIA white and/or gray cement as follows: ASTM C150 complying with staining requirements of ASTM C91 for not more than 0.03% water soluble alkali. Mortar shall show no efflorescence when cast in a 2" x 7" x ½" slab consisting of 1 part of the cement to be used, 2 parts Ottawa plastic mortar sand and distilled water, and subjected to a 7 day "wick test" conforming to ASTM C67.

E. Hydrated Lime: ASTM C207, Type S.

D. Fine Aggregate / Sand:

1. Sand for mortar and grout: ASTM C144, washed. "Bulk" or moisten sand before mixing with

binder (proportions based on damp sand).

a. Sand for use in exterior-exposed pointing or re-pointing mortar and for plug and filler mortar shall match the sand of the original, exposed mortar.

2. For surface fill: Clean, fine sand free of salts.

E. The contractor shall review the water content and any required adjustments along with proposed products with the Engineer. Contractor shall then submit a record mortar mix design along with product data sheets to the Engineer for verification, review and approval before beginning any mixing or installation.

F. Thoroughly mix mortar ingredients in accordance with ASTM C270 in quantities needed for immediate use.

G. Mix grout in accordance with ASTM C94 or thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 Fine or Course grout.

H. Do not use anti-freeze compounds to lower the freezing point of grout.

2.3 REINFORCEMENT, ANCHORAGE AND ADHESIVE PRODUCTS

A. Cintec Sock Anchors shall be as supplied by VoidSpan Technologies, LLC of Salem, MA.

B. Horizontal Joint Reinforcement for CMU Construction: Ladder type; steel wire, hot dip galvanized to ASTM A641 Class 3 after fabrication, cold drawn steel wire conforming to ASTM A82, 3/16" diameter side rods with 9 gage cross ties, hot dip galvanized.

C. Reinforcing Steel: ASTM A615, epoxy coated, grade 60 deformed bars.

D. Provide Reinforcing steel dowels in accordance with Specification Section 00 33 00 - Cast in Place Concrete.

E. Provide stainless steel ties and anchors for the tie-back to stone construction meeting the requirements of ASTM A276, Type 304/316.

F. Adhesive Anchoring System for Miscellaneous Embedded Items (where indicated on the Contract Drawings as “Adhesive Anchors”):

1. For anchorage to masonry (except as noted below under #2 or 3): Hilti HY200 Adhesive Injection System with properly sized Screen Tubes as manufactured by the HILTI Corporation of Tulsa, OK.

2. For anchorage to large, non-porous solid masonry units (w/out crossing voids or cavities): Hilti RE500 Adhesive Injection System as manufactured by the HILTI Corporation of Tulsa, OK or Sikadur Injection Gel as manufactured by the Sika Corporation of Lyndhurst, NJ.

I. Adhesive Anchoring System for Miscellaneous Embedded Items (where indicated on the Contract Drawings as "Adhesive Anchors"):

1. For anchorage to masonry (except as noted below under #2 or 3): Hilti HY20 Adhesive Injection System with properly sized Screen Tubes as manufactured by the HILTI Corporation of Tulsa, OK.

2. For anchorage to large, non-porous solid masonry units (w/out crossing voids or cavities): Hilti RE 500 Adhesive Injection System as manufactured by the HILTI Corporation of Tulsa, OK or Sikadur Injection Gel as manufactured by the Sika Corporation of Lyndhurst, NJ.

3. For pinning of stone dutchmen or fragments to parent units: Sikadur Injection Gel as manufactured by the Sika Corporation of Lyndhurst, NJ.

J. Mortar Washdown Cleaner:

1. For Pigmented Mortar- Equal or equivalent to "Vanatrol" as manufactured by ProSoCo Inc. of Lawrence, KS.

2. For Unpigmented Mortar- Equal or equivalent to "Sureclean 600" as manufactured by ProSoCo Inc. of Lawrence, KS.

K. Steel Braces, Pinning Rods and Connectors: See SECTION 05 10 00 – Structural Metals.

L. Reinforcing Steel shall satisfy ASTM A615 Grade 60, and be epoxy coated in accordance with ASTM A775.

N. Sealant and Backer Rods

1. Provide closed cell backer rod at all sealant joints. Backer rod shall be carefully sized per sealant manufacturer instructions for each joint.

2. Provide 2-component polyurethane complying with ASTM C-920 and Federal Specification TT-S-00227E.

3. Acceptable manufacturers: Sika, Tremco or equivalent product line.

O. Lead Weathercaps for sky-facing mortar joints shall be equal or equivalent to those manufactured by Weathercap, Inc., of Slidell, LA.

P. Vapor Permeable Air Barrier: Equal or equivalent to "Air Bloc 31" as manufactured by the Henry Company of El Segundo, CA.

PART 3 - EXECUTION

3.1 DISMANTLING OF DESIGNATED MASONRY

A. Mark removal lines and provide temporary support and protection to adjacent work to remain. Maintain existing structure in safe condition at all times.

B. Evaluate each piece of stonework in place and determine the best, most gentle method(s) of removal for each unit. Locate and cut any anchors that are holding the units in place, providing support to the units while the anchors are being detached or cut so that the units do not fall or become stressed. If any of the units are found to be “headered” or irremovably locked into the back-up construction, stop removal work, brace the unit and notify the Engineer of the condition.

C. Carefully remove designated stone units in proper sequence and demolish designated brick, rubble or grouted back-up construction. If any of the adjacent construction becomes destabilized during the removal process, stop work in the affected area and notify the Engineer immediately. Back-up construction shall be demolished where indicated and where found to be in unsound condition (schedule a site inspection with the Engineer before proceeding with unsound masonry removal). Comply with all requirements of Section 02 00 50- Structural Dismantling and Demolition

D. Visibly tag all stones as to their locations and orientations and record these on referenced elevation drawings. Tags shall be removable upon reinstallation.

3.3 RESTORATION OF EXISTING BACK-UP MASONRY TO REMAIN

A. Remove all loose masonry units, mortar and residue from surface of back-up construction without disturbing or weakening or destabilizing the masonry. Employ a "pressure washer" and regulate the nozzle pressure to clean but not damage the surfaces. Nozzle pressure shall be in the range of 600 psi with a 15 degree fan at the tip.

B. Identify and remove loose units and re-set them with new mortar slushed into surrounding voids. Add stones and chinkers as may be appropriate to re-stitch the wall to a sound, unfragmented condition.

1. Locate damaged and/or loose brick or stone units to be removed. Pull unit(s) out of wall with a gentle rocking action, driving wedges into surrounding joints only as required to snap this joint off. Stones shall be removed one at a time, bricks may be removed up to 4 at a time.

2. Set new replacement brick units into wall in orientation and locations of existing damaged units. Pre-wet existing construction and fully butter all contact surfaces of new units during setting, striking mortar at distance of 1” back from the ashlar face of the masonry to allow for final tuck pointing.

C. Grout-inject cracks and small voids encountered in masonry to remain per the requirements of Section 04 50 40.

D. Inspect all joints and rake deteriorated or softened mortar joints to a minimum depth of 1”, or as

deeply as necessary to reach sound mortar, but not to exceed one half of the thickness of the joint without supplementary means of support. Employ tools that are sharp and will completely cut out joints at intersections without splitting or damaging stones. Drive hardwood shims into joints that will be cut more deeply than 1 ½" to prevent the wall construction from shifting.

E. Moist-cure all work under a tarpaulin or plastic sheets. Following curing period, maintain weather protection to interior of structure until exterior wall system is replaced.

F. Work under this subsection shall only be done when the ambient air, material, and substrate temperatures are above 40 degrees F. by 9:00 AM and rising.

3.4 EXCAVATION AND CLEANING OF STRUCTURAL CRACKS

A. Diagonal and Vertical Crack Repair

1. Except at cracks that run in the extreme corners of the tower, carefully remove two wythes of interior brickwork/stonework along diagonal step and vertical cracks to expose remaining depths of cracks in back-up construction.

2. Remove all loose mortar and residue from remaining surfaces within crack excavations without disturbing or weakening or destabilizing the masonry. Employ a "pressure washer" as needed and regulate the nozzle pressure to clean but not damage the surfaces. Nozzle pressure shall be in the range of 600 psi with a 15 degree fan at the tip.

3. Working from the exposed back-up surfaces at all cracks, identify and remove any loose remaining units and re-set them with new mortar slushed into surrounding voids. Add new bricks in place of damaged bricks, toothing them into the surrounding work to re-create solid conditions within the walls.

4. Point the cracks in the remaining back-up wythes and insert regularly spaced ½' diameter plastic grouting tubes into the pointing mortar.

B. Grout inject cracks in accordance with Section 04 50 40.

3.5 GROUTED REINFORCED CONCRETE UNIT MASONRY BACK-UP CONSTRUCTION

A. Establish lines, levels, and coursing indicated. Protect from displacement. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

B. All vertical joints between sequentially constructed vertical strips of liner wall shall be fully toothed and horizontal steel fully lap-spliced so that both connected sections of wall will act as one.

C. Set masonry units as follows:

1. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

2. Lay hollow masonry units with face shell bedding on head and bed joints.

3. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.

4. Remove excess mortar as Work progresses.

5. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

6. Perform job site cutting of masonry units with proper tools to provide straight, clean, un-chipped edges. Prevent broken masonry unit corners or edges.

7. Masonry units shall be laid in Running Bond except where there are multiple wythes, full header units shall be provided on a 16” x 16” pattern, whether of block or brick.

8. Pilasters shall be constructed in a woven pattern that is fully toothed into the main liner walls, with interlocking header units making up 50% of the total vertical cross-sectional area in each direction.

D. Install horizontal and vertical bar reinforcing per notes and details on structural drawings. Lap reinforcing to develop full tension capacity of bar (50 bar diameters or greater). Support and secure reinforcing bars from displacement.

E. Provide bond beam lintels over all openings.

F. Fully grout and parge all horizontal surfaces with a slight outward slope so as not to perch or absorb standing water. Parge or smoothly trowel all vertical surfaces in addition to horizontal surfaces, and their intersections in order to fill all cracks and gaps.

G. Grouted Reinforced Wall Construction:

1. Reinforce bond beams, lintels per the structural drawings.

2. Support and secure reinforcing bars from displacement.

3. Place and consolidate grout fill without displacing reinforcing.

4. Lay masonry units with core cells vertically aligned and cavities between wythes clear of mortar and unobstructed.

5. Place mortar in masonry unit bed joints back 1/8" from edge of unit grout spaces, bevel back and upward. Permit mortar to cure 7 days before placing grout.

6. Reinforce masonry unit cores and cavities with reinforcement bars and grout as indicated.

7. Wet masonry unit surfaces in contact with grout just prior to grout placement.

8. Grout spaces less than 2" in width with Fine grout using low lift grouting techniques. Grout spaces 2" or greater in width with Course grout using low lift grouting techniques.

9. When grouting is stopped for more than one hour, terminate grout 1 1/2" below top of upper masonry unit to form a positive key for subsequent grout placement.

10. Low Lift Grouting: Place first lift of grout to a height of 16" to three courses and rod for grout consolidation. Place subsequent lifts in 8-inch increments and for grout consolidation.

3.6 APPLICATION OF VAPOR PERMEABLE AIR BARRIER

A. Vapor Permeable Air Barrier shall be applied to completed masonry back-up surfaces where indicated on the drawings. Encapsulation of back-up masonry shall be complete without any gaps or “holidays” that might otherwise allow water to enter the structure behind.

B. Apply only enough product to satisfy the minimum thickness requirements, apply in accordance with manufacturer’s literature.

C. Allow Air Barrier to fully cure before laying new masonry against or above it.

3.7 INSTALLATION OF ANCHORS, PINS AND RODS

A. Install Adhesive-Set pins, connectors and dowels as shown on the Contract Drawings and as described below using the applicable Injection System.

1. Carefully drill holes of the proper oversize diameter for the screen tube (in masonry) and for injection resin or sealants 1/8" larger in diameter than the anchor rod or pin, or as indicated on the Drawings or specified by the manufacturer of the injection system if different.

2. Locate and size anchors and pins in as indicated in the Contract Documents and as needed per Engineer’s field instructions following exposure of hidden conditions.

3. Provide embedment as noted or instructed but not less than 8” embedment at ½” diameter and larger anchors or 4” embedment at anchors of less than ½’ diameter.

4. Incrementally core-drill all holes being careful not to damage or loosen substrate and being careful to avoid embedded metal if any.

5. Simultaneously with injection of holes, pre-butter rods’ surfaces with injection resin so that there is a uniform coating all around the rod of between 1/16” and 1/8” in thickness and insert rods immediately thereafter.

6. Wipe off excess resin and clean out remaining hole depth. Do not allow resin to leak out of holes and stain stone surface(s). Remove resin immediately if this happens!

7. Monitor progress and quality of work, adjusting techniques as may be necessary with approval of the Engineer. Check that annular space is filled around the end of each rod following insertion. If properly installed, resin should be oozing out beyond end of rod all around annular space, showing that the annular space and the hole are completely filled. Supplementary injection may be necessary due to the presence of voids.

B. Install Cintec Anchors in accordance with the following:

1. Coordinate design and installation of Cintec anchoring system with manufacturer.

a. Forward contract drawings, required load information and description of conditions to a representative of Cintec America, Inc. and arrange site visit to observe existing conditions and review installation.

b. Cintec America shall provide written verification of design load and installation and shall provide additional installation requirements and instructions. Submit to Engineer for review before proceeding with installation. Adjustments shall be made if necessary to the anchor design at no additional cost to the Owner but no adjustments shall be made in diameter of rod nor reduction in embedment.

c. Satisfy Cintec contractor training and certification requirements and successfully complete at least 4 trial anchor installations in field to satisfaction of a qualified Cintec representative (unless more are required to obtain certification).

d. Successful trial installations may be used as permanent installations.

2. Install anchors in arrangement indicated on the contract drawings and by the size indicated on the contract drawings and verified or modified by the manufacturer in accordance with the approved procedures. Coordinate anchor rod installation and layout with layout and installation of connected members and within required tolerances. Provide sufficient thread length and clearance for attachments where required. Cut-off or remove grouting ports following installation.

3. Follow all applicable requirements of VoidSpan Installation Guides “C1” and “C2”, at the end of this specification.

C. Work under this subsection shall only be done when the ambient air, material, and substrate temperatures are above 40 degrees F. by 9:00 AM and rising.

3.8 PREPARATION OF EXISTING STONE UNITS TO BE RE-USED

A. Following removal, mechanically and chemically clean all salvaged stone units to be re-used. Identify all chips, spalls and cracks and soft or weathered areas, and notify the Engineer of all such conditions.

B. Document conditions of units before and during removal. The Contractor shall be responsible for replacement of any units that are irreparably damaged due to improper removal or handling and

shall replace such at no additional cost to the owner.

C. Remove all ferrous inserts and connectors from units and patch remaining holes.

D. Trim and/or grind bearing surfaces and drill holes in units as needed for re-attachment as shown on the Drawings or per instructions given by the Engineer. All cuts and modifications shall be made in a careful manner so as not to cause any damage to or weaken the units.

E. Adhesive Injection of Cracks in Intact Stones (both sides of crack in fixed position):

1. Drill holes in crack and insert grouting ports at between 4" and 6" on center. Verify that crack width is equal to or less than ¼".

2. Seal surface of crack between and around grouting ports with crack sealant. Surface seal shall be pigmented to match surrounding stone.

3. Pressure-inject crack with injection gel, starting from bottom port and proceeding upward as each successive port fills.

4. Allow to cure, remove ports and grind off crack sealant.

F. Re-attachment of Detached Stone Fragments:

1. Remove loose stone fragments from parent material. Install straight 3/16" diameter stainless steel threaded repair pins on a 4" by 4" pattern but at least 2" from any stone edges where stone shards are more than 6" wide or 2" thick. Hole shall be oversized for epoxy adhesive and shall be run through the loose shard into the parent stone.

2. Clean contact surfaces between stone fragments.

3. Pre-butter surfaces to be bonded with epoxy adhesive (injection gel) and adhere together in position, and immediately inject the repair pin holes and insert the rods to a depth of ½" from the surface of the stone shard.

G. Filling of Voids, Nicks and Recesses in Stones: Hand-rub a latex cement paste slurry on surfaces to be bonded to and hand trowel or form matching plug and filler mortar on surface immediately thereafter. Moist-cure.

H. Carefully core-drill holes in units to receive setting pins, avoiding cracks, repairs and fissures in stones that could cause further damage. Pin hole locations should be coordinated with field-set pin locations and any modifications to the layout shown on the Contract Drawings shall be presented to the Engineer for review.

I. Before, during and after work, store units in a dry and safe location.

J. Work under this subsection shall only be done when the ambient air, material, and substrate temperatures are above 40 degrees F. by 9:00 AM and rising.

3.10 RE-SETTING OF STONEWORK

A. At bed joints, add lead shims as needed to help float large units without squeezing out the mortar. Install stone anchors at proper alignments and stack next courses of units properly over them. Incorporate cotton chord weeps as indicated. Tool the interior edge of the mortar bedding at cavities to provide "shed joints" at a 1:1 slope, keeping the weep extensions clear of mortar. Incorporate flashing where indicated, providing solid bedding below the flashing to minimize "oil canning".

B. Install ties and connectors to hold stones in place, looping these where indicated around reinforcing steel cages, being careful not to mar the epoxy coating so as to keep the stainless steel galvanically separated from the protected non-stainless reinforcing steel.

C. At head joints, fill the gaps between stone ends solidly with mortar, using backer rods at the interior edges of cavity construction if needed. Add slate shims if greater than 1" thickness, in order to minimize shrinkage and sloughing.

D. Stones shall be re-set to within ¼" of their previous positions and surface alignment, with individual joints' widths along all sides within 1/8" of their cumulative average width per stone.

E. Install all indicated stainless steel anchors, pints and ties to reinforce the cores of buttresses and to laterally tie out wythes of walls.

F. Strike outer joints at a recessed depth of 2 ½ times the joints' widths from the surrounding masonry and provide dovetail transitions to existing surrounding joints and to those that are to be re-pointed or removed.

G. Collar joints may be gravity-filled with PHLc grout. Grout may be amended with up to 2:1 Course Aggregate (VSES) by volume where gaps are consistently greater than 3" in width.

H. Fill cores of buttresses as follows: Loosely dry stack up to three feet of angular stone at a time with sufficient pathways for the flow of grout, then gravity feed PHLc grout into the cores to fully surround the dry-stacked stone. Grout may be amended with up to 2:1 Course Aggregate (VSES) by volume where gaps are consistently greater than 3" in width.

I. Finish point outer surfaces of the joints to match surrounding work after not less than 24 hours from the setting of the stones and filling of the joints.

J. Work under this subsection shall only be done when the ambient air, material, and substrate temperatures are above 40 degrees F. by 9:00 AM and rising.

3.11 RE-SETTING TOLERANCES

A. Maximum Variation from Plane of Wall: 1/4" in 10 feet or as required by elevator clearances.

B. Maximum Variation from Plumb: 1/4" per story non-cumulative, 1/2" total, or as required by elevator clearances.

C. Maximum Variation from Level Coursing: 1/8" in 4 feet, 1/4" in 10 feet.

D. Maximum Variation of Joint Thickness: 1/8".

3.12 PREPARATION OF JOINTS FOR REPOINTING

A. Rake mortar joints in existing construction in areas designated to be repointed to a minimum depth of 2.5 times the mortar joint width, 1", or as deeply as necessary to reach sound mortar (whichever is greatest), but not to exceed one half of the thickness of the stone thickness without supplementary means of support. Employ tools that are sharp and will completely cut out joints at intersections without splitting or damaging stones or bricks. Raking work shall match the approved test sample.

B. Gently drive wedges or hardwood shims into wide, deep cracks in masonry where there is a possibility that the vertical and in-plane lateral support of masonry work will be compromised during deep raking of the joints. This should at least be done where more than half of the length of a specific joint is removed to a depth of more than one third of the thickness of the stone.

C. Cut flashing relets in new or existing masonry as indicated on the Contract Drawings.

D. Wire brush clean and then pre-wet the joints and allow for the existing mortar to dry or saturate to a dull, non-glossy finish immediately before applying new mortar.

3.13 FINISH POINTING

A. Pre-wet prepared mortar joint surfaces until they are saturated but surface dry. At flashing reglets, verify that flashing has been fully installed and is stable.

B. Apply final "tuck" lift of tuck pointing mortar and strike-off for flush surface.

C. Install lead weathercaps at sky-facing joints as indicated.

D. Moist cure all work, spraying with a water mist and cover with damp cloth or tarpaulin.

E. Clean mortar from all surfaces following completion and curing of work.

F. Work under this subsection shall only be done when the ambient air, material, and substrate temperatures are above 40 degrees F. by 9:00 AM and rising.

G. The Contractor shall be responsible for matching the joints of the mock-up surrounding work and shall re-cut and replace any joints that are poorly formed or do not match the mock-up or the surrounding work, as determined by the Engineer, at the Contractor's own expense.

H. Moist cure all work, spraying with a water mist and cover with damp cloth or tarpaulin.

I. Chemically clean all surfaces following completion and curing of work.

J. Completed work shall match approved sample patch or shall be re-done at the Contractor’s

expense.

3.14 CLEANING AND PROTECTION OF COMPLETED MASONRY WORK

A. As work proceeds and upon completion, remove excess mortar, smears and droppings. Clean adjacent and adjoining surface of marks arising out of execution of work in this Section.

B. Sweep up and remove daily sand, cleaning compounds and mixtures, dirt, debris and rubbish. Sweep or flush away nightly, all residual washed materials. Keep the premises neat and clean at all times.

C. After installation and pointing are completed, carefully clean all surfaces of all dirt, excess mortar, grout splatter, stains and/or other site incident defacements. Clean soiled surfaces using a non-acidic solution that will not harm stone or adjacent materials. Consult stone fabricator for acceptable cleaners. Do not use wire brushes, acid or other solutions which may cause discoloration. Use nonmetallic tools in cleaning operation. Apply in accordance with cleaner manufacturer recommendations.

D. Mechanically remove all loose mortar and concrete splatter with hand tools without scratching, gouging or otherwise marring the existing substrate.

E. Chemically clean stone following completion of work, and where specifically specified on the drawings.

3.15 INSTALLATION OF FLEXIBLE SEALANTS

A. Provide backer rod and sealant where indicated on the Contract Drawings.

B. Install backer rod and sealant in strict accordance to manufacturer's instructions. Use primer where recommended by manufacturer.

C. Size backer rod for each joint size.

D. Install sealant to the depth recommended by the manufacturer for each width of joint. Joint profile shall match adjoining mortar profile. Face of joint shall be sanded so that color and texture shall match adjoining mortar joints.

E. Sealant at backer rod shall be installed at all locations indicated on Drawings and at all locations subject to structural or thermal movement.

END OF SECTION

SECTION 04 50 00 - STONE UNIT REPAIR

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Provide all labor, materials, equipment, and services required to complete the work as described on the drawings, as specified in this section, and as may be required.

B. Scope for Terra Cotta Repair

1. Patching with specified repair mortar all spalls or losses equal to or less than 4” x 4” x 3” in locations indicated on contract drawings.

2. Patching with stainless steel rod-reinforced repair mortar at all losses greater than 4” x 4” x 3” and/or all losses or deteriorated areas indicated on contract drawings.

3. Removal of non-matching and failed terra cotta patches and re-patching with specified mortar.

4. Injection of cracks where required.

C. Scope for Brownstone Repair

1. Removal of all prior brownstone patches and re-patching with specified repair mortar.

2. Removal of flaking and deteriorating brownstone and re-patching with specified repair mortars.

3. Light tooling or honing to remove shallow areas of exfoliating brownstone.

1.2 RELATED SECTIONS

A. Section 04 10 00 – Masonry Restoration

1.3 SUBMITTALS

A. Epoxy Adhesive: Manufacturer’s data and MSDS sheets on epoxy adhesive.

B. Stainless Steel Dowels, Plates: Sample of each type of anchor or fastener.

C. Patching Material: Manufacturer’s data and numbers of standard colors.

D. Product data and MSDS sheets for each product indicated including recommendations for their application and use. Include test reports and certifications substantiating that products comply with requirements.

E. Samples for verification purposes, prior to erecting the mockup, of the following:

1. Each new exposed masonry material to be used for replacing existing materials. Include

in each set of samples the full range of colors and textures to be expected in the completed work.

2. Each type of adhesive.

3. Each type of anchor.

F. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include a list of completed projects with project names, addresses, names of Architects and Owners, and other information specified.

G. Restoration program for each phase of the restoration process, including protection of surrounding materials on building and site during operations. Describe in detail the materials, methods, and equipment to be used for each phase of the restoration work.

1. If alternative methods and materials to those indicated are proposed for any phase of restoration work, provide a written description, including evidence of successful use on other comparable projects, and a testing program to demonstrate their effectiveness for this project.

1.4 QUALITY ASSURANCE

A. Patching

1. The goal of patching is to reestablish flush surfaces and original profiles on spalled or exfoliated limestone/cast stone or brownstone units. Patches should match the existing stone in color, texture, exposed aggregate and physical properties.

B. Repointing

1. The goal of repointing is to remove all failed and deteriorated joints to a sufficient depth without damaging the edges of the stone or widening the existing joints. New mortar should be compatible with the stone and resemble the original mortar in color, texture and appearance.

C. Crack Repair

1. The goal of crack repair is to remove and replace incompatible or failed mortars, grouts or sealants and replace them with compatible materials.

D. Contractor shall maintain an experienced full-time supervisor on the job site during times that stone masonry restoration and cleaning are in progress. Restoration Specialist: Engage an experience masonry restoration and cleaning firm that has specialized in the types of work required for this project.

1. Field Supervision: Require restoration specialist firm to maintain an experienced full-time supervisor on the job site during times that stone masonry restoration and cleaning are in progress.

E. Manufacturer Qualifications: A company regularly engaged in producing masonry cleaning compounds, which have been used on similar projects with successful results, and that retains

factory-trained representatives who are available for consultation and jobsite inspection and assistance at no additional cost.

F. Field-Constructed Mockups: Prior to start of general masonry restoration, prepare the following sample panels on the building where directed by Architect. Prepare sample panels using same materials and methods proposed for the Work, and under same weather conditions to be expected during construction as a standard for judging the completed Work.

1. Dutchmen: Submit one sample of a stone dutchman in a location to be selected by Architect/Engineer/Conservator. The dutchmen mockups will be evaluated for craftsmanship, fit, tooling, carving and seams.

2. Cementitious Patches: Prepare a minimum of six sample patches using approved composite mortar colors. Samples to be evaluated for color, texture, tooling, shaping and in the case of cast stone for exposed aggregate. Provide a minimum of two samples each for brownstone matching, limestone matching and cast stone matching. Cast stone samples to have matching exposed aggregate pressed into surface or mixed into top coat.

G. Source of Materials: Obtain materials for masonry restoration from a single source for each type of material required (stone, cement, sand, etc.) to ensure a match of quality, color, pattern, and texture.

1.5 REFERENCE STANDARDS

A. ASTM C119: Definitions of Terms Relating to Natural Building Stones.

B. ASTM C144: Aggregate for Masonry Mortar.

C. ASTM C150: Portland Cement.

D. ASTM C170: Compressive Strength.

E. ASTM C270: Mortar for Unit Masonry.

1.6 SEQUENCING/ SCHEDULING

A. Perform masonry restoration work in the following sequence:

1. Disassemble cap and cornice elements placing key numbers on each unit in a concealed location.

2. Remove pins and old mortar.

3. Repair existing units as directed.

4. Replace existing damaged masonry with new masonry materials.

5. Rebuild cornice incorporating repaired units as well as new elements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Site Storage of Stone: Upon receipt at the building site or storage yard, stack the stone on timber platforms at least 4" above the ground. Take extreme care to prevent staining during storage. If storage is to be for a prolonged period, place polyethylene or other suitable plastic film between any wood and finished surfaces. Use also as an overall protective covering. Plug Lewis holes during freezing weather to prevent the accumulation of water. Do not use salt for the melting of ice formed in Lewis holes or on pieces, or for any purpose involving its contact with the stone.

B. Store and handle stone units to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion or other causes.

C. Protect stone during storage and construction against moisture, soiling, staining and physical damage.

1. Handle to prevent chipping, breakage, soiling or other damage. Do not use pinch or wrecking bars without protecting edges with wood or other rigid materials. Lift with wide-belt type slings wherever possible. Do no use wire rope or ropes containing tar or other substances that might cause staining. If required use wood rollers and provide cushion at end of wood slides.

2. Store on wood skids or pallets, covered with non-staining, waterproof membrane. Place and stack to distribute weight evenly and to prevent breakage or cracking. Protect stored materials from weather with waterproof, non-staining covers or enclosures, but allow air to circulate around materials.

D. Deliver stone materials in undamaged condition. Deliver cleaning materials to site in manufacturer's original unopened containers and packaging, bearing labels as to type and names of products and manufacturers.

E. Store cementitious materials off the ground, under cover and in dry location.

F. Store aggregates where grading and other required characteristics can be maintained.

G. Protect mortar materials and stone accessories including metal items to prevent deterioration by corrosion and accumulation of dirt.

1.8 PROJECT CONDITIONS

A. Protection of Work During Erection: Cover top of walls with heavy waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

2. Do not apply concentrated loads for at least 3 days after building masonry walls.

3. Staining: Prevent grout or mortar from staining the face of stone to be left exposed. Remove immediately grout or mortar in contact with such stone.

4. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface. Protect sills, ledges and projections from

droppings of mortar.

B. Remove all stone determined to be frozen or damaged by freezing conditions.

1.9 COLD WEATHER PROTECTION

A. Do not erect, clean or repoint any stone when temperature of surrounding area is below 40 degrees F., or below 45 degrees F. and falling, or forecast by public news media to fall to or below 35 degrees F. within 24 hours without temporary heated enclosures or without heating materials or other precautions necessary to prevent freezing. Minimum temperature within heated enclosure shall be 40 degrees F. Do not use masonry materials which are likely to contain frost. Do not use accelerating ingredients with any mortar. Mortar shall harden without freezing and with no damage from frost. Protect all stone against freezing for not less than 48 hours after installation.

B. Do not lay stone units that are wet or frozen. Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen setting beds. Remove any ice or snow formed on stone bed by carefully applying heat until top surface is dry to the touch. Remove and replace stone work damaged by frost or freezing.

1.10 HOT WEATHER PROTECTION

A. Protect stone work in hot weather to prevent excessive evaporation of setting beds and grout. Provide artificial shade, wind breaks and use cooled materials as required. Use fresh mortar. Discard mortar that has stiffened due to hydration.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Accessories and Anchors

1. Reinforcing for deep patches: 3/16” diameter threaded stainless steel rod as indicated from AISI Type 304 stainless steel.

B. Epoxy Adhesive for Setting Pins and Stone to Stone Contact: Equal to Sikadur 35, Hi-Mod LV high strength adhesive ASTM C881 as manufactured by Sika Corporation, Lyndhust NJ.

C. Terra Cotta Patching: Jahn M-100 Terra Cotta and Brick Repair Mortar as distributed by: Cathedral Stone Products, Jessup, MD, or approved equal.

F. Brownstone Patching: Jahn M-70 Limestone and Sandstone Repair Mortar as distributed by: Cathedral Stone Products, Jessup, MD, or approved equal.

G. Cementitious Crack Grout: For cracks up to 3/16” Jahn M30 for cracks 3/16 to 9/16Jahn M-40 as distributed by: Cathedral Stone Products, Jessup, MD, or approved equal.

I. Water for Cleaning and Mixing with Mortars: Potable water. If not potable filter through an Aqua- pure (or equal) filtration system to remove iron and particulates. The water shall be

filtered with a 5-micron particulate filter placed in line with the water supply. All hoses, fittings, pumps shall be made from non-ferrous alloy parts.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect surfaces adjacent to work area from damage or staining.

3.2 TERRA COTTA AND BROWNSTONE PATCHING

A. Cut out deteriorated stone and adjacent stone that has begun to deteriorate. Remove additional stone so that patch will not have feathered edges and will be at least ¼ inch thick. In the case of brownstone remove old patches and any deteriorated stone then prepare surface as described above.

B. Remove loose particles, soil, debris, oil, and other contaminants from existing stone units at locations indicated by cleaning with a stiff-bristle brush.

C. Mix materials as per manufacturer's directions.

D. Place patching mortar in layers no thicker than 2 inches. Roughen surface of each layer to provide a key for the next.

E. Build patch up ¼ inch above surrounding stone and carve surface to match adjoining stone after mortar has hardened.

F. Keep each layer damp for 72 hours or until mortar has set.

G. Unacceptable patches are defined as those with hairline cracks or that show separation from stone at edges, and those that do not match adjoining stone in color or texture. Remove patches and refill to provide patches free of those defects.

3.3 CRACK REPAIR AT LIMESTONE AND CASTSTONE

A. Review areas to be grouted with project engineer/architect/conservator.

B. Follow manufacturer's instructions for mixing material, sealing crack prior to injection and for injecting material.

C. Clean surfaces of excess grout.

END OF SECTION

SECTION 04 50 40 - LOW PRESSURE GROUTING OF STONE MASONRY ASSEMBLIES

Portions of this project were detailed to utilize a unique and specific proprietary system to stabilize the lower portion of the tower. The Contractor may propose or devise an alternate system that achieves the same result as the specified proprietary system with the same level of safety but that does not infringe upon any of the patents or restricted trade secrets of the system specified.

PART 1 - GENERAL

1.1 CERTIFICATION REQUIREMENTS

A. The "PRESSURE-CRITICAL" work under the following subsection shall be executed by VOIDSPAN-CERTIFIED APPLICATORS ONLY.

1.2 INCLUDED IN THIS SECTION

A. Installation of Rods and Dunnage.

B. Drilling and jet cleaning of grouting ports.

C. Installation of Port Anchors.

D. Grouting of Voided Cavities.

E. Grouting of Cracks.

F. Final closeout.

1.3 SCOPE OF WORK

A. The base bid and alternate shall include all masonry grouting work, the nature and quantities of which are detailed and described herein and on the Contract Drawings.

B. Confirm that all required protection of the building structure, contents, adjacencies and the general public are in place as may relate to the work specified herein, before starting execution of the work.

C. It shall be noted that the work under this section shall be executed on masonry elements that are currently in a structurally weakened state. It shall be the responsibility of the grouting contractor to conduct all work in such a manner as does not additionally weaken or destabilize the existing masonry in any way as would directly result from this work.

D. It is the intent of this work to strengthen the existing masonry assembly by replacing friable mortar and empty cavities with injected flowable pozzolan-lime grout.

1.4 RELATED SECTIONS AND REFERENCES

A. Section 04 30 00- Masonry Restoration

B. Section 06 10 00- Rough Carpentry

C. VoidSpan Installation Guides at www.vopidspan.com.

1.5 SUBMITTALS

A. Submit the following items to the Architect for review:

1. Planned grouting sequence.
2. Samples of new structural pointing and patching mortars and grouts cured in same fashion as will be applied to structure.
3. Four completed hole and plug mortar applications to simulate completed retrofit facing tie installations.
4. Final injection record.

1.6 QUALITY CONTROL

A. Comply with all referenced standards for the products employed.

D. Coordinate times of Special Inspections to comply with the International Existing Building Code.

E. Grouting Contractor shall be a well-referenced with at least 10 years of experience in the field of cleaning and injection of cavities within historic masonry and shall be Cintec-Certified and VoidSpan-Certified for Pressure-Critical Applications.

PART 2 - PRODUCTS

2.1 REMOVABLE CROSS-TIES AND DUNNAGE

A. Through rods as specified by the Architect.

B. Wooden 2x4 or 4x4 bracing on faces of stonework clamped together with through rod ties.

2.2 RESTORATION GROUT

A. Void Filling Grout for injection and gravity feeding: Equal or equivalent to VoidSpan PHLc Cavity Fill Grout as supplied by VoidSpan Technologies, LLC of Salem, MA.

B. Coarse Aggregate for Extending Gravity Fed Grout: Equal or equivalent to VoidSpan “Extend” Vacuum Saturated Expanded Shale Aggregate as supplied by VoidSpan Technologies, LLC of Salem, MA.

2.3 STAY-IN-PLACE MASONRY ANCHORS

A. Cintec Sock Anchors and VoidSpan Port Anchors shall be as supplied by VoidSpan Technologies, LLC of Salem, MA.

2.4 EQUIPMENT AND ACCESSORIES

A. Cleaning Jets: Equal or equivalent to Voidspan “J-1” Jet Cleaning Wands as supplied by VoidSpan Technologies, LLC of Salem, MA with 3,000 psi capacity and ¾” max diameter, 90-degree spray tips.

B. Injection Piezometers: Equal or equivalent to VoidSpan pressure limiting “P18” Standpipe Piezometers as supplied by VoidSpan Technologies, LLC of Salem, MA.

C. Pressurization Equipment: Pressure Pot with pressure regulator, mixing agitator and 5/8” ID hook-up lines (may be purchased from VoidSpan Technologies, LLC of Salem, MA).

D. Hand-Held 220v Cavity Pre-dampening System: Equal or Equivalent to the VoidSpan Steam Injector as supplied by VoidSpan Technologies, LLC of Salem, MA

PART 3 – EXECUTION

3.1 INITIAL PREPARATION AND SEQUENCING OF OPERATIONS

A. Visually inspect the interior and exterior wall surfaces to locate cracks, bulges and loose stones that would become destabilized under grouting fluid pressures.

B. Rake out all friable surface mortar and all cracks and identify all gaps and externally exposed voids.

C. Remove and re-set loose stones and point raked and cracked joints in accordance with Section 04 10 00.

D. Identify gaps along sides of windows and other openings where grout might not be contained and seal them with mortar or expanding foam.

E. Schedule and sequence work to enable cleaning and grouting operations to proceed in 32" to 36" lifts on alternating days on alternating bays, with at least 18" of wall height jetted and prepped above the highest injection port in the lift. This will allow two days' hardening before the next wave of jetting and cleaning, which after two days should not damage the placed grout.

3.2 SURFACE MONITORING

A. Establish appropriate measurement points with which to monitor out-of-plane wall geometry.

B. Monitor the measurement points during the cleaning and grouting operations, and stop work immediately if any movement is detected and immediately notify the Architect.

3.3 HOLE DRILLING AND EXCAVATION

A. Core drill holes for VoidSpan Port Anchors using a wet core drill of the required diameter to fit the socks. Exercise care in advancing the drill through the rubble wall construction without locking the core bit or destabilizing the masonry.

B. Drill holes as needed for through wall tie-rods to anchor the wooden dunnage system where Port Anchors are not being used. Diameter shall be 1/8" greater than rod diameter. Drilling may be done with a small diameter core bit or rotary hammer.

C. Create limited sized excavations into the wall construction on a pattern that act as draining points for jetted spoil to be washed out of the masonry during the cleaning operation. These shall be closed up after cleaning and mortar sealed at the outer surface with an added flexible feeding tube to runs into the remaining voided core of the masonry.

3.4 PORT ANCHOR AND THROUGH-ROD INSTALLATION

A. Install Single Ended Port Anchors as Follows:

1. Complete specified collar joint cavity cleaning and flushing operations at each anchor location before installing anchors.
2. Thoroughly clean core holes and insert socked anchor rods into holes. Recess fronts of anchors from outer faces of stones as detailed on the Contract Drawings. Confirm that sock lengths and positions will not encroach into collar joint cavity and that cavity injection tubes are clear. Thread temporary extender rods into end plate holes.
3. Inflate front and back socks with Cintec Presstec Grout to 40 psi and clamp injection tubes. Allow sufficient time to cure before structurally loading.
5. Cut off exposed sock grouting tube lengths and temporarily plug cavity grouting tubes to keep clear.
6. Follow all applicable requirements of VoidSpan Installation Guides "C1" and "V1", at the end of this specification.

B. Install Double Ended Port Anchors as Follows:

1. Complete specified collar joint cavity cleaning and flushing operations at each anchor location before installing anchors.
2. Thoroughly clean core holes and insert socked anchor rods into holes. Recess both ends of anchors equally from outer faces of stones as detailed on the Contract Drawings. Confirm that sock lengths and positions will not encroach into collar joint cavities and that cavity injection tubes are clear. Thread temporary extender rods into end plate holes.
3. Inflate front and back socks with Cintec Presstec Grout to 40 psi and clamp injection tubes. Allow sufficient time to cure before structurally loading.
4. Cut off exposed sock grouting tube lengths and temporarily plug cavity grouting tubes to keep clear.

5. Follow all applicable requirements of VoidSpan Installation Guides “C1” and “V2”, at the end of this specification.

C. Install threaded tie rods by passing them through the drilled holes. Do not adhere them into place so that they can be removed.

3.5 JET CLEANING OF INTERNAL CAVITIES

A. Carefully drill core holes through the masonry” diameter grouting holes on the pattern described on the contract drawings, no to exceed a 24” square pattern.

B. Jet-clean holes by inserting Single Spray or Double Spray Jetting Wands connected to a pressure washer with 2,000 to 3,000 psi water pressure. Vary the angles and depths of the jets to provide optimum cleaning and keep jetting until friable material exits from the annular space around the wand and/or from the holes below.

C. Jet all of the holes within and to a height of at least 18” above the next grouting lift in a random sequence, repeating randomly until water flows freely between them and exists with a clear appearance.

3.6 RESTRAINING DUNNAGE INSTALLATION

A. Using the threaded rods extending from the Port Anchors, assemble a grid of wood dunnage bracing to help resist lateral grouting pressures within the wall.

B. Provide two layers of dunnage bracing:

1. The outer layer will consist of solid 4x4 or 6x6 struts that span between the extender rods and are spaced by 2-inches to 4-inches off of the masonry.
2. The inner layer will consist of 2x4 or 4x4 braces that span between the 4x4s of the outer layer, and are nested inboard of them and toe-nailed in place.
3. Provide shims and wedges as needed to provide tight contact between the masonry and the inner layer of dunnage.
4. Provide appropriate joist hanger hardware at all coplanar dunnage intersections.

C. It is acceptable to remove and re-use dunnage timbers at sequential locations, as long as new rod holes are at least 2-inches from old ones and the wood has not been significantly damaged during removal.

D. Dunnage shall be constructed to safely restrain the masonry against internal, outwardly directed grouting pressures of up to 750 pounds per square foot of wall surface. Follow all applicable requirements of VoidSpan Installation Guide “D1” and Specification Section 06 10 00.

3.7 GROUTING OF VOIDED CAVITIES

A. The grouting operation will start from bottom to top of the collar joint cavity in the following sequence. Grout shall be injected into the masonry through installed VoidSpan anchors using the cavity grouting tubes provided, as well as through additional ports left open in the masonry, if desired.

B. Power mix the grout to the proper, manufacturer-specified proportions. It is easiest to initially mix half the grout powder with all of the water, and then add grout powder while mixing until the final proportion is reached. Continue power mixing until the grout reaches a flowable batter-like consistency.

C. Using the grouting tubes, pre-dampen the holes with steam mist and then immediately start to inject grout into the wall. IT IS ABSOLUTELY CRITICAL THAT THE EXISTING STONEWORKWORK IS IN A TOTALLY SATURATED CONDITION FOR THE GROUT TO FLOW.

D. Starting at the bottom row of holes inject grout into the masonry at a rate of not more than 3-feet per lift for day, with a nozzle pressure head of not more than 12-inches.

E. Fit piezometer junctions over the flex and employ a standpipe height of 24” above the junction to provide a maximum of two feet of grouting pressure head (2 psi) into each grouting port. Vary the pressure in the pressure pot as needed to maintain adequate flow rate without over-topping the stand pipe. Collect spillage in a bucket below each standpipe for re-use.

F. During pressurized feeding turn the paddle crank occasionally to keep grout from compacting on the bottom of the pot, particularly if feeding under high air temperatures.

G. When port has reached refusal the grout within the standpipe will over-top it and flow into the bucket. Stop feeding and allow the grout in the standpipe to settle down and re-pressurize repeatedly until no settle-down occurs and the head in the standpipe is maintained.

H. Proceed from port to port, bottom to top, monitoring the wall conditions and volume of flow. Make note of the total volume of grout injected within each area of wall. Injected grout volume should be in the range of 10% to 15% of the wall volume.

I. Where gravity feeding through open ports, slowly feed grout into the port with a nozzle of less diameter than the port in order to eliminate positive pressure.

J. Install wooden dunnage for the full height of each successive grout lift, maintaining in a tight condition for at least 48-hours after injection of the lift before removal.

K. After a period of at least 48 hours from grout injection, randomly drill 5/8” diameter test holes in the completed areas and examine for remaining voids. Perform secondary grouting where remaining voids are encountered in accordance with the procedure above.

3.8 GROUTING OF CRACKS

The "pressure-critical" work under the following subsection shall be directed and/or executed by VoidSpan-Certified applicators only:

A. The grouting operation will start from bottom to top of the crack in the following sequence. Grout shall be injected into the masonry through installed grouting tubes set into the crack, as well as through additional ports left open in the masonry, if desired.

B. Power mix the grout to the proper, manufacturer-specified proportions. It is easiest to initially mix half the grout powder with all of the water, and then add grout powder while mixing until the final proportion is reached. Continue power mixing until the grout reaches a flowable batter-like consistency.

C. Using the grouting tubes, pre-dampen the holes with steam mist and then immediately start to inject grout into the wall. IT IS ABSOLUTELY CRITICAL THAT THE EXISTING STONEWORKWORK IS IN A TOTALLY SATURATED CONDITION FOR THE GROUT TO FLOW.

D. Starting at the bottom row of holes inject grout into the masonry at a rate of not more than 3-feet per lift for day, with a nozzle pressure head of not more than 12-inches.

E. Fit piezometer junctions over the flex and employ a standpipe height of 24" above the junction to provide a maximum of two feet of grouting pressure head (2 psi) into each grouting port. Vary the pressure in the pressure pot as needed to maintain adequate flow rate without over-topping the stand pipe. Collect spillage in a bucket below each standpipe for re-use.

F. During pressurized feeding turn the paddle crank occasionally to keep grout from compacting on the bottom of the pot, particularly if feeding under high air temperatures.

G. When port has reached refusal the grout within the standpipe will over-top it and flow into the bucket. Stop feeding and allow the grout in the standpipe to settle down and re-pressurize repeatedly until no settle-down occurs and the head in the standpipe is maintained.

H. Proceed from port to port, bottom to top, monitoring the wall conditions and volume of flow. Make note of the total volume of grout injected within each area of wall. Injected grout volume should be in the range of 10% to 15% of the wall volume.

I. Where gravity feeding through open ports, slowly feed grout into the port with a nozzle of less diameter than the port in order to eliminate positive pressure.

J. After a period of at least 48 hours from grout injection, randomly drill 5/8" diameter test holes in the completed areas and examine for remaining voids. Perform secondary grouting where remaining voids are encountered in accordance with the procedure above.

3.9 FINAL PATCHING AND CLOSEOUT

A. Fill all core drilled holes with cut-off core plugs that correspond to each of the holes drilled, adhesive-bonding the plugs to the ends of the Port Anchors and filling the annular spaces around the plugs with matching repair mortar.

B. Submit a final injection log to the Architect, with the total volume of all void filling grout at a percentage of total wall volume by injection area.

END OF SECTION

SECTION 05 10 00 - STRUCTURAL METALS

PART 1 - GENERAL

1.1 INCLUDED IN THIS SECTION

A. Galvanized Steel Connections.

1.2 RELATED SECTIONS

A. Section 04 30 00 – Masonry Restoration

1.3 REFERENCES

A. Comply with the following standard material specifications:

AISC - Code of Standard Practice - Manual of Steel Construction - Allowable Stress Design (ASD).

ASTM A123 – Hot Dip Galvanizing for Structural Steel Products

ASTM A276, Type 304 - Threaded Round Stainless Steel Bar Stock.

ASTM A240, Type 304 – Stainless Steel Plate Stock.

AWS A2.4 - Symbols for Welding, Brazing, and Nondestructive Examination.

AWS D1.1 - Structural Welding Code.

1.4 SUBMITTALS

A. Submit the following items to the Engineer for review:

1. Shop Drawings of all fabrications showing field verified dimensions, locations, and connections to be made in the field.
2. Product literature for standard products and/or mass produced items to be used.

1.5 QUALITY CONTROL

A. Comply with all referenced standards for the products employed.

B. Coordinate times of Engineer's Special Inspections.

PART 2 - PRODUCTS

2.1 STAINLESS STEEL BRACKETS AND CONNECTORS

A. Stainless Steel Plates and Hardware: ASTM A240 Type 304 or 304L where welded.

B. Stainless Steel Rods and Bars: ASTM A276 Type 304 or 304L where welded.

C. Welding Electrodes for Stainless Steel shall be AWS A5.4 E308/308L-16

2.1 STRUCTURAL STEEL MATERIALS AND FABRICATIONS

A. Rolled shapes: ASTM A36.

B. Plates, rods and bars: ASTM A36.

C. Welding Electrodes for Structural Steel shall be AWS E70-XX.

D. Bolts, nuts, and washers: ASTM A325 bolts, ASTM A563 nuts.

E. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi at 28 days.

F. Touch-up primer for galvanized surfaces: SSPC 20 Type I Inorganic or Type II inorganic.

G. Steel items to be embedded in masonry shall be hot dip galvanized in accordance with ASTM A123. Provide blow holes as necessary for galvanizing, indicating sizes and locations on shop drawings.

H. All non-galvanized steel fabrications shall be painted with one coat of zinc rich primmer equal or equivalent to TNEMC Series 90-97 Tneme-Zinc.

I. All connections shall be fully welded with 5/16" minimum fillet unless otherwise noted.

J. Shear connections of beams shall be designed to support the maximum load that can be carried by the beam according to AISC standards, unless otherwise specifically detailed on the structural drawings.

PART 3 - EXECUTION

3.1 INSTALLATION OF STEEL BRACKETS AND CONNECTORS

A. Install and adjust stainless steel brackets and connectors to proper alignment, marking locations for bolts and lag screws before drilling holes.

B. Position brackets with shims tightening bolts against these and filling all gaps in bearing surfaces which are wider than 1/16" with filler grout or mortar.

3.2 INSTALLATION AND ERECTION OF STRUCTURAL STEEL

A. Allow for erection loads, and for sufficient temporary bracing to maintain steel framing in a safe, plumb, and in true alignment until completion of erection and installation of permanent bracing connections.

B. Field-weld structural components only with written approval of Architect or where specifically indicated on the drawings.

C. Field-connect members with threaded fasteners; torque to required resistance per AISC Specification for Structural Joints Using ASTM A325 or A490 Bolts.

D. Do not field-cut or alter structural members without approval of the Architect.

E. After erection, prime welds, abrasions, and surfaces not galvanized, except surfaces to be in contact with concrete.

F. Install all mechanically-set and adhesive-set drilled anchors in accordance with the respective product manufacturer's instructions.

G. Coordinate work with the general contractor who shall be responsible for shoring of existing elements that may be supported by or temporarily in the way of the structural steel.

H. Coordinate removal finishes and wood construction as necessary for installation of structural steel, submitting a list of all necessary removals to the Architect for review before proceeding with the work.

I. Laterally brace all columns at floor levels and the top flanges of all steel beams at not more than 4 feet on center.

3.3 FIELD QUALITY CONTROL

A. Satisfy all applicable requirements of the Massachusetts State Building Code and referenced standards.

END OF SECTION

SECTION 06 10 00 – ROUGH CARPENTRY

PART 1 - GENERAL

1.1 INCLUDED IN THIS SECTION

A. Structural framing and sheathing with respect to the re-setting of masonry.

B. Roof flashing and curbs.

C. Floor decking, fixed ladders, handrails and guardrails for intermediate landings

D. Custom roof framing to match adjacent historic roof beams

E. Roof decking to match adjacent historic exposed underside of roof

F. Construction of temporary restraining dunnage.

G. Temporary protection of roofs, stairs, doors and windows.

1.2 RELATED SECTIONS

A. Section 02 21 00 - Temporary Shoring and Bracing.

1.3 REFERENCES

A. ALSC (American Lumber Standards Committee) - Softwood Lumber Standards.

B. ASTM (American Society of Testing and Materials) D245 - Standard Practice for Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber.

C. AWPA (American Wood Preservers Association) C1 - All Timber Products - Preservative Treatment by Pressure Process.

D. MSBBRS (Massachusetts State Board of Building Regulations and Standards) - Grading Agency Certification.

E. NELMA (Northeast Lumber Manufacturer's Association) - Grading Rules.

F. NFPA (National Forest Products Association).

G. NLGA (National Lumber Grades Authority).

H. NSLB (Northern Softwood Lumber Bureau) - Grading Rules.

I. SPIB (Southern Pine Inspection Bureau).

1.1 SUBMITTALS

A. Submit the following items to the Engineer for review:

1. Product Data sheets for standard hangers and supports.
2. Grading certification for remanufactured and new timber products.

1.2 QUALITY CONTROL

A. Comply with all referenced standards for the products employed.

PART 2 - PRODUCTS

2.1 DIMENSIONAL LUMBER

A. Lumber Grading Rules: NELMA, NFPA, RIS, SPIB, WCLIB or WWPA.

B. Furring, plates and rafter ends: SYP Species, No. 1 or 2 grade, size as per drawings, 19.

2.2 SHEATHING MATERIALS

A. Plywood Floor and Roof Sheathing: APA Rated Sheathing, Span Rating 40/20; Exposure Durability 1; touch sanded ¾" min. thick or to match surrounding work where thicker.

2.3 MISCELLANEOUS FASTENERS AND CONNECTORS

A. Provide standard attachment hardware consisting of nails, bolts, screws and standard fittings as noted on the drawings and as required. Hardware for rough carpentry shall be as follows:

1. Bolts and Nuts: AISI / ASME Standard B18.2.1
2. Lag Screws: AISI / ASME Standard B18.6.1
3. Steel Washer Plates: Same as above or ASTM A36 for custom sizes.
4. Spikes: Galvanized, hardened steel conforming to Federal Specification FF-N-105B.
5. Standard Connectors (where specified or allowed): Items as manufactured by the Simpson Strong-Tie Company of San Leandro, CA, or approved equal.
6. Shear Plates: Hot Rolled Pressed Steel Type Satisfying SAE Standard 1010.

B. Provide non-standard attachment hardware as detailed on the drawings in accordance with Section 05500.

C. Wood Preservative shall be Boracare or equivalent boric acid solution.

PART 3 - EXECUTION

3.1 REMOVAL OF DESIGNATED OR REJECTED FRAMING

A. Carefully remove framing designated or required to be replaced so as not to damage the surrounding construction or finishes not scheduled for removal. Provide sufficient shoring and bracing to the structure to preclude the possibility of settlement or collapse of the structure above. Completely measure the members during removal for detailing of shop drawings. Timbers that are to be removed and replaced with other timbers may be cut and marred in any way necessary to enable their removal.

B. Following removal of noted timbers, clean ends of contiguous timbers for inspection by the Engineer. Perform additional finish board removal as required to expose additional deteriorated members as designated by the Engineer based upon the site inspection. Be prepared to drill holes in remaining beams during the inspection by the Engineer to help determine the depth of sound wood.

3.2 INSTALLATION OF FRAMING

A. Set structural members in correct positions.

B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Place horizontal members, crown side up.

D. Field drill all holes and recesses for bolts, lag screws and shear plates. Inject all bolt and lead holes with wood preservative before installing hardware.

E. Holes for through bolts and lag screw shanks shall be 1/32” greater in diameter than bolt and screw shanks.

F. Drill lead holes for the threaded portions of lag screws to avoid splitting wood. Lead holes shall be properly sized for the threaded diameters and species type in accordance with the NFPA National Design Specification.

G. Provide tapered oak shims of at least 1/8” thickness as required for adjustment and to provide solid, firm contact between bearing surfaces where proper fit is not other wise provided with existing members. Maximum allowable tolerance to be accommodated by shims shall be 3/8" or less.

H. Make all cut lines plumb and true, to within 1/8" of required dimension. Do not leave any splintered wood or checked end grain exposed to weather or soil.

I. Make secondary fastenings not otherwise called out on drawings with at least (4) common wire nails or spikes per location, of a length which is four times the thickness of the thinner part joined but not of such length that it will not over-penetrate the thicker part, and of a diameter which is the greatest commonly available for the given length. Provide additional nails to detailed connections as may be helpful to keep them aligned and stable. Nails shall be located to be concealed from plain view.

J. Leave completed structural framing work exposed for inspection by the Architect.

3.3 INSTALLATION OF SHEATHING AND PLANKING

A. Secure sheathing and decking with longer edge perpendicular to framing members and with ends staggered and sheet ends over bearing.

B. Install sheathing boards with minimum of two continuous spans per board between supports except at the top of the tower.

C. Plywood sheathing shall be installed with the face grain running perpendicularly to supports and all panel ends running over supports.

D. Fasten board and plywood sheathing per the requirements of the Massachusetts State Building Code, Appendix C, but not less than 12d nails at 6” on center over all supports and along all edges for plywood, or three 12d nails per board at all board ends on support crossings.

END OF SECTION

SECTION 06 20 00 - FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Scope of Work:

1. Custom Roof Deck and Framing (Dressed Lumber)
2. Wood Windows

PART 2 - PRODUCTS

2.1 EXTERIOR WOODWORK

A. Lumber Trim:

1. Species: Western Red Cedar, Grade C and Better Clear
2. Maximum Moisture Content: 15 percent.
3. Face Surface: Surfaced 4 sides

B. Wood Windows: Wood moldings. Made from kiln-dried stock.

1. Species: Mahogany, Grade 1
2. Maximum Moisture Content: 15 percent.
3. Face Surface: Surfaced 4 sides

2.2 INTERIOR TRIM

A. Interior window and door casings and sills. Made from kiln-dried stock.

1. Species: Mahogany, Grade 1
2. Maximum Moisture Content: 15 percent.
3. Face Surface: Surfaced 4 sides

2.3 MISCELLANEOUS MATERIALS

A. Fasteners for Exterior Finish Carpentry: Provide stainless nails or screws, in sufficient length to penetrate not less than 1-1/2 inches into wood substrate. For applications not otherwise indicated, provide stainless-steel fasteners.

B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.

C. Exterior Blocking, Shims, and Nailers: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.

D. Interior Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.

E. Nails for Exterior Use: stainless steel.

F. Screws for Exterior Use: stainless steel.

G. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

H. Adhesives: Do not use adhesives that contain urea formaldehyde.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prime lumber and moldings to be painted, including both faces and edges, unless factory primed. Cut to required lengths and prime ends.

B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

3.2 INSTALLATION, GENERAL

A. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.

B. 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 long except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.

1. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches. Countersink fasteners, fill surface flush with wood filler, and sand unless otherwise indicated.

2. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.

C. For exterior carpentry:

1. Scribe and cut exterior finish carpentry to fit adjoining work. Refinish and seal cuts.

2. Anchor wood trim to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.

3.3 STANDING AND RUNNING TRIM INSTALLATION

A. Install exterior flat-grain lumber. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Cope at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints.

1. Install trim with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long except where necessary.

2. Use scarf joints for end-to-end joints.

3. Stagger end joints in adjacent and related members.

4. Fit exterior joints to exclude water.

END OF SECTION

SECTION 07 60 00 – COPPER ROOFING AND FLASHING

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 SUMMARY

A. Section Includes:

1. Flat-seam copper roofing, flashing, and counterflashing.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show installation layout of sheet metal roofing, flashing and trim, including plans, elevations, expansion joint locations, and keyed details. Distinguish between shop- and field-assembled work.

1. Include details for forming, joining, and securing sheet metal roofing and flashing, including pattern of seams, termination points, fixed points, movement joints, edge conditions, special conditions, connections to adjoining work, and details of accessory items.

C. Samples: For each exposed product and for each finish specified.

1. Copper sample for each weight to be used.

D. Warranties: Sample of special warranties.

1.4 SPECIAL PROJECT CONDITIONS - FIRE VULNERABILITY

A. Project is a historic building with seasoned wood framing and sheathing in wood areas.

B. EXTREME DILIGENCE is required for all heat-producing operations. Enact full measures to monitor and protect against open flame or hidden combustion.

1.5 QUALITY ASURANCE

A. Copper Roofing Standard: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

B. Sheet Metal Roofing Standard: Comply with SMACNA's "Architectural Sheet Metal Manual," unless more stringent requirements are specified or shown on Drawings.

C. Mockups: Build mockups to verify selections made under sample submittals and to aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical copper roofing and flashing assembly, including attachments, underlayment, and accessories.

D. Pre-installation Conference: Conduct conference at Project Site.

1.6 WARRANTY

A. Special Warranty: Warranty form in which Installer agrees to repair or replace components of sheet metal roofing that fail in materials or workmanship within two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ROOFING SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

B. Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 temper, 20 oz./sq. ft., unless otherwise indicated.

2.2 ROOFING AND FLASHING SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

B. Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 temper, 20 oz./sq. ft., unless otherwise indicated.

1. Non-Patinated Exposed Finish: Red copper, mill finish.

2.3 UNDERLAYMENT MATERIALS

A. Felts: ASTM D 226, Type II (No. 30), asphalt-saturated organic felts.

B. Slip Sheet: Building paper, 3-lb/100 sq. ft. (0.16-kg/sq. m) minimum, rosin sized.

2.4 JOINT SEALANTS

A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Tremco Incorporated
2. Sika Corporations
3. Pecora Corporation

2.5 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for a complete roofing system and as recommended by primary sheet metal manufacturer unless otherwise indicated.

B. Fasteners: Wood screws, annular-threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.

1. Fasteners for Copper Sheet: Copper, hardware bronze, or Series 300 stainless steel.

C. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

D. ACCESSORIES

E. Sheet Metal Accessories: Provide components required for a complete sheet metal roofing assembly including trim, copings, fasciae, corner units, clips, flashings, sealants, gaskets, fillers, metal closures, closure strips, and similar items. Match material and finish of sheet metal roofing unless otherwise indicated.

1. Provide accessories as recommended by portable roll-forming equipment manufacturer to produce sheet metal roofing assemblies that comply with UL 580 for wind-uplift resistance classification specified in "Quality Assurance" Article.
2. Cleats: For mechanically seaming into joints and formed from the following materials:

a. Copper Roofing: 20-oz./sq. ft. copper sheet.

3. Flashing and Trim: Formed from same material and finish as sheet metal roofing, minimum thickness matching the sheet metal roofing.

2.6 FABRICATION

A. General: Custom fabricate sheet metal roofing and flashing to comply with details shown and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions (panel width and seam height), geometry, metal thickness, and other characteristics of installation indicated. Fabricate sheet metal roofing and accessories at the shop to greatest extent possible.

1. Obtain field measurements for accurate fit before shop fabrication.
2. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
3. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant.
4. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
6. Seams: Fabricate non-moving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
7. Low Slope Flat-Seam Roofing: Form flat-seam panels from metal sheets. Match existing sheet sizes with 3/4-inch notched and folded edges.
8. Solder joints at slopes of less than 4” per foot.

B. Form exposed sheet metal work to fit substrates without excessive oil canning, buckling, and tool marks; true to line and levels indicated; and with exposed edges folded back to form hems.

1. Form and fabricate sheets, seams, strips, cleats, valleys, ridges, edge treatments, integral flashings, and other components of metal roofing to profiles, patterns, and drainage arrangements shown on Drawings and as required for leak-proof construction.

C. Metal Protection: Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with bituminous coating, by applying self-adhering sheet underlayment to each contact surface, or by other permanent separation as recommended by fabricator of sheet metal roofing or manufacturers of the metals in contact.

D. Sheet Metal Accessories: Custom fabricate flashings and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Obtain field measurements for accurate fit before shop fabrication.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that tops of fasteners are flush with surface.

3.2 UNDERLAYMENT INSTALLATION

A. Felt Underlayment: Install felt underlayment on roof sheathing under sheet metal roofing. Use adhesive for temporary anchorage. Apply at locations indicated on Drawings, in shingle fashion to shed water, with lapped joints of not less than 2 inches (50 mm).

B. Apply slip sheet before installing sheet metal roofing.

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal roofing and other components of the Work securely in place, with provisions for thermal and structural movement. Install fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for a complete roofing system and as recommended by fabricator for sheet metal roofing.

1. Field cutting of sheet metal roofing by torch is not permitted.
2. Provide metal closures at peaks and each side of ridge and hip caps.
3. Locate and space fastenings in uniform vertical and horizontal alignment. Predrill panels for fasteners.
4. Install hip caps as sheet metal roofing work proceeds.
5. Locate roofing splices over, but not attached to, structural supports. Stagger roofing splices and end laps to avoid a four-panel lap splice condition.
6. Lap metal flashing over sheet metal roofing to allow moisture to run over and off the material.

B. Thermal Movement. Rigidly fasten metal roof panels to structure at only one location for each panel. Allow remainder of panel to move freely for thermal expansion and contraction.

1. Point of Fixity: Fasten each panel along a single line of fixing located at center of panel length.
2. Avoid attaching accessories through roof panels in a manner that will inhibit thermal movement.

C. Fasteners: Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.

D. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates,

protect against galvanic action by painting contact surfaces with bituminous coating, by applying self-adhering sheet underlayment to each contact surface, or by other permanent separation as recommended by SMACNA.

E. 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.

3.4 CUSTOM-FABRICATED SHEET METAL ROOFING INSTALLATION

A. Fabricate and install work with lines and corners of exposed units true and accurate. Form exposed faces flat and free of buckles, excessive waves, and avoidable tool marks, considering temper and reflectivity of metal. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant. Fold back sheet metal to form a hem on concealed side of exposed edges unless otherwise indicated.

1. Install cleats to hold sheet metal panels in position. Attach each cleat with two fasteners to prevent rotation.
2. Fasten cleats not more than 12 inches (300 mm) o.c. Bend tabs over fastener head.
3. Provide expansion-type cleats and clips for roof panels that exceed 30 feet (9.1 m) in length.

B. Seal joints as shown and as required for watertight construction. For roofing with 3:12 slopes or less, use cleats at transverse seams. Use only silicone flexible sealants, do not over fill joints.

C. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm), except reduce pre-tinning where pre-tinned surface would show in completed Work.

1. LIMIT FIRE RISK: DO NOT use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
2. Copper Roofing: Tin edges of uncoated copper sheets, using solder for copper.

D. Flat-Seam Roofing: Attach flat-seam metal panels to substrate with cleats, starting at eave and working upward toward ridge. After panels are in place, mallet seams and solder.

1. Attach roofing panels with cleats spaced not more than 24 inches (610 mm) o.c. Lock and solder panels to base flashing.
2. Attach edge flashing to face of roof edge with continuous cleat fastened to roof substrate at 12 inches o.c. Lock panels to edge flashing and solder.

3.5 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete sheet metal roofing assembly including trim, copings, seam covers, flashings, sealants, gaskets, fillers, metal closures, closure strips, and similar items.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

3.6 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder and sealants.

C. Remove temporary protective coverings and strippable films as sheet metal roofing is installed unless otherwise indicated in manufacturer's written installation instructions.

END OF SECTION

SECTION 09 90 00 - PAINTING

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
   1. Field painting of exposed steel and iron lintels, miscellaneous supports and surfaces.
   2. Field painting of new steel handrails
   3. Field painting of restored metal stair and railings
   4. Stain and clear finish for custom wood decking and framing and new windows.
   5. Surface preparation for painting.

1.3 DEFINITIONS AND EXTENT

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 20 and 35 when measured at a 60-degree meter.
   3. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
   4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

B. This Section includes surface preparation and painting of exposed exterior and interior items and surfaces.

   1. Surface preparation, priming, and finish coats
   2. Shop priming and surface treatment

C. Paint exposed surfaces, except where drawings indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.

1.4 SUBMITTALS

A. Product Data: For each paint system indicated. Include block fillers and primers.

1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.

a. Disclose material ingredients by name and Chemical Abstract Service (CAS) Registry Number.

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 two 8 inch by 12 inch Samples for each type of finish coating for Architect's review of color and texture only.

C. Qualification Data: For Applicator.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.

C. Mockups: Provide a full-coat benchmark finish sample for each type of coating and substrate required. Comply with procedures specified in PDCA P5. Duplicate finish of approved sample Submittals.

1. Architect will select items to represent surfaces and conditions for application of each type of coating and substrate.

4

a. Restored metal stair and railing: Provide samples on at least 5 sq. ft.
b. Stain and clear finish on new custom wood deck and framing on at least 5 sq. ft.
c. Small areas and items: Architect will designate items or areas required.

2. Apply benchmark samples, according to requirements for the completed Work, after permanent lighting and other environmental services have been activated. Provide required sheen, color, and texture on each surface.

    a. After finishes are accepted, Architect will evaluate coating systems of a similar nature.

3. Final approval of colors will be from benchmark samples.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to 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 storage containers in a clean condition, free of foreign materials and residue.

1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.

1.7 PROJECT CONDITIONS

A. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F.

B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F.

C. Do not apply paint 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. 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 materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: Furnish one unopened quart of each type of paint and coating work, in color and gloss as used for the Project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work are listed in the Finish Schedule at the end of this Section.

2.2 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with 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 that are factory formulated and recommended by manufacturer for application indicated. 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. Paint Colors (PT-#): Refer to the Finish Schedule on the Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application.

1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on

characteristics of finish materials to ensure use of compatible primers.

1. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.

3.2 PREPARATION FOR PAINT

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.

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 substrates of substances that could impair 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 and technical bulletins for each particular substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and reprime.
2. 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 dustoff.

    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 back sides of wood, including cabinets, counters, cases, and paneling.
    c. If transparent finish is required, back-prime with spar varnish.
    d. Back-prime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on back side.
    e. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.

3. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.

    a. Exterior Exposed Steel: Clean steel surfaces in accordance with SSPC-SP 6/NACE No.

3 Commercial Blast Cleaning. Abrasive blast cleaned surfaces shall exhibit a uniform, angular profile of 1.5-3.0 mils. Prime cleaned surfaces within 8 hours and prior to surface rusting.

b. Interior Exposed Steel, in Humid Environments: Clean steel surfaces in accordance with SSPC-SP 6/NACE No. 3 Commercial Blast Cleaning. Abrasive blast cleaned surfaces shall exhibit a uniform, angular profile of 1.5-3.0 mils. Prime cleaned surfaces within 8 hours and prior to surface rusting.

c. Interior Exposed Steel, in Dry Environments: Clean steel surfaces in accordance with SSPC-SP2 or SP3 Hand or Power Tool Cleaning.

4. Galvanized Surfaces: Clean galvanized surfaces in accordance with SSPC-SP16 Brush off Blast Cleaning of Galvanized Steel and Non-Ferrous Metals, to achieve a minimum 1 mil anchor profile.

D. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
2. 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.
3. Use only thinners approved by paint manufacturer and only within recommended limits.

E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of 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.

3.3 APPLICATION FOR PAINT

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 paint 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, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
6. Paint interior surfaces of ducts with a flat, non-specular black paint where visible through registers or grilles.
7. Paint backsides of access panels and removable or hinged covers to match exposed

surfaces.

8. Finish exterior doors and doors in wet areas on tops, bottoms, and side edges the same as exterior faces.
9. Sand lightly between each succeeding enamel or varnish coat.

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 film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
2. Omit primer over 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 that 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, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

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 type of material applied. Use brush of appropriate size for surface or item being painted.
2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.

E. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by 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.

F. 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.

G. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 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:

1. The Owner will engage a qualified independent testing agency to sample paint material being used. Samples of material delivered to Project will be taken, identified, sealed, and certified in the presence of Contractor.
2. Testing agency will perform appropriate tests for the following characteristics as required by the Architect.
3. The Architect may direct Contractor to stop painting if test results show material being used does not comply with specified requirements. Contractor shall remove noncomplying paint from Project site, pay for testing, and repaint surfaces previously coated with the noncomplying paint. If necessary, Contractor may be required to remove noncomplying paint from previously painted surfaces if, on repainting with specified paint, the two coatings are incompatible.

3.5 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.6 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.7 PAINT SCHEDULE

A. Schedule: Provide products and number of coats specified. Use of manufacturer's proprietary product names to designate colors, materials, generic class, standard of quality and performance criteria and is not intended to imply that products named are required to be used to the exclusion of equivalent performing products of other manufacturers.

B. Exterior Paint Schedule:

1. Exposed Structural Metal, Metal Stairs and Railings:

   a. Surface Preparation: SSPC-SP16 Brush-off Blast Clean Corroded Metal or Galvanized Steel as required.

   b. One Coat:

      1) Tnemec 66HS Hi-Build Epoxoline at 3.0 mils DFT.
      2) PPG PMC Amerlock 400 Hi-Build Epoxy at 4.0-5.0 mils DFT.
      3) Dupont 25P High Solids at 4.0 mils DFT.
      4) International Intergard 475 HS at 5.0 to 10.0 mils DFT.

   c. And One Coat:

      1) Tnemec 73 Endura-Shield at 3.0 mils DFT.
      2) PPG PMC Amercoat 450H Polyurethane at 3.0 mils DFT.
      3) Dupont Imron 2.8 Urethane at 3.0 to 4.0 mils DFT.
      4) International Interthane 990 HS at 3.0 to 4.0 mils DFT.

2. Exterior Wood and Wood Windows for Stained Finish and Clear Finish

   a. Preparation
      1) Scrape and clean and apply coat of knot sealer before applying primer.
      2) Prime edges, ends, faces, undersides, and backsides of wood.
      3) Countersink fasteners and fill with putty tinted to final color.
      4) Sand smooth when dried.

   b. Finish:
      1) Primer: Oil for exterior wood
      2) Intermediate Coat: Stain, exterior, water based, solid hide, matching topcoat.
      3) Topcoat: Stain, exterior, water based, solid hide

3. Exterior Wood for Painted Finish:

   a. One Coat, Primer:
      1) California Paint Grip-Coat Bonding Primer 505 series.
      2) Moore Ultra Spec Exterior Primer N558.
      3) PPG Seal Grip Acrylic Latex Primer.

   b. And Two Coats, Semi-Gloss Finish:
      1) California Paint Fresh Coat 100% Acrylic Satin-Gloss 471 series.
      2) Duron Weathershield Exterior 100% Acrylic Semi-Gloss House Paint.
      3) Moore Ultra Spec Exterior Gloss Finish N449.

END OF SECTION

SECTION 09 95 00 - STAINING AND TRANSPARENT FINISH

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 surface preparation and application of wood finishes.

1. Exterior Substrates:
    a. Custom Roof Deck and Framing (Dressed Lumber)
    b. Wood Windows

1.3 DEFINITIONS

A. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

C. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of product indicated.

C. Samples for Verification: For each type of finish system and in each color and gloss of finish indicated.

1. Submit Samples on representative samples of actual wood substrates, 8 inches square .
2. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:
1. Cross-reference to finish system and locations of application areas.
2. Use same designations indicated on Drawings and in schedules.
3. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the product proposed for use highlighted.
4. VOC content.

1.5 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. Stains and Transparent Finishes:percent, but not less than 1 quart of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply finishes when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

C. Do not apply exterior finishes in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:
1. Pratt & Lambert.
2. Substitutions: see Section 01 30 00 – Submittals.

B. Products: Subject to compliance with requirements, provide product listed in other Part 2 articles for the category indicated.

2.2 MATERIALS, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each finish system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a finish system, provide products recommended in writing by manufacturers of topcoat for use in finish system and on substrate indicated.

C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior stains and finishes applied at project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

1. Clear Wood Finishes, Varnishes: VOC not more than 350 g/L.
2. Shellacs, Clear: VOC not more than 730 g/L.
3. Stains: VOC not more than 250 g/L.
4. Primers, Sealers, and Undercoaters: 200 g/L.

D. Low-Emitting Materials: Interior stains and finishes shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the

Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. Stain Colors: As selected by Architect from manufacturer's full range.

2.3 WOOD FILLERS

A. Wood Filler Paste: MPI #91.

2.4 PRIMERS AND SEALERS

A. Provide all primer, sealants, and coating products used in any individual system from the same manufacturer, no exceptions.

B. Primer, Latex for Exterior Wood: MPI #6.

2.5 STAINS

A. Provide all stain and varnish products used in any individual system from the same manufacturer, no exceptions.

B. Stain, Exterior, Water Based, Solid Hide: MPI #16.

2.6 WATER-BASED VARNISHES

A. Varnish, Water Based, Clear, Satin (Gloss Level 4): MPI #128.

2.7 POLYURETHANE VARNISHES

A. Varnish, Polyurethane, Moisture-Cured, Gloss (Gloss Level 6): MPI #31.

2.8 OIL FINISH

A. Danish Oil: MPI #92.

2.9 SOURCE QUALITY CONTROL

A. Testing of Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample wood finishing materials. Contractor will be notified in advance and may be present when samples are taken. If materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying wood finishes if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying materials from Project site, pay for testing, and refinish surfaces finished with rejected materials. Contractor will be required to remove rejected materials from previously finished surfaces before refinishing with complying materials if the two finishes are incompatible or produce results that, in the opinion of the Architect, are aesthetically unacceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Exterior Wood Substrates: 15 percent, when measured with an electronic moisture meter.

C. Maximum Moisture Content of Interior Wood Substrates: 15 percent, when measured with an electronic moisture meter.

D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

E. Proceed with finish application only after unsatisfactory conditions have been corrected.

1. Beginning finish application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.

1. After completing finishing operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Remove dust, dirt, oil, and grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.

D. Exterior Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Prime edges, ends, faces, undersides, and backsides of wood.

a. For solid hide stained wood, stain edges and ends after priming.
b. For varnish coated stained wood, stain edges and ends and prime with varnish. Prime undersides and backsides with varnish.

3. Countersink steel nails, if used, and fill with putty or plastic wood filler tinted to final color. Sand smooth when dried.

E. Interior Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.
3. Sand surfaces that will be exposed to view and dust off.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 APPLICATION

A. Apply finishes according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for finish and substrate indicated.
2. Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.
3. Do not apply finishes over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

3.5 EXTERIOR WOOD-FINISH-SYSTEM SCHEDULE

A. Wood substrates, nontraffic surfaces, including wood trim architectural woodwork doors wood-based panel products glued-laminated construction exposed joists exposed beams.

1. Solid Hide, Water-Based Stain System:
   a. Prime Coat: Primer, oil for exterior wood, MPI #7.
   b. Topcoat: Stain, exterior, water based, solid hide, MPI #16.

2. Solid Hide, Water-Based Stain System:

   a. Prime Coat: Primer, latex for exterior wood, MPI #6.
   b. Prime Coat: Primer, alkyd for exterior wood[**, MPI #5**].
   c. Prime Coat: Primer, oil for exterior wood[**, MPI #7**].
   d. Intermediate Coat: Stain, exterior, water based, solid hide, matching topcoat.
   e. Topcoat: Stain, exterior, water based, solid hide, MPI #16.

3. Semitransparent Stain System:

   a. Prime Coat: Stain, exterior, solvent based, semi-transparent, matching topcoat.
   b. Topcoat: Stain, exterior, solvent based, semi-transparent, MPI #13.

4. Varnish over Semitransparent Stain System:

   a. Stain Coat: Stain, exterior, solvent based, semi-transparent, MPI #13.
   b. First Intermediate Coat: Varnish matching topcoat.
   c. Second Intermediate Coat: Varnish matching topcoat.
   d. Topcoat: Varnish, with UV Inhibitor, Exterior, Semi-Gloss (Gloss Level 5), MPI #30.

5. Varnish System:

   a. Prime Coat: Varnish matching topcoat.
   b. First Intermediate Coat: Varnish matching topcoat.

c. Second Intermediate Coat: Varnish matching topcoat.
d. Topcoat: Varnish, with UV Inhibitor, Exterior, Semi-Gloss (Gloss Level 5), MPI #30.

6. Clear, Two-Component Polyurethane Varnish over Stain System:

a. Stain Coat: Stain, exterior, solvent based, semi-transparent, MPI #13.
b. First Intermediate Coat: Varnish, aliphatic polyurethane, two-component, matching topcoat.
c. Second Intermediate Coat: Varnish, aliphatic polyurethane, two-component, matching topcoat.
d. Topcoat: Varnish, aliphatic polyurethane, two-component (Gloss Level 6 or 7), MPI #78.

7. Clear, Two-Component Polyurethane Varnish System:

a. Prime Coat: Varnish, aliphatic polyurethane, two-component, matching topcoat.
b. Intermediate Coat: Varnish, aliphatic polyurethane, two-component, matching topcoat.
c. Topcoat: Varnish, aliphatic polyurethane, two-component (Gloss Level 6 or 7), MPI #78.

B. Wood substrates, traffic surfaces, including wood decks and stairs.

1. Deck Stain over Wood Preservative System:

a. Preservative Coat: Preservative, for exterior wood, MPI #37.
b. Intermediate Coat: Stain, for exterior wood decks, matching topcoat.
c. Top coat: Stain, for exterior wood decks, MPI #33.

2. Deck Stain System:

a. Prime Coat: Stain, for exterior wood decks, matching topcoat.
b. Top coat: Stain, for exterior wood decks, MPI #33.

3.6 INTERIOR WOOD-FINISH-SYSTEM SCHEDULE

A. Wood substrates, nontraffic surfaces, including wood trim architectural woodwork doors windows wood-based panel products glued-laminated construction exposed joists exposed beams .

1. Solid-Color Latex Stain System:

a. Prime Coat: Primer, latex for exterior wood, MPI #6.
b. Intermediate Coat: Stain, exterior, water based, solid hide, matching topcoat.
c. Topcoat: Stain, exterior, water based, solid hide, MPI #16.

2. Solid-Color Latex Stain System:

    a. Prime Coat: Primer, alkyd for exterior wood, MPI #5.
    b. Prime Coat: Primer, oil for exterior wood, MPI #7.
    c. Intermediate Coat: Stain, exterior, water based, solid hide, matching topcoat.
    d. Topcoat: Stain, exterior, water based, solid hide, MPI #16.

3. Semitransparent Stain System:

    a. Prime Coat: Stain, semi-transparent, matching topcoat.
    b. Topcoat: Stain, semi-transparent, for interior wood, MPI #90.

4. Semitransparent Stain System:

    a. Prime Coat: Stain, exterior, solvent based, semi-transparent, matching topcoat.
    b. Topcoat: Stain, exterior, solvent based, semi-transparent, MPI #13.

5. Water-Based Varnish over Stain System:

    a. Stain Coat: Stain, semi-transparent, for interior wood, MPI #90.
    b. First Intermediate Coat: Water-based varnish matching topcoat.
    c. Second Intermediate Coat: Water-based varnish matching topcoat.
    d. Topcoat: Varnish, water based, clear, satin (Gloss Level 4), MPI #128.

6. Water-Based Varnish System:

    a. Prime Coat: Water-based varnish matching topcoat.
    b. Intermediate Coat: Water-based varnish matching topcoat.
    c. Topcoat: Varnish, water based, clear, satin (Gloss Level 4), MPI #128.

7. Polyurethane Varnish over Stain System:

    a. Stain Coat: Stain, semi-transparent, for interior wood, MPI #90.
    b. First Intermediate Coat: Polyurethane varnish matching topcoat.
    c. Second Intermediate Coat: Polyurethane varnish matching topcoat.
    d. Topcoat: Varnish, interior, polyurethane, oil-modified, satin (Gloss Level 4), MPI #57.

8. Polyurethane Varnish System:

    a. Prime Coat: Polyurethane varnish matching topcoat.
    b. Intermediate Coat: Polyurethane varnish matching topcoat.
    c. Topcoat: Varnish, interior, polyurethane, oil-modified, satin (Gloss Level 4), MPI #57.

9. Moisture-Cured Clear Polyurethane over Stain System:

    a. Stain Coat: Stain, semi-transparent, for interior wood, MPI #90.
    b. First Intermediate Coat: Moisture-cured polyurethane matching topcoat.

c. Second Intermediate Coat: Moisture-cured polyurethane matching topcoat.
d. Topcoat: Varnish, polyurethane, moisture-cured, gloss (Gloss Level 6), MPI #31.

10. Moisture-Cured Clear Polyurethane System:

a. Prime Coat: Moisture-cured polyurethane matching topcoat.
b. Intermediate Coat: Moisture-cured polyurethane matching topcoat.
c. Topcoat: Varnish, polyurethane, moisture-cured, gloss (Gloss Level 6), MPI #31.

11. Clear, Two-Component Polyurethane System:

a. Prime Coat: Two-component polyurethane matching topcoat.
b. Intermediate Coat: Two-component polyurethane matching topcoat.
c. Topcoat: Varnish, aliphatic polyurethane, two-component (Gloss Level 6 or Gloss Level 7), MPI #78.

12. Danish Oil System:

a. Prime Coat: Danish oil, MPI #92.
b. Topcoat: Danish oil, MPI #92.

END OF SECTION

SECTION 13 10 00 – LIGHTNING PROTECTION

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. Section includes lightening protection for structures, structure elements and building site components.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For air terminals and mounting accessories.

1. Layout of the lightening protection system, along with details of the components to be used in the installation.

2. Include indications for use of raceway, data on how concealment requirements will be met, and calculations required by NFPA 780 for bonding of grounded and isolated metal bodies.

C. Qualification Data: For qualifies Installer and manufacturer. Include data on listing or certification by UL.

D. Certification, signed by Contractor, that roof adhesive is approved by manufacturer of roofing material.

E. Field quality-control reports.

F. Comply with recommendations in the NFPA 780, Annex D, “Inspection and Maintenance of Lightning Protection Systems,” for maintenance of the lightning protection system.

G. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features, including the following:

1. Ground rods

2. Ground loop conductor

H. Prior to submitting shop drawings, meet with Architect/Engineer and lightning protection installer at site to discuss proposed layout. Amend layout to include recommendations of Architect/Engineer.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Certified by UL or LPI as a Master Installer/Designer, trained and approved for installation of units required for this Project.

B. System Certificate:

1. UL Master Label

C. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 780, “Definitions” Article.

1.5 COORDINATION

A. Coordinate installation of lightning protection with installation of other building systems and components, including electrical wiring, supporting structures and building materials, metal bodies requiring bonding to lightning protection components, and building finishes.

B. Coordinate installation of air terminals attached to roof systems with roofing manufacturer and Installer.

C. Flashings of through-roof assemblies shall comply with roofing manufacturers’ specifications.

PART 2 - PRODUCTS

2.1 LIGHTNING PROTECTION SYSTEM COMPONENTS

A. Comply with UL 96 and NFPA 780.

B. Roof-Mounted Air Terminals: Aluminum, solid, NFPA Class I for buildings under 75 feet in height. NFPA Class II for buildings taller than 75 feet in height.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. East Coast Lightning Equipment Inc

b. Harger

c. Northeast Lightning Protection Systems, Inc.

2. Air Terminals More than 24 Inches Long: With brace attached to the terminal at not less than half the height of the terminal.

3. Single-Membrane, Roof-Mounted Air Terminals: Designed specifically for single-membrane roof system materials. Comply with requirements in Division 7.

C. Main and Bonding Conductors: Copper

D. Ground Loop Conductor: The same size and type as the main conductor except tinned.

E. Ground Rods: Copper-clad steel: ¾ inch in diameter by 10 feet long.

F. Heavy-Duty Stack-Mounted Lightning Protection components: Lead sheathed copper.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install lightning protection components and systems according to UL 96A and NFPA 780.

B. Install conductors with direct paths from air terminals to connect to existing ground system. Avoid sharp bends.

C. Conceal the following conductors:

1. System conductors

2. Down conductors

3. Interior conductors

4. Conductors within normal view of exterior locations at grade within 200 feet of building.

D. Cable Connections: Use exothermic-welded connections for all conductor splices and connections between conductors and other components.

E. Bond lightning protection components with intermediate-level interconnection loop conductors to grounded metal bodies of building at 60-foot intervals.

3.2 CORROSION PROTECTION

A. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture unless moisture is permanently excluded from junction of such materials.

B. Use conductors with protective coatings where conditions cause deterioration or corrosion of conductors.

3.3 FIELD QUALITY CONTROL

A. Notify Architect/Engineer at least 48 hours in advance of inspection before concealing lightening protection components.

B. UL Inspection: Meet requirements to obtain a UL Master Label for system.

END OF SECTION

SECTION 13 40 00 CATHODIC PROTECTION SYSTEM

PART 1 - GENERAL

1.1 INCLUDED IN THIS SPECIFICATION

A. Impressed Current Cathodic Protection System for the following elements:

1. Rusting pocketed beam ends embedded in masonry.

2. Lintels

1.2 SUBMITTALS

A. Submit written descriptions and certifications of all equipment.

B. Submit minimum 5-year warrantee.

1.5 GENERAL REQUIREMENTS

A. Cathodic Protection is the application of DC current to a corroding metallic structure through an electrolyte, with the intention of halting the corrosion activity.

B. Cathodic protection system shall be installed with at least four anode rod electrodes within the brick masonry surrounding the embedded beam ends to be protected. The system shall be Impressed Current, designed and supplied as a complete functioning system including all wires, tie-ins, anodes, rectifier and bonds, excluding power source which has not been installed.

C. System, when installed, shall not be visible from the exterior from finished interior spaces of the structure or in any way hinder the support or integrity of the building structure or encroach upon its safe access.

D. Comply with Massachusetts State Electrical Code.

PART 2 - PRODUCTS AND MATERIALS

2.1 ANODE SYSTEM

A. The anode system shall consist of catalyzed titanium anode ribbon and/or rods, current distributor bar, reference cells, and power supply. The type, size, and location of the anode shall

be shown on the cathodic protection design drawings. The installed system shall have the following or equivalent components:

1. 1/8" and ¼" Rod Anodes: The specified anode shall consist of a precious metal oxide catalyst sintered to a Grade 1 titanium substrate. The anode rod shall be rated at a current of 0.32mA/ft (1/8") and 0.65mA/ft (1/4"), with a nominal anodic current density of 10 mA/ft2 (110mA/m2).

2. Current Distributor Bar: The current distributor bar shall be a solid Grade 1, 0.5 in. (12.7 mm) uncoated titanium bar. Thickness shall be a minimum of 0.035 in. (0.889 mm).

B. The anode sample shall be subjected to a lifetime equivalent of 3,580 amp-hours/ft^2 (38,500 amp-hours/m^2) in accordance with the latest edition of the National Association of Corrosion Engineers (NACE International) Standard TM0294 "Testing of Embeddable Anodes for Use in Cathodic Protection of Atmospherically Exposed Steel-Reinforced Concrete." The anode must function for at least a 180-day period under the test conditions to be acceptable indicating a minimum 40 year design life. The anode mesh to be used on this project shall have demonstrated at least ten years successful performance as a cathodic protection anode on a reinforced concrete structure.

2.2 RECTIFIER (POWER SUPPLY): The power supply shall be a manual voltage control tap-switch rectifier with a filtered DC output. The rectifier shall be a silicon diode type. Cooling shall be by natural air convection. Operating ambient temperature shall range from –40 to +45 C. The power supply shall be appropriate for the output voltage of the solar array collection system, which may or may not be running by the time the ICCP system is installed. If the solar collection system is not on line by the time of ICCP installation completion, the ICCP system shall be prequalification tested powered by a tested using a charged battery of proper voltage, and then readjusted as needed when connected to the solar array.

2.3 REFERENCE ELECTRODES: Reference electrodes shall be silver/silver chloride (Ag/AgCl) and suitable for installation in reinforced concrete structures. Each electrode shall have a No. 14 AWG copper conductor with HMWPE insulation attached to the electrode at the factory. The ground wire shall be No. 10 AWG HMWPE.

2.4 Provide all wiring and connectors to create a workable, maintainable system that his resistant to salt air.

PART 3 - EXECUTION

3.1 GENERAL: The Cathodic Protection System Supplier shall provide for the following:

A. All necessary coordination, supplies, guidance and supervision to the Masonry Contractor that will enable the proper design, detailing installation and testing of the equipment.

B. Coordination with the owner and Architect regarding the location of equipment and power

A. Proper training of the owners' personnel regarding the operation and maintenance of the system.

B. Electrical system tie-in shall occur at or near the main electrical panel, via shielded electrical conduits to be run in a non-descript manner within the lighthouse interior.

C. Transformer and monitoring equipment shall be located per the desire of the Architect and Owner.

D. Exact locations of system tie-in, transformer and monitoring equipment shall be determined and coordinated with the owner.

3.2 INSTALLATION REQUIREMENTS

A. The most appropriate and effective combination of anode ribbons and rods shall be selected, designed and installed that shall provide the most protection for the protected elements. Installation shall be coordinated with the masonry contractor, who will assist via the cutting of slots and reglets, drilling of holes, and patching of the same.

B. All Cathodic Protection Equipment shall be concealed in its installation from view and shall in no way require permanent marring or destruction of the existing exposed masonry elements.

END OF SECTION

SECTION 31 63 33 - DRILLED MICROPILES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

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

B. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this Section.

C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.2 DESCRIPTION OF WORK

A. Provide all labor, equipment, materials, and services to complete the work of this Section, including, but not limited to, the following:

1. Furnish and install micropiles as indicated herein and on the drawings. Micropiles will be bonded in the glacial till and if required, based on the thickness of the glacial till, in the bedrock with a designed vertical load capacity of 150 kips.

B. The data report on subsurface soil and groundwater conditions, and micropile design drawing(s) will be provided in an addendum to the bid package.

C. The Contractor shall expect to encounter obstructions during micropile installation and shall provide equipment and use methods that permit advancement of casing through abandoned foundations and walls, soils, cobbles, and boulders, if encountered. At the existing footing locations, the existing footing should be sleeved in such a manner that vertical load cannot be transferred between the footing and drilled micropile.

D. The micropile installation will be performed in close proximity to existing structures. The Contractor shall protect adjacent buildings, property, streets, public and private utilities, below-grade structures, and completed work, from damage associated with micropile installation including undermining, flooding, sedimentation and overspray. Fully and promptly repair and/or restore all property damage caused from performing the Work described herein at no expense to the Owner, the City, or owner of the damaged property. Use equipment and procedures that limit noise and vibrations.

E. The Contractor shall keep the premises safe, secure, neat and clean during performance of the Work to include proper management of drilling spoils, equipment exhaust, and debris so as to minimize disruption to normal area activities.

1.3 DEFINITIONS AND REFERENCE STANDARDS

A. Engineer: Authorized representatives of the Architect or Owner. For work covered under this Section, this term will include GeoEngineers, USA, P.C.

B. ASTM: Specifications of the American Society for Testing and Materials.

C. AISC: Specifications of the American Institute of Steel Construction.

D. API: American Petroleum Institute Standard.

E. ACI: American Concrete Institute

F. AWS: American Welding Society, Standard Code for Welding in Building Construction

G. Code: Massachusetts State Building Code, 8th Edition

H. OSHA: Occupational Safety and Health Administration

1.4 QUALITY ASSURANCE

A. Comply with all rules, regulations laws and ordinances of the City of Newton, Commonwealth of Massachusetts, and that of all other authorities having jurisdiction. All labor, materials, equipment and services necessary to make the work comply with such requirements shall be provided at no additional cost to the Owner.

A. All welding shall be performed by operators who have been previously qualified by tests as prescribed in AWS. Evidence that welders meet qualification requirements shall be submitted to the Engineer before welding is begun.

B. Field Monitoring and Testing:

1. Full-time field monitoring of micropile installation operations shall be performed by the Engineer. No micropiles shall be installed except in the presence of the Engineer.

2. From time to time, monitoring of the welding and welds may be performed by an independent testing agency employed by the Owner. The Contractor shall fully cooperate with the agency to facilitate inspection, notifying the agency in advance when welding is to be performed. Welds which do not conform to the applicable specifications shall be replaced as directed by the Engineer at no additional cost to the Owner.

3. Certification of the quality of the micropile materials to be used in the Work shall be furnished to the Engineer at the time of delivery of materials to the Site. Micropile materials shall also be subject to on-site observation for conformance with the specifications.

4. Approvals and acceptance given by the Engineer shall not relieve the Contractor of responsibility to perform the Work in accordance with the Contract Documents and the Code.

C. The Contractor will engage a qualified independent testing agency to obtain and test at least one set of three 2-inch grout test cubes for each pile. The grout cubes shall be obtained, cured and tested for compressive strength in accordance with ASTM C109, expect that the grout shall be restrained from expansion using a top plate. The Contractor shall also measure and record the specific gravity of each grout batch using a mud balance.

D. The Contractor shall be responsible for the correct location of micropiles as shown on the Contract Drawings. The Contractor shall establish, maintain and record all locations and elevations required, including the elevation of the top and bottom of the micropile and casing, and other location and elevation information as required.

E. The Contractor's proposed installation procedures shall be submitted in accordance with paragraph 1.6 for review by the Engineer for compliance with the Contract Specifications and industry standards. Work shall not proceed without written notice of the Owner's acceptance of proposed micropile installation procedures.

F. The Contractor shall have a minimum of 5 years experience in the Work specified in herein and shall have successfully completed a minimum of 5 similar projects.

1.5 SUBMITTALS

A. Submittals for the Work described herein shall be made to the Engineer a minimum of three (3) weeks prior to the start of the Work. If, after review, the Engineer requires resubmission for any reason, the specified time period(s) shall commence upon the date of receipt of the re-submittals. The Contractor is responsible for scheduling specified submittals and re-submittals to prevent delays in the work.

B. Submit qualifications to satisfy the requirements of Parts 1.5.B and F.

C. Mix Design, Equipment and Materials:

1. Grout mix design, manufacturer's product data for any additives used in the mix design and results of the compressive strength tests for the grout mix.

2. Mill certifications for reinforcing steel and other steel members incorporated in the design.

3. Description of all equipment to be used for construction of the micropiles. If used, include water reconditioning and processing equipment.

4. Admixtures proposed for use in drilling fluid intended to stabilize the borehole, if any. Bentonite shall not be allowed in drilling fluid.

D. Proposed Means and Methods:

1. Proposed method of constructing the micropile including advancing the casing and drilling the socket.

2. Proposed method of continuous monitoring for plumbness and deviation of micropiles during excavation and details of corrective measures to be implemented as required.

3. Proposed method of cleaning the micropile borehole, and verifying the depth of the borehole prior to placement of reinforcing.

4. Proposed method for installation of steel reinforcing and grouting.

5. Proposed method to drill through existing concrete structures or other obstructions that may be encountered within the micropile location.

6. Proposed methods to contain and dispose of drilling spoils during drilling operations.

E. As Built Records:

1. During micropile construction, the Contractor shall maintain and submit to the Engineer as-built records of the Work. The micropile as-builts shall contain:

   a. Micropile identification number.

   b. Plan dimensions, diameter, design bottom and top elevations, and actual bottom and top elevations of the permanent outer steel casing and pile socket. Plan location and top elevation after pile is cut to final elevation shall be surveyed by a Licensed Surveyor.

   c. Dates and times of micropile drilling, micropile cleaning, reinforcing steel placement and grouting.

   d. Grout type, theoretical and actual grout volume placed, specific gravity, grout pressures and grout cube test results.

   e. Description of soils encountered, description of obstructions and drilling problems, if any. Description of bearing stratum, condition of bearing stratum, and embedment depth in glacial till and rock, if applicable.

   f. Description of steel reinforcing, cutouts, threaded inserts, variations from shop drawings, if any.

   g. Plumbness and deviation from plan location.

   h. Unusual occurrences during drilling, reinforcement or grout placement.

2. During micropile construction, any unusual conditions encountered shall be noted and reported to the Engineer immediately.

3. Results of quality control tests performed on recirculated water, if any, shall be made available to the Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Admixtures proposed for use to stabilize the borehole during drilling shall be biodegradable and free from oil, acid, alkali organic matter and other deleterious substances. Bentonite shall not be allowed in drilling fluid.

B. Water used for drilling fluid shall be potable, clean, fresh, and free from oil, acid, alkali organic matter and other deleterious substances.

2.2 CEMENT GROUT

A. The grout shall be a fluid mixture of portland cement and clean potable water capable of maintain the solids in suspension without appreciable bleed and shall conform to the following:

1. Minimum compressive strength of 5,000 psi at 28 days.

2. Maximum water-cement ratio (w/c) of 0.45.

3. Fly ash, air entraining, and plasticizers of a recognized type may be used to make the mix more workable. Admixtures must be approved by the Engineer.

4. Type V cement conforming to ASTM C150.

5. Grout batched on-site shall be used within 1 hour after mixing.

2.3 REINFORCING STEEL

A. Steel core reinforcement at a minimum shall be standard deformed steel conforming to the requirements of ASTM A615, Grade 60 and Grade 150, a structural steel section conforming to ASTM A36, welded, or seamless pipe conforming to ASTM designations A53, A500, A501 or A618, or equivalent approved by the Engineer. Splices and threaded connections shall develop the full design capacity of the reinforcing.

B. Pipe or drill casing, shall conform to one of the following ASTM designations: A53, A500, A501 or A618, or other approved by the Engineer.

C. Structural steel for use in micropiles shall conform to the current edition of the ASIC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings.

D. Store reinforcing steel in such a manner that they will be kept free of mud.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Micropile locations shall be staked out and maintained by a Licensed Surveyor in the Commonwealth of Massachusetts. Locations of micropiles shall be cross-staked so that all centerlines are retained after drilling.

B. Control operations to prevent damage to existing structures and utilities located at the site. Preventive measures shall include, but are not limited to, selecting construction methods and procedures that will prevent caving of the borehole, and monitoring and controlling the vibrations from construction activities such as drilling of the borehole. Construction vibrations shall not exceed 0.3 inch per second at and beyond the site property line.

C. Mobilize, furnish, and maintain equipment and supplies as necessary for the preparation, mixing, circulation, and storage in tanks of drilling fluids.

D. Legally haul and dispose of excavated material, spent drilling fluid, and drilling fluid-contaminated excavated materials at an approved landfill or disposal site, in accordance with applicable Local, State and Federal laws.

E. Leave exposed reinforcing steel in a clean, neat condition to permit pile cap connection.

F. Sequence of micropile installation shall be such that pile to be drilled do not communicate or impact piles that have recently been grouted.

3.2 MICROPILE INSTALLATION

A. Use equipment and procedures that will limit vibrations and loss of ground and will prevent undermining of existing foundations. When drilling within 10 feet of an existing foundation, use a drilling method in which the drill water returns inside the drill casing or drill with surface casing that extends at least 10 feet deeper than the existing foundation.

B. If applicable, use drilling methods that are capable of seating the drill casing into the top of competent bedrock and drilling the required socket into the competent bedrock. Drilling equipment shall have adequate capacity, including power, torque, and down thrust to drill a borehole of both the maximum diameter and to a depth of 20 percent beyond the proposed depths through all fill, soil, rock, and other materials, such as obstructions.

C. Installation will be performed by personnel experienced and properly equipped to drill micropiles of the proposed diameter and length.

D. The Contractor shall anticipate surface and subsurface obstructions at micropile locations such as boulders or concrete foundations. Obstructions shall be drilled through by the Contractor at no additional expense to the Owner.

E. The use of mud slurry to lubricate the casing, seal off the water, or to stabilize the borehole is allowed. Slurry shall not contain Bentonite.

F. If used, slurry shall not contain Bentonite. It shall be adequate in all respects to support the sides of the borehole and shall not have any adverse effects on the ground/grout bond strength.

G. After reaching the final depth, flush the borehole from the bottom with clean water to remove all drill cuttings until the water at top of the casing is clear. After flushing, check the depth of borehole with a weighted tape to confirm the bottom of the borehole is clean. If grouting is delayed, reflush and recheck cleanliness before grouting.

H. Install the steel reinforcing in the borehole. Use centralizers to center the steel reinforcing.

I. Place cement grout using a tremie pipe from the bottom of the borehole. Continue grouting until grout return at the top of the borehole is of the same consistency as the grout being placed. Use a positive displacement grout pump. Use grouting equipment that prevents the introduction of oil, air, or other foreign substances into the grout and has a screen to sieve the grout before the grout is introduced into the grout pump. Measure the volume of the grout being placed to an accuracy of 10 percent.

J. After grouting, check to make sure that the grout level inside the casing remains at the top of the casing. Add grout as required until the grout level remains stable.

K. Install required dowels, plates, etc., at the top of the pile as shown on the Contract Drawings.

3.3 MICROPILE INSTALLATION PERFORMANCE REQUIREMENTS AND TOLERANCES

A. The micropiles shall be constructed entirely within the lateral limits indicated on the Contract Drawings. No portion of the micropiles designed to remain in place shall exceed beyond the tolerances established.

B. Tolerances: Comply with the following:

1. Location Tolerance: Maximum of 1-1/2” at the cutoff elevation.

2. Plumb Tolerance: Maximum of 2 percent in any 10’ length.

3. Borehole Tolerance: Within plus 1”, minus 0” of specified diameter.

4. Top Elevation Tolerance: Plus 0”, minus 1”.

5. Reinforcing Placing Tolerances: For micropile reinforcing, maintain a minimum clear cover of 1 inch. For dowels and reinforcing extending into adjacent construction, comply

with the requirements of ACI 303-84, Section 5.4, unless otherwise specified in the Contract Documents.

6. Micropiles that pass through existing foundations to remain shall be sleeved and isolated from the foot so that no vertical load can be transferred between the footing and micropile.

C. Piles that are rejected because of damage, misalignment, mislocation or failure to meet other installation criteria shall be cutoff a minimum of 5 feet below final grade and abandoned. Additional piles shall be installed as necessary subject to review by the Engineer. When, in the opinion of the Engineer, rejection of a pile is caused by the Contractor's violation of the specifications or other error on the Contractor's part, and the installation of one or more piles is necessitated, the cost of such reinstallation shall be borne by the Contractor.

END OF SECTION

SECTION 32 23 00 - EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.1 INCLUDED IN THIS SECTION

A. The work of this section includes, but is not limited to, the following:

1. Excavation and backfill of tops of mound tombs.

2. Filling of tombs with sand.

1.2 PROJECT CONDITIONS

A. Protection: Ensure the safe passage or persons and traffic around the areas of earthwork. Provide sheeting, shoring, and bracing as may be required to support sides of excavation.

B. Dust Control: Take effective measures to minimize and control windblown dust. Do not create ice hazards by water spraying in freezing weather.

C. Erosion Control: Take effective action to control erosion and run off from site. Prevent siltation of drainage systems and pollution of waterways and water bodies. Install erosion controls prior to beginning site clearing and earthwork. Provide temporary silt barriers such as Siltation Fencing as may be required to protect adjacent areas and water bodies from site erosion.

D. Utilities: Locate all utilities and maintain and keep utilities in service and protected from damage, except utilities indicated to be removed or relocated. Excavate and uncover all utilities requiring work or service.

E. Cold Weather Conditions: Protect subgrade and building foundations from freezing in cold weather. Do not backfill when temperatures are below freezing.

F. Prior to beginning any soil excavation, the contractor shall submit a proposal in writing to the Architect / Engineer who shall then review it and forward it to the Massachusetts Historical Commission (MHC). MHC shall retain authority to require archeological documentation and mitigation measures to be undertaken by others prior to commencing excavation work. Avoid subsurface disturbance where possible.

G. Exercise extreme care during excavating to avoid contacting or damaging existing buried coffins, caskets, remains or artifacts. Stop work immediately upon detecting such and notify the Engineer immediately. Contractor shall be responsible for protecting these items on site until a proper method of storing or archiving is determined. Move to another location on the project and resume normal operations during the resulting period of review. This shall not be reason for change orders or delays unless the review period exceeds two weeks for a specific item; therefore, the contractor must allow sufficient slack in his project schedule.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Structural Fill: Provide gravel, sandy gravel, or gravelly sand free from organic material, loam, trash, snow, ice, frozen soil, and other objectionable material and well graded within the following limits.

SIEVE SIZE	PERCENT FINER BY WEIGHT PASSING THROUGH
3 inches	100
No. 4	30-90
No. 40	10-50
No. 200	0-8

B. Crushed Stone: Provide clean, washed crushed stone free of fine materials and graded within the following limits:

SIEVE SIZE	PERCENT FINER BY WEIGHT PASSING THROUGH
1 inches	100
¾ inches	90-100
½ inches	10-50
No. 4	0-5
No. 40	0-5
No. 200	0-5

C. Sand: Provide clean, washed sand free of silt and clay components and graded within the following limits:

SIEVE SIZE	PERCENT FINER BY WEIGHT PASSING THROUGH
No. 4	100
No. 8	95-100
No. 16	70-100
No. 30	40-75

No. 50	10-35
No. 100	2-15

2.2 ACCESSORIES

A. Erosion Control Mat for “Soil Weave”: Biodegradable rolled erosion control product (RECP) shall be composed of jute fibers, curled wood fibers, straw, coconut fiber, or a combination of these materials, with a non-biodegradable heavy polypropylene net stitched to the top and a high-strength continuous filament geomatrix or net stitched to the bottom.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Locate and mark excavations. Carefully remove sod in ¾" or 1” thick layers with topsoil retained in the root system. Following sod removal, remove topsoil down to a depth where it becomes sandy and inorganic, or to the bottom of the excavation, whichever is reached first. Following topsoil removal, remove remaining soil, if any, to the bottom of the excavation.

B. Shoring and Bracing: Slope excavations and provide shoring and bracing as needed to comply with requirements of all local requirements and standard, accepted practice.

C. Dewatering and Drainage: Remove water from excavations by appropriate methods and protect excavations from surface runoff.

D. Finished Grades: The grading around the tombs should match the historical grades as closely as can be determined. On the above ground tombs the grading at the fronts of the tombs should allow access to and visibility of the tomb doors.

E. Re-use existing soil from each excavation or replace (or supplement) with structural fill meeting the above gradation requirements. Control moisture in subgrades and in fill materials, and conform compact all materials within 3% of optimum moisture. Compact, to 95% of maximum density as determined by ASTM D1557, Method C. Place backfill in lifts of not more than 6”.

F. Disposal: Dispose of excess materials and materials which are not to be reused off-site in a legal manner. Do not remove topsoil without the permission of the owner.

G. Cold Weather: Contractor shall be responsible for protection of earth materials, subgrade, and foundations from frost during excavation operations and shall submit protection plan to the Engineer for review. Do not place or compact fill when ambient air temperatures are below freezing or when the fill could freeze prior to compaction.

H. Stockpile sod, topsoil, and inorganic soil at separate locations on site for re-use. Locations shall be separated to avoid inter-mixing of materials, shall be protected against run-off, and shall be located on walkways in order to not damage existing lawns.

I. Protect all grave markers from damage during excavation and backfill operation, utilizing wooden barriers or shields when necessary.

3.2 SURFACING AND SEEDING

A. Following inorganic fill or crushed stone fill placement along excavations, add topsoil to a minimum depth of 8" from grade.

B. Where designated on the drawings as “SOIL WEAVE”, and following completion of earthwork, add topsoil (loam) to a minimum depth as indicated on the drawings and not less than 4”. In locations with increased slope, install Geosynthetic Synthetic Erosion Control Mat at a depth of 2” from the top of soil.

C. Spread sod over topsoil in pieces arranged to most completely cover the area, selecting the most healthy salvaged pieces.

D. Seed and maintain completed work in accordance with Section 32 92 00 – Loaming and Seeding.

END OF SECTION

PROJECT MANUAL

ADDENDUM #1

5-23-24

First Baptist Church in Newton

Tower Restoration

Newton, MA

May 15, 2024

Engineer:
Structures North Consulting Engineers, Inc.
60 Washington Street
Salem, MA 01970
978-745-6817

Architect:
Scott B. Aquilina, AIA
1253 Commonwealth Avenue
Newton, MA 02465
617-943-4079

SECTION 00 10 00 - INVITATION TO BID

First Baptist Church in Newton, a.k.a. FBCN or the Owner, 848 Beacon Street, Newton, MA, requests bids for the structural stabilization and masonry restoration of their 1888 tower. The tower and the adjacent church buildings are listed in the National and State Register of Historic Places and are governed under a Preservation Restriction with the Massachusetts Historical Commission.

Special Requirements

The project may be partially funded with grants from the City of Newton Community Preservation Act program (CPA) and the Massachusetts Preservation Projects Fund through the Massachusetts Historical Commission and other grant programs yet to be confirmed. All work must be performed in accordance with the documents prepared jointly by Scott B. Aquilina, AIA and Structures North Consulting Engineers Inc. and meet the Secretary of Interior's *Standards for the Treatment of Historic Properties*.

While the project may be partially funded through public agencies, it is not subject to any specific statutory requirements, either under M.G.L. c. 30B or M.G.L. c.149. FBCN has nevertheless determined that a fair, open competitive process assures best value to the public. Accordingly, the terms of this Invitation for Bid (IFB) set forth all the rules of this procurement. There are no Filed Sub Bids, Chapter 149 procedures, or Prevailing Wage requirements. The Massachusetts laws and regulations may be referred to for guidance, but they shall not be binding on this IFB, the terms of which may be modified or waived if it is in the best interests of FBCN or the City.

While the structural masonry restoration is the primary focus of the project, the scope of work includes masonry cleaning, roofing, metalwork, carpentry, painting, and limited electrical. The Bidder on this contract should include these scopes of work except, as noted in the drawings, the replacement of existing porch roofs which will be under a separate contract. Paving and landscaping scope as indicated on the drawing is to be included from this bid. The Bidder must, however, include the coordination of this work in the sequence of construction on site.

Licensing and Bonds

Bidders shall be properly licensed under the laws governing their respective trades and be able to obtain insurance and bonds required for the Work. The successful Bidder will be required to furnish a Performance Bond and a Labor and Materials Payment Bond, each equal to 100 % of the Construction Contract Amount, as required by the Contract Documents.

ACCESS TO BID DOCUMENTS

Scott B. Aquilina, AIA is the Owner's Project Manager and Designated Representative. Bidding documents may be obtained by emailing Scott Aquilina at sbaquilina@gmail.com as of May 16,

PRE-BID ACCESS
The Project Site is at 848 Beacon Street, Newton, MA and may be accessed by applying to Scott Aquilina at sbaquilina@gmail.com.

PRE-BID MEETING
A pre-bid meeting and site inspection will be held at 848 Beacon Street, Newton on Monday, May 20, 2024 at 11:00 AM.

REQUESTS FOR INFORMATION
Requests for Information will be accepted until 5pm, Tuesday, May 28th and should be directed to sbaquilina@gmail.com and copied to jwathne@structures-north.com. Questions will be answered in memo format via email to all bidders by 5pm, Thursday, May 30th.

ACCEPTANCE
All bids must be submitted prior to 5 pm on Friday, June 7, 2024 to be eligible for consideration. Bids shall be submitted by email to the Architect at sbaquilina@gmail.com and, simultaneously, Project Engineer at jwathne@structures-north.com. Bids shall be submitted as pdfs per the requirements of the FORM FOR GENERAL BID, Section 00 40 00 with the required Construction Schedule, Schedule of Alternates and Qualifications Statement.

BID PROPOSALS MUST BE:
- Clearly labeled "Bid Proposal for First Baptist Church in Newton Tower Restoration."
- Endorsed with the name and address of the Bidder.
- Addressed to the Richard Ransom, Tower Restoration Committee Chair, First Baptist Church in Newton

BID PROPOSALS SHALL BE ACCOMPANIED BY:
(1) A fully executed FORM FOR GENERAL BID, Section 00 40 00
(2) A proposed construction schedule indicating site mobilization and staging, completion of work of the Base Bid and any accepted Alternates; demobilization; and site cleanup.
(3) Unit Costs and Schedule of Alternates as outlined below.
(4) Qualification Statement, Section 00 23 00,
including firm qualifications, company references, and resumes of key personnel to be assigned to the project for the full duration of the work.

EVALUATION OF BID PROPOSALS
Bids shall be evaluated on the basis of price, previous experience with similar types of masonry restoration projects, ability to perform the work in a timely manner, company references and resumes of key personnel to be assigned to the project. As used herein, the term "lowest responsible and eligible Bidder" shall mean the Bidder (1) whose bid is the lowest of those bidders possessing the skill, ability and integrity necessary for the faithful performance of the work; (2) who has met all the requirements of the IFB; and (3) who shall certify that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work.

First Baptist Church in Newton reserves the right to waive any informalities in or to reject any or all proposals if it be in their interest to do so. In inviting bid proposals, First Baptist Church in

Newton shall reserve the right to reject any proposal, if it determines that such bid does not represent the proposal of a person or entity competent to perform the work as specified; or that fewer than three such proposals were received and the proposals are not reasonable for acceptance without further competition.

TERMS

The term of the awarded contract shall extend from the time of execution for approximately thirty (30) months but incorporate the full term required for Project completion.

TAXES

The Owner is a register 501(c)(3) entity and is exempt from payment of the Massachusetts Sales Tax.

WORK UNDER SEPARATE CONTRACTS AND BY OWNER: The Owner may do other work during construction with his own forces, or by separate contract.

END OF INVITATION TO BID

SECTION 00 23 00 - QUALIFICATION STATEMENT

In order to be eligible and responsible to bid on this project, General Bidders shall have a minimum of ten years of experience in the restoration of historic buildings, including structural reinforcement and masonry restoration of the scope described herein, to buildings of a similar age, size and scale as F B C N , and shall have completed at least three similar projects in the past five years, including at least three buildings on the Massachusetts State Register of Historic Places.

All bids shall be accompanied by a reference list of similar projects and resumes of key personnel to be assigned for the full duration of the project. All masonry repairs performed as work of this Contract shall be directed by at least one person who understands the specified requirements and the materials and methods needed for their correct execution; and shall be present at all times during the execution of the work of these Sections.

Submitted to: First Baptist Church in Newton

By (print name clearly): _____
Signature: _____

Principal Office: _____
Street City State Zip

The signer of this Qualification Statement guarantees the truth and accuracy of all statements and of all answers to questions hereinafter made.

1. How many years has your organization been in business as a contractor under your present business name?

   _____

2. How many years of experience in construction work has your organization had

   (a) as a Prime Contractor? _____ (b) as a Sub-Contractor? _____

3. Have you ever failed to complete any work awarded to you? _____

   If so, name the project and location, and state the reason for failure to complete:

   _____

   _____

4. List your references:

_____

_____

_____

_____

_____

_____

5. What similar projects has your organization completed? Be specific. Identify which projects are listed in the National or State Register of Historic Places.

Project Name	Contract Amount	Class of Work	Date Completed	Owner's Name and Address	Phone Number

_____

_____

_____

_____

_____

_____

_____

_____

_____

6. What is the construction experience of the principal individuals of your organization? Identify which individuals have worked on projects listed in the National or State Register of Historic Places.

Individual's Name	Present Position in Company	Years of Construction Experience	Type of Work	In What Capacity

END OF QUALIFICATION STATEMENT

SECTION 00 40 00 –FORM FOR GENERAL BID

By submitting this bid the undersigned represents to the Owner:

- that he/she has examined and understands the Advertisement for Bids, Instructions to Bidders, contract forms, General Conditions of the Contract, Drawings, Specifications and all other Contract Documents, and has examined the site, as defined therein;
- that this bid is made with distinct reference and relation to all said Contract Documents;
- that in regard to the conditions affecting the work to be done and the labor and materials needed, this bid is based upon his/her own investigation and research in addition to any drawings, surveys, measurements, dimensions, calculations, estimates, or other tests or representations of any employee, officer, agent or consultant of the Owner.

A bidder wishing to amend this bid after transmittal to the Owner may do so only by withdrawing this bid and resubmitting another bid prior to the time for opening bids.

Submitted to: First Baptist Church Newton, 848 Beacon Street, Newton, MA. as directed in Section 00100 - Invitation to Bid, via email to:

Structures North Consulting Engineers, Inc.
60 Washington St, Salem, MA 01970
Attn: jwathne@structures-north.com

and

Scott B. Aquilina, AIA
1253 Commonwealth Ave, Newton, MA 02464
Attn: sbaquilina@gmail.com

A. The Undersigned proposes to furnish all labor and materials required to complete all of the work for the First Baptist Church Newton Tower Restoration, in accordance with the accompanying Drawings, Specifications and Addenda, prepared jointly by Structures North Consulting Engineers Inc. and Scott B. Aquilina, AIA for the Contract Price specified below, subject to additions or deductions according to the terms of the Specifications.

B. THIS BID INCLUDES **ADDENDA** NUMBERED: _____

C. PROPOSED PRICING AS FOLLOWS:

1. **BASE BID:**

Item #U1: 522 sf @_____ = _____

Item #U2: 2786 sf @_____ = _____

Item #U3: 235 sf @_____ = _____

Item #U4: 1735 cf @_____ = _____

Item #U5: 55 lf @_____ = _____

Item #U6: 5 units @_____ = _____

Item #U7: 83 cf @_____ = _____

Item #U8A: 4 anch @_____ = _____

Item #U8B: 3 anch @_____ = _____

Item #U8C: 41 anch @_____ = _____

Item #U8D: 68 anch @_____ = _____

Item #U8E: 0 anch @_____ = _____

Remainder of work by the Lump Sum = _____

TOTAL BASE BID = **$**_____

D. ADD ALTERNATE PRICING AS FOLLOWS:

1. **ALTERNATE #A1:**

Item #U1: 2110 sf @_____ = _____

Item #U2: 90 sf @_____ = _____

Item #U3: 0 sf @_____ = _____

Item #U4: 210 cf @_____ = _____

Item #U5: 0 lf @_____ = _____

Item #U6: 0 units @_____ = _____

Item #U7: 152 cf @_____ = _____

Item #U8A: 0 anch @_____ = _____

Item #U8B: 0 anch @_____ = _____

Item #U8C: 0 anch @_____ = _____

Item #U8D: 0 anch @_____ = _____

Item #U8E: 14 anch @_____ = _____

Remainder of work by the Lump Sum = _____

TOTAL ALTERNATE A1 = **$**_____

1. **ALTERNATE #A2:** $_____

2. **ALTERNATE #A3:** $_____

3. **ALTERNATE #A4:** $_____

D. **PERFORMANCE GUARANTEE**: The undersigned agrees that, if he/she is selected as General Contractor, he /she will within ten days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the Awarding Authority, execute a contract in accordance with the terms of this bid.

E. The undersigned further certifies under penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used herein the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity.

Date _____ _____
(Print Name of Bidder)

Social Security Number or
Federal Identification
Number: _____

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

Telephone: (____) _____ _____
(Business Street Address)

_____
(City, State and Zip Code)

END OF SECTION 00 40 00 - FORM FOR GENERAL BID