Orpheum Theatre
Terra Cotta/Masonry Restoration

Hennepin Avenue
Minneapolis, Minnesota

Project Manual
Division 1, Technical Specification,
And Small Sheet Details

Construction Documents

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HGA Commission Number
0781-006-25

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END OF SECTION

SECTION 01110
SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification:
   1. Project Name: **Orpheum Theatre Terra Cotta/Masonry Restoration**
   2. Project Location: Hennepin Avenue, Minneapolis, Minnesota.
   3. Owner: MCDA, City of Minneapolis

B. Architect Identification: The Division 1 and Technical Specifications, and Drawings, dated April 10, 2002, were prepared for Project by:
   1. Hammel Green and Abrahamson, Inc.
   2. 701 Washington Avenue North
   3. Minneapolis, Minnesota 55401
   4. Commission No.: 0781-006-25

C. The Work consists of the renovation of existing terra cotta items including repointing of all terra cotta joints, patching and repair of broken and damaged terra cotta, replacement of terra cotta units, brick renovation including repointing of brick joints, and replacement of broken and damaged brick on 9th Street and Hawthorne Street facades and at other roof level facades as indicated.
   1. Work Included: Provide labor, materials, articles, equipment, incidentals, items, tools, services, supplies, methods, operations, skills in such quantities as may be necessary to complete project as described in the Contract Documents.
   2. Scope of Work: Base Bid Work is identified by priority level assigned to each detail and as indicated by area on the building elevation Drawings. Additional scope of Work is identified by other priority level indicators. This additional work will be done by Unit Price and the contract adjusted by Change Order to include this scope of work when approved by Owner.
      a. Priority Level Definitions: Refer to Priority Level Descriptions and Key Notes in the Drawings specific requirements. In addition to Priority level designation, specific notes on the photographs indicate additional work to be included in the Base Bid.

1.3 CONTRACT[S]

1. Project will be constructed under a lump sum general construction contract.

1.4 SCHEDULES

A. Preliminary Project Schedule: Refer to Bidding Information for project dates.

1.5 USE OF PREMISES

A. General: Contractor shall have partial use of Project site for construction operations. Contractor to obtain street and sidewalk permits from the City Public Works Department where construction activities will occupy these right-of-ways. Contractor shall maintain egress from building exits at all times.

B. Contractor may obtain keys to access building roof areas upon prior notice to Owner. Keys to be returned each day and doors locked to roof areas.

C. Access to Work Areas: The Contractor shall control the public from accessing to the construction areas. Unauthorized personnel and the public shall be kept from the construction areas. Erect temporary protection covers over pedestrian walkways and at points of entrance and exit for persons and vehicles, which must remain in operation during the course of construction.

1.6 PRE-CONSTRUCTION SURVEY

A. Where photographs in the Contract Documents do not adequately document the existing conditions, provide additional photographs of these areas. Review photographs with Architect to determine that the restoration procedures are appropriate for these areas.

PART 2 - PRODUCTS

2.1 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "MasterFormat" numbering system.

1. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.

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

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
   a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

2.2 BONDS, PERMITS, FEES

A. Contractor shall provide and pay for all bonds, fees and permits that may be required, including bonds, permits and fees required by municipalities, including connecting fees, to directly accomplish the work under this project.

2.3 HAZARDOUS SUBSTANCES AND HARMFUL PHYSICAL AGENTS

A. Where work of this project involves possible hazardous substances or harmful physical agents, extreme care shall be exercised to avoid damage and preserve safety of all personnel.

B. Regulations concerning availability of information and employee training in use and handling of "hazardous substances" and "harmful physical agents" is governed by Employee Right-to-Know Act of 1983 (Laws of Minnesota 1983, Chapter 316).

C. Regulations governing handling of asbestos-containing materials and disposal of asbestos-containing debris are:

1. Code of Federal Regulations, Title 29, U.S. Department of Labor - Occupational Safety and Health Administration (OSHA), Section 1910.1001 - Asbestos.
2. Minnesota Pollution Control Agency Rules, Chapter 17 - Emission Standards for Asbestos.

2.4 CONSTRUCTION SAFETY

A. General: In accordance with best construction practices, the Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property affected directly or indirectly by Contractor's operations during the performance of the Work. This requirement shall apply continuously 24 hours per day until acceptance of the Work by the Owner and shall not be limited to normal working hours.

B. Swingstages, scaffolding shall be equipped with outriggers, debris nets and other OSHA safety equipment.

C. General Fire Safety: The Contractor and the Safety Director shall recognize the utmost importance of extraordinary precautions to prevent a fire in or adjacent to the functioning and occupied building. The Contractor shall exercise extreme care to maintain and exercise fire safety precautions through the work, including providing sufficient fire fighting devices, watchmen, standby helpers or other precautions during construction, in use of temporary heat, welding, bracing, sweating, and testing.

D. Safety Director: The Contractor shall appoint a responsible member to act as Safety Director (fire and accident or separate individuals for each) whose duty it shall be to prevent accidents and minimize fire hazards and to enforce safety precautions. The Safety Director shall develop procedures and regulations to guide the Contractor, subcontractors and all workmen. With particular respect to existing buildings, facilities, and the Owner's staff, the Safety Director shall consult with and be guided by the directions of the Owner.

   1. Compliance: The Contractor and Trade Contractors shall conform to and abide by requirements of the Safety Director.

E. Inspection: The Safety Director shall periodically inspect all spaces of work under this Contract and operations of the Contractor and list hazards to be removed or corrected. These shall be reported to the Owner, the Contractor and the responsible subcontractors, who shall promptly remove or correct the hazards.

F. Site Meetings: The Safety Director shall hold accident and fire prevention meetings at least once a month or as required by governing authorities, with the representatives of the various trades employed to insure all employees understand and comply with the programs.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01221
ALLOWANCES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

B. Types of allowances include the following:
   1. Testing and inspecting allowances.

C. Related Requirements:
   1. Individual Specifications Sections Listed Under Schedule of Allowances.

D. Related Sections
   1. Document 00700: General Conditions of the Contract.
   2. Section 01330: Submittals.

1.2 SUBMITTALS

A. Submit invoices or delivery slips to show actual quantities of materials or services delivered to the site for use in fulfillment of each allowance.

1.3 TESTING AND INSPECTING ALLOWANCES

A. Testing and inspecting allowances for field quality control include the cost of engaging testing agencies, actual tests and inspections, and reporting results.

B. The allowance does not include incidental labor required to assist the testing agency or costs for retesting if previous tests and inspections result in failure.

C. Costs of services not required by the Contract Documents are not included in the allowance.
   1. Costs for Pre-construction testing are not included in this Allowance and are the responsibility of the Contractor.

D. At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to Owner by Change Order.

E. Adjustments for Allowances will be approved by Change Order.
   1. If actual costs are more or less than the stated Allowance, actual cost will be determined by submittals of invoices, delivery slips, rental charges, and labor used.

PART 2 PRODUCTS
Not Used

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

3.3 SCHEDULE OF ALLOWANCES

A. Allowance No. 1: Include inspection of mortar and testing of mortar as specified in Division 4 Sections "Terra Cotta Restoration" and "Brick Restoration".

1. Amount of Allowance: $2500

END OF SECTION

SECTION 01250
CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

B. Related Sections include the following:
   1. Division 1 Section "Allowances" for procedural requirements for handling and processing allowances.
   2. Division 1 Section "Unit Prices" for administrative requirements for using unit prices.
   3. Division 1 Section "Product Options and Substitutions" for administrative procedures for handling requests for substitutions made after Contract award.

1.2 MINOR CHANGES IN THE WORK

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

1.3 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
   1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
   2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
      a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
      b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
      c. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to the Architect.
   1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
   2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
   3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
   4. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
   5. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

C. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

1.4 ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, base each Change Order proposal on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.
2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the Purchase Order amount or Contractor's handling, labor, installation, overhead, and profit. Submit claims within 14 days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. Owner will reject claims submitted later than 21 days after such authorization.

1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

1.5 CHANGE ORDER PROCEDURES

C.O. must be on MCDA C.O. Form

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

→ Submitted with Contractor Signature for MCDA approval & processing.

1.6 CONSTRUCTION CHANGE DIRECTIVE

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

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

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

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

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION

SECTION 01270
UNIT PRICES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Administrative and procedural requirements for unit prices.

B. Related Sections include the following:
   1. Division 1 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

1.2 DEFINITIONS

A. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification.

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

1.3 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, equipment, supervision, bond, insurance, applicable taxes, overhead, and profit.
   1. No increase in Unit Prices or additional costs will be allowed for other consideration, such as change in schedule, change in labor costs, delay, efficiency loss or any other related matters when the Contract Sum is adjusted by the application of unit prices for work performed or not performed.

B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

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

E. The Owner may, at their discretion, consider the Bids of other bidders in evaluating the Unit Prices.
   1. The sole right to accept or reject Unit Prices is vested in the Owner and Owner's decision shall be final.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

3.1 LIST OF UNIT PRICES

A. Unit Price No. 1 – Repair of Impost Block at Hawthrone Elevation:

1. Description: Repair cracks in terra cotta below springer brick. Repair exposed steel lintel and fill joint with sealant according to Division 4 "Terra Cotta Restoration"
2. Unit of Measurement: Per terra cotta unit.

B. Unit Price No. 2 – Replacement of Impost Block at Hawthrone Elevation:

1. Description: Replace broken corner unit in terra cotta below springer brick according to Division 4 "Terra Cotta Restoration"
2. Unit of Measurement: Per terra cotta unit.

C. Unit Price No. 3 – Repair Concrete Foundation Wall at Stair:

1. Description: Repair cracks in concrete walls. Propose method of crack repair
2. Unit of Measurement: Lump sum to include both stairways.

D. Unit Price No. 4 – Repointing of Brick:

1. Description: Repointing of brick on a square foot basis assuming work will require scaffolding. Do not include scaffolding cost in this unit price. Work to include cutting out of joints and repointing with mortar according to Division 4 Section "Brick Restoration."
2. Unit of Measurement: Square foot of repointing installed.

E. Unit Price No. 5 – Replacement of Brick:

1. Description: Replace broken brick on a square foot basis assuming work will require scaffolding. Do not include scaffolding cost in this unit price. Work to include cutting out of joints and setting of brick, cost of new brick, and mortar according to Division 4 Section "Brick Restoration."
2. Unit of Measurement: Square foot of replacement brick installed.

F. Unit Price No. 6 – Minor Spalling of Terra Cotta:

1. Description: Repair minor spalls in the finish of the terra cotta as defined in Section "Terra Cotta Restoration." Minor spalling includes surface preparation and finish restoration at spalled area.
2. Unit of Measurement: Per terra cotta unit. May include more than one spall on unit face.

G. Unit Price No. 7 – Major Spalling of Terra Cotta:

1. Description: Repair of major spalls in the finish and base material of the terra cotta as defined in Section "Terra Cotta Restoration." Major spalling includes preparation of base material to receive patching material to fill in spall. Then applying of new glazing material at spalled area.
2. Unit of Measurement: Per terra cotta unit. May include more than one spall on unit face.

H. Unit Price No.8 – Repair of Threshold at Door:

1. Description: Repair of concrete and masonry sill at area above terra cotta. Remove damaged masonry and concrete cap. Fill in with masonry and patch top of masonry with concrete patching material, apply sealant at joints between brick masonry and terra cotta. Refer to detail 51.1/409.
2. Unit of Measurement: Lump sum unit price.

I. Unit Price No.9 – Remove steel projecting through Terra Cotta:

1. Description: Remove or cut exposed steel projecting through terra cotta to allow patching and repair terra cotta. Fill in with masonry and patch top of masonry with concrete patching material, apply sealant at joints between brick masonry and terra cotta. Refer to detail 51.1/409.
2. Unit of Measurement: Per terra cotta unit. May include more than one steel areas on unit face..

J. Unit Price No. 10 – Repointing of Brick at Stage House:

1. Description: Repointing of brick on a square foot basis assuming work will be accessed from adjoining roof. Work to include cutting out of joints and repointing with mortar according to Division 4 Section "Brick Restoration." Refer to detail 72/4-9.
2. Unit of Measurement: Square foot of repointing installed.

K. Unit Price No. 11 – Rebuild Balustrade at Top of Façade on Hennepin:

1. Description: Owner has existing spindels of the original balustrade. Provide new balustrade elements required to rebuild railing. Owner has __ number of spindels and __ feet of cap. Work to include new spindels and additional feet of cap in terra cotta. Install balustrade at original location with mortar according to Division 4 Section "Terra Cotta Restoration."
2. Unit of Measurement: Lump sum unit price for rebuilding balustrade.

L. Unit Price No. 12 – Sealant at Upper Slab at Recessed Doors:

1. Description: Apply sealant at concrete slab to wall joints. Apply penetrating sealer to slab to improve water-resistance according to Division 7 Section "Joint Sealants."
2. Unit of Measurement: Lump sum unit price. Includes 2 door openings.

END OF SECTION

SECTION 01290
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Procedures for submitting schedules of values and applications for payment.

B. Related Sections:
   1. Section 01330 – Submittals

1.2 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
   1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
      a. Application for Payment forms with Continuation Sheets.
      b. Submittals Schedule.
   2. Submit the Schedule of Values to Architect at earliest possible date but no later than **7** days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
   1. Identification: Include the following Project identification on the Schedule of Values:
      a. Project name and location.
      b. Name of Architect.
      c. Architect's project number.
      d. Contractor's name and address.
      e. Date of submittal.
   2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
      a. Related Specification Section or Division.
      b. Description of the Work.
      c. Name of subcontractor.
      d. Name of manufacturer or fabricator.
      e. Name of supplier.
      f. Change Orders (numbers) that affect value.
      g. Dollar value.
         1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
   3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
   4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
   5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
      a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing if required.
   6. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
      a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

7 Schedule of Values Updating: Update the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.
   a. Each Change Order or Construction Change Directive to be included as a new line item.

1.3 APPLICATIONS FOR PAYMENT

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

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.
   1. Contractor's accounting program with a G702 format may be acceptable, provided all language of the AIA Document G702 in included and unmodified.

D. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours.
   1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

E. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
   1. Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.
   2. When an application shows completion of an item, submit final or full waivers.
   3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
   4. Waiver Delays: Submit each Application for Payment with Contractor's waiver of mechanic's lien for construction period covered by the application.
      a. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

F. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
   1. List of subcontractors.
   2. Schedule of Values.
   3. Contractor's Construction Schedule (preliminary if not final).
   4. Products list.
   5. Submittals Schedule (preliminary if not final).
   6. Copies of building permits.
   7. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
   8. Initial progress report.
   9. Report of pre-construction conference.
   10. Certificates of insurance and insurance policies.
   11. Performance and payment bonds.

G. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
   1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
   2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

H. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 01310
PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. General project coordination procedures.
   2. Conservation.
   3. Administrative and supervisory personnel.
   4. Project meetings.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 1 Section "Closeout Procedures" for coordinating Contract closeout.

1.2 COORDINATION

A. Coordination: Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, which depend on each other for proper installation, connection, and operation.
   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.

B. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
   1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

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

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

1.3 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
   1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
   2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.

3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within 5 days of the meeting.

B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:
   a. Tentative construction schedule.
   b. Phasing.
   c. Critical work sequencing.
   d. Designation of responsible personnel.
   e. Procedures for processing field decisions and Change Orders.
   f. Procedures for processing Applications for Payment.
   g. Distribution of the Contract Documents.
   h. Submittal procedures.
   i. Preparation of Record Documents.
   j. Use of the premises.
   k. Responsibility for temporary facilities and controls.
   l. Parking availability.
   m. Office, work, and storage areas.
   n. Equipment deliveries and priorities.
   o. First aid.
   p. Security.
   q. Progress cleaning.
   r. Working hours.

C. Pre-installation Conferences: Conduct a preinstallation conference at Project site for each Section with preinstallation requirements for before starting the construction activity.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
   a. Contract Documents.
   b. Related Change Orders.
   c. Purchases.
   d. Deliveries.
   e. Submittals.
   f. Review of mockups, if required in the Section
   g. Possible conflicts.
   h. Compatibility problems.
   i. Time schedules.
   j. Weather limitations.
   k. Manufacturer's written recommendations.
   l. Compatibility of materials.
   m. Acceptability of substrates.
   n. Temporary facilities and controls.
   o. Space and access limitations.
   p. Testing and inspecting requirements.
   q. Protection of construction and personnel.
   r. Refer to each technical Section (Divisions 2-16) for additional specific requirements.
3. Record significant conference discussions, agreements, and disagreements.

4. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Conduct progress meetings at regular intervals.

1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
   a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
   b. Review present and future needs of each entity present, including the following:
      1) Interface requirements.
      2) Sequence of operations.
      3) Status of submittals.
      4) Deliveries.
      5) Off-site fabrication.
      6) Access.
      7) Site utilization.
      8) Temporary facilities and controls.
      9) Work hours.
      10) Hazards and risks.
      11) Progress cleaning.
      12) Quality and work standards.
      13) Change Orders.
      14) Documentation of information for payment requests.
3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
   a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION 01330
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A Section Includes:

1. Procedures for submittals.

B Related Sections:

1. Section 01110 - Summary of Work.
2. Section 01310 - Project Management and Coordination.
3. Section 01770 - Close Out Procedures.
4. Section 01780 - Closeout Submittals.

1.3 DEFINITIONS

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

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

1.4 SUBMITTAL SCHEDULE

A. General: Electronic copies of CAD Drawings of the Contract Drawings will not be provided by Architect for Contractor's use in preparing submittals

B. Prepare and submit a "Submittal Schedule" within 10 days after award of Contract, and prior to execution of Contract. Include the following information.

1. Specification Section Number.
2. Type of submittal required.
3. Estimated time for submittal.

C. Coordinate, organize and plan submittal schedule so submittals are sent with appropriate time allowed for review and so submittals do not accumulate into unreasonably large groups.

D Some submittals may required additional time for routing and review including but not limited to the following:

1. Terra Cotta shop drawings and samples.
2. Terra cotta repair samples.

1.5 TRANSMITTAL FORM

A. Submittals must be sent with "Submittal Transmittal Form" Section 01331 completely filled out with appropriate information.

B. Submittals sent without properly completed "Submittal Transmittal Form" will be considered incomplete and marked "Not Accepted" and returned without review.

C. Send separate transmittal forms for each section and separate transmittals for each type listed:

1. Shop Drawings.
2. Product Data.

3. Samples.

D. If shop drawings, samples or product data describe the same product or item, send submittals together under same transmittal otherwise send each type submittal under separate transmittals.

1.6 SUBMITTAL ACCEPTANCE

A. Refer to General Conditions for scope of submittal review and acceptance.

B. Maintain copies of "Accepted" and "Conditionally Accepted" submittals with record set per 01780.

C. "Accepted" submittals have no exceptions noted. One set of accepted submittals will be returned to Contractor. Make appropriate copies for use and distribution.

D. "Conditionally Accepted" submittals have exceptions noted but resubmission is not required. Make appropriate copies for use and distribution.

E. "Not Accepted" submittals are incomplete and/or need corrections. Complete and/or correct and resubmit until final acceptance is obtained.

F. "Not Reviewed" means submittals was not required or was provided for information only.

1.7 CONTRACTOR'S SCHEDULE

A. Submit at Pre-Construction Conference. See 01310.

1.8 DISTRIBUTION

A. Contractor is responsible for duplication and distribution of accepted submittals including shop drawings. Exchange directly with subcontractors and others involved, not through Owner or Architect.

B. Provide and exchange submittals as needed to coordinate Work.

C. Otherwise Owner will receive accepted submittals as part of Record Set submitted during project closeout.

1.9 SHOP DRAWINGS

A. Submit specially prepared shop, fabrication, or erection drawings.

B. Shop drawings submitted without requested information and without Contractor's approval will not be reviewed and will be returned to Contractor marked "Not Accepted."

C. Drawings Submittal Requirements:
   1. Submit four opaque copies of each drawing.
   2. Number in submittal sequence.
   3. Include Contractor's stamp of approval, as evidence that drawings are approved except that field dimensions must be verified prior to approval and submittal.
   4. Show field verified dimensions on final shop drawings and identify verified dimensions.
   5. Drawings must be clear, sharp and readable quality acceptable to Architect/Engineer.
   6. Provide a clear space on each drawing of not less than 40 square inches for Architect's stamps.

D. Reproducing Architect's Drawings
   1. Do not reproduce Architect's drawings to serve as shop drawings except where necessary to indicate general location of a specific fabricated item.
   2. If Architect's drawings are reproduced, remove extraneous notes and information from drawing before inclusion in submittal.
   3. Submitted drawing should only include information intended to be reviewed and accepted.

E. Drawings that include unnecessary information will marked "Not Reviewed" or "Not Accepted" and returned for resubmittal.

F. Maintain accepted shop drawings as part "Record Set." See 01780.

PRODUCT DATA AND EQUIPMENT BROCHURES

A. Provide multiple originals of brochures, cuts, etc if they are multi-page bound catalogs which would be difficult photocopy or they are intended to illustrate color or other appearance characteristics which cannot be adequately represented by photo copies.

B. Photo copies of original brochures are acceptable except as specified above. Photo copies must be clear and readable. Unreadable or unclear photocopies will be returned "Not Accepted."

C. Provide layout drawings where necessary for field use or as required by Architect.

D. Number of Copies of Product Data:
   1. 3 minimum unless otherwise specified.
   2. Additional copies required for two Owner's manuals per 01780.
   3. Additional copies for other contractors for purposes of information and coordination.
   4. Number in submittal sequence.
   5. Include contractor's stamp of approval, as evidence that drawings are approved in accordance with General Conditions (including field dimensions where applicable).
   6. Indicate field verified information as applicable.
   7. Provide a clear space of not less than 40 square inches for Architect's stamps.

E. Provide an index of each page in submittal with space for notes and acceptance stamps.

F Warranties:
   1. Where warranty is indicated, submit manufacturers' sample warranty with shop drawings.
   2. Submit actual executed warranties or guarantees per Section 01770 and 01780.

SAMPLES

A. Deliver samples of materials, equipment, assemblies and components as required by specifications to Architect/Engineer with delivery costs prepaid. At Architect's/Engineer's direction, remove samples after approval.
   1. Provide samples representative of actual product including finishes and other specified characteristics.
   2. Indicate type of construction and quality proposed for installation in Project.

B. Number Samples:
   1. Provide (3) Three samples unless otherwise specified.
   2. If accepted samples must be returned, submit extra sample for Architect's record as requested.

C. Maintain record of accepted samples with other record documents at project site.

1.12 LIST OF MATERIALS

A. Submit within ten (10) days after award of Contract and prior to purchase.

B. Submit (3) copies of complete list of materials, products, and equipment proposed to be used to Architect/Engineer for acceptance.

C. Do not order materials or equipment until proposed list of materials is accepted.

D. Materials and equipment are subject to Architect's and Owner's acceptance.

E. Arrange list in order of specification sections and in form indicated by Architect/Engineer.
   1. Items listed shall fully conform to project requirements and specifications.
   2. Specifically identify each material, product or equipment item by manufacturer, brand and model and other identifying designations including those where only one material or product is specified.

3. Products specified by reference standards, described by performance requirements and descriptive language shall be named.
4. Do not list "as specified."

F. Where two or more makes or kinds of items are named in specifications (or additional names are listed in an addendum), Contractor shall state which particular make or kind of each item is to be provided.

G. If list is not received within 10 days mechanical and electrical equipment under Divisions 15 and 16 will be as scheduled.

1.13 LIST OF SUBCONTRACTORS

A. Submit within ten (10) days after award of Contract, and prior to execution of Contract.

B. Submit with List of Materials.

C. Submit (3) copies of a complete list.

D. Do not execute subcontracts until proposed list of subcontractors is accepted by Owner, Architect and Engineers.

E. List to include the following information and be in form indicated by Architect.
1. Description of work proposed to be done subcontract.
2. Names of subcontractors and major material suppliers proposed to perform portions of Work.
3. Names of sub-subcontractors of mechanical and electrical subcontractors.
4. Include proposed sub-subcontractors for other trades as requested by Architect and Engineers.

F. Proposed subcontractors or sub-subcontractors (and materials supplier installers) shall be established, reputable firms of recognized standing with a record of successful and satisfactory past performance with type work and/or items proposed to be provided or installed by them.
1. Only those subcontractors (and sub-subcontractor when appropriate) who Architect and Owner have no reasonable objection to shall be used on Work.

G. Reasonable objection shall be deemed to have been exercised when, in opinion of Architect or Owner, objections have been made based on their reasonable belief that proposed subcontractor, sub-subcontractor or material supplier:
1. Cannot provide materials, equipment, facilities or other products as specified or required by Contract Documents;
2. Cannot provide labor and skill necessary to accomplish part of Work for which he is proposed, including but not limited to quality of work;
3. Lacks adequate and appropriate experience for that part of Work proposed, including materials or methods required;
4. Has previously failed to perform timely or satisfactorily, including in cooperation and in necessary services after project completion;
5. Proposes deviations in materials or methods that are unacceptable to Architect or Owner, such as proposing materials or products that were not specified or not listed in addenda;
6. There is reasonable doubt he can satisfactorily perform part of Work for which he is proposed, within time schedule, due to size of organization or existing work load;
7. Cannot demonstrate ability through quality of representative work to perform part of Work for which he is being considered;
8. Of questionable integrity;
9. Or other similar considerations bearing on possibility of unsatisfactory performance.

H. If Owner or Architect has a reasonable objection to any person or entity proposed by Contractor to do any portion of Work, Contractor shall submit a substitute to whom neither Owner nor Architect has any reasonable objection and no increase in Contract Sum shall be allowed as a result of any such substitution.

After acceptance of proposed list, no change of any subcontractor, sub-subcontractor or supplier not objected to by Architect or Owner, shall be made, except for cause acceptable to Architect and Owner.

1. In event of a proposed change, Contractor shall submit reasons for change, in writing, along with alternate proposed subcontractor, sub-subcontractor or material supplier.
2. Proposed change is subject to conditions of this Article and requirements of General Conditions.

1.14 CLOSE-OUT SUBMITTALS

A. Submit documents specified under Section 01770 and 01780.

B. Submit two copies of operating instructions and maintenance manuals to Owner at time of Owner's instructions.

1.15 OTHER SUBMITTALS

A. Provide other submittals as required by Architect or Owner.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01630
PRODUCT OPTIONS AND SUBSTITUTIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes the following administrative and procedural requirements:
   1. Selection of products for use in Project;
   2. Pre-bid Substitutions
   3. Product delivery, storage, and handling;
   4. Manufacturers' standard warranties on products;
   5. Special warranties;
   6. Product Options
   7. Product substitutions after execution of Contract

B. Related Sections;
   1. Instructions to Bidders
   2. General Conditions of the Contract for Construction.
   3. Section 01330 – Submittal Procedures.

1.2 DEFINITIONS

A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
   1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation, shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
   2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.

B. Substitutions: Changes in products, materials, equipment, manufacturers, installers, and methods of construction from those required by the Contract Documents and proposed by Contractor.
   1. Comply with Pre-Bid Substitution Request Article for substitution during the Bidding Period.
   2. Comply with Product Substitutions after Execution of the Contract for substitutions during construction.

C. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

D. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

1.3 SUBMITALS

A. **Pre-Bid Substitution Requests:** Submit two copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Substitution Request Form: Use form in Section 01631.
   2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

B. All requests for consideration of proposed products for those specified shall be made in writing and must be received by Architect at least seven (7) days prior to bid date and bid hour. Acceptable alternate products will be included in Addenda prior to bid date.
   1. Requests received after this time will not be considered or reviewed.

a. Requests shall clearly define and describe product for which acceptance is requested, and shall be accompanied by manufacturer's literature, specifications, drawings, cuts, performance data, list of references, model numbers, or other information necessary to completely describe the item.

2. Acceptance of a product by the Architect for bidding purposes will be in the form of Addenda to Contract Documents.

C. No information or indication of acceptance will be provided in any other manner than Addendum.

D. The use of references to standards, manufacturers, brands and similar designations is intended to establish the measure of quality as to minimum standards of design, function, appearance, type, strength, durability, construction, efficiency, sound level, finish, appearance, availability, service and similar characteristics, which have been determined as requisite for this Project.

1. Proposed alternate products shall also be available in the same range of colors, textures, dimensions, gauges, types, and finishes as the material or article specified; must equal the specified item in strength, durability, efficiency, serviceability, ease and cost of maintenance must be compatible with the building design and not necessitate design modifications; nor impose additional work or require changes in the work of any Prime Contractor, or any other Subcontractor, vendor, or materials supplier, nor result in any additional cost to the Owner.

2. The contractor, supplier or manufacturer providing any acceptable product shall bear the cost of any required modifications to spaces, services, utilities and other features as the result of the use of its product, including but not limited to

a. Larger capacity mechanical or electrical service, devices or utilities resulting from acceptance of the product for bidding purposes.

b. Modification to pipes, conduits, ducts, and controls for conveying, distributing, and controlling those services or utilities.

c. Modification to insulation, wrappings, coatings, or other integral features of the lines or items conveying those lines.

E. Any product or manufacturer used as basis of the specifications shall generally set the criteria.

1. It shall be expressly understood that any other product or manufacturer listed in the specification or any addenda as acceptable will be acceptable provided they fully comply with the requirements and match the basic and essential criteria of the product used for base specification, including the level of workmanship quality, as determined by the Architect.

F. For final acceptance for use in the work, the Architect shall have right to accept or reject proposed deviations. Should a proposed product be unable to meet requirements, the product shall not be used. No additional compensation will be allowed for any work required by the use of any product accepted by Addendum or not accepted by Addendum.

G. Where two or more products are shown or specified, the bidder and Contractor has his option of which to use, provided the product proposed will meet all requirements of the specifications and the design criteria. The right is reserved by the Architect to accept or reject proposed deviations in design, function, construction or similar differences that will affect design intent or quality.

H. For any same or like product for this Project, only one brand, manufacturer, source or type shall be used, as approved by Architect.

For products specified or shown by describing proprietary items, model numbers, catalog numbers, manufacturers, trade names or similar reference, each bidder obligates himself to submit bids and accept awards of a contract based upon the use of such products.

1. The reference is intended to establish the measure for the quality which has been determined as requisite and necessary for the Project.

J. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 3 days of receipt of request, or receipt of additional information or documentation, whichever is later.

1. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

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

1.5 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
   1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
   2. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 MATERIALS

2.1 PRODUCT OPTIONS

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

B. Product Selection Procedures: Procedures for product selection include the following:
   1. Product: Where Specification paragraphs or subparagraphs titled "Product" name a single product and manufacturer, provide the product named.

a. Substitutions may be considered, unless otherwise indicated.

2. Products: Where Specification paragraphs or subparagraphs titled "Products" introduce a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
   a. Substitutions may be considered, unless otherwise indicated.
3. Manufacturers: Where Specification paragraphs or subparagraphs titled "Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
   a. Substitutions may be considered, unless otherwise indicated.
4. Available Products: Where Specification paragraphs or subparagraphs titled "Available Products" introduce a list of names of both products and manufacturers, provide one of the products listed or another product that complies with requirements. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
5. Product Options: Where Specification paragraphs titled "Product Options" indicate that size, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide either the specific product or system indicated or a comparable product or system by another manufacturer. Comply with provisions in "Product Substitutions" Article.
6. Visual Matching Specification: Where Specifications require matching an established Sample, select a product (and manufacturer) that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches satisfactorily.
   a. If no product available within specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents on "substitutions" for selection of a matching product.
7. Allowances: Refer to individual Specification Sections and "Allowance" provisions in Division 1 for allowances that control product selection and for procedures required for processing such selections.

2.2 PRODUCT SUBSTITUTIONS AFTER EXECUTION OF CONTRACT

A. Timing: Architect will consider requests for substitution if received within 15 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
   1. For products that become unavailable and are beyond the control of the Contractor, the substitution request for the use of an substitute product must be submitted in writing within 10 days after the date the Contractor has ascertained the product does not comply with the specifications or has become unavailable.

B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
   1. Specified product is no longer available. The reason for unavailability is beyond the control of the Contractor. Unavailability will be construed as being due to prolonged strikes or lockouts which will seriously delay the entire Project to an extent the Owner finds unacceptable, bankruptcy, discontinuance of manufacture of a product or Acts of God.
   2. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume.
      a. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
   3. Requested substitution does not require extensive revisions to the Contract Documents.
   4. Requested substitution is consistent with the Contract Documents and will produce indicated results.
   5. Substitution request is fully documented and properly submitted.
   6. Requested substitution will not adversely affect Contractor's Construction Schedule.
   7. Requested substitution has received necessary approvals of authorities having jurisdiction.
   8. Requested substitution is compatible with other portions of the Work.
   9. Requested substitution has been coordinated with other portions of the Work.
   10. Requested substitution provides specified warranty.
   11. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01631
SUBSTITUTION REQUEST FORM

To: **Hammel, Green and Abrahamson, Inc.**
701 Washington Avenue North
Minneapolis, Minnesota 55401-1180
Attention: Ginny Lackovic

Project: **Orpheum Theatre Terra Cotta/Masonry Restoration**

HGA Comm. No.: 781-006-25 **Date Received:** _____

Specification Section Number and paragraph: _____

Drawing and details affected: _____

Proposed Substitution: _____
Manufacturer _____
Product (model, pattern, etc.): _____

WHY IS SUBSTITUTION BEING SUBMITTED ? (Select one of the following):
[__] Pre-Bid Substitution (Prior Approval) Bid Date:
[__] Specified product is not available. Explain.
[__] Cost savings to Owner. Indicate comparative cost analysis.
[__] Other. Explain.

EFFECTS OF PROPOSED SUBSTITUTION Answer the following questions and attach explanations.

Does substitution affect dimensions indicated on Drawings?
(NO) (YES, explain)

Does substitution affect Work of other Sections?
(NO) (YES, explain)

Does substitution require modifications to design, changes to Drawings, or revisions to specifications to be incorporated into the Project?
(NO) (YES, explain)

Attach list of at least 3 projects where proposed substitution has been used within past 12 months include name, address, and telephone number of Owner and Architect.

CONTRACTOR'S / BIDDER'S REPRESENTATION
Undersigned accepts responsibility for coordination of proposed substitution and accepts all additional costs resulting from the incorporation of proposed substitution into the Project per Section 01630.

SUBMITTED BY:

_____

_____

For Architect's use:
Accepted [___] Not Accepted [___]
No Action Required [____]
Submission: Incomplete [___]
Too Late [____]
Reviewed by/date: _____
Comments: _____

Subcontractor's signature and date: _____

Contractor's signature and date: _____

SECTION 01770
CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Inspection procedures.
   2. Project Record Documents.
   3. Operation and maintenance manuals.
   4. Warranties.
   5. Final cleaning.

B. Related Sections:
   1. Section 01780 – Closeout Submittals.

1.2 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
   1. Advise Owner of pending insurance changeover requirements.
   2. Submit specific warranties, final certifications, and similar documents.
   3. Prepare and submit Project Record Documents, operation and maintenance manuals and similar final record information.
   4. Deliver extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
   5. Terminate and remove temporary facilities from Project site, along with mockups, and similar elements.
   6. Complete final cleaning requirements.

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

1.3 FINAL COMPLETION

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

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 PROJECT RECORD DOCUMENTS

A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.
   1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
      a. Refer to Division 1 " Closeout Submittals" for specific requirements of items to be recorded.
      b. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
      c. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
   2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
   3. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
   4. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.

C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
   1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
   2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
   3. Note related Change Orders, Record Drawings, where applicable.

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

1.5 OPERATION AND MAINTENANCE MANUALS

A. Assemble a complete set of operation and maintenance data indicating the maintenance of terra cotta and brick materials:
   1. Maintenance Data:
      a. Manufacturer's information.
      b. Name, address, and telephone number of Installer or supplier.
      c. Maintenance procedures.
      d. Maintenance and service schedules for preventive maintenance.
      e. Maintenance record forms.
      f. Sources of maintenance materials.
      g. Copies of warranties and bonds.

B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.6 WARRANTIES

A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
   1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (115-by-280-mm) paper.
   2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
   3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 FINAL CLEANING

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

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
   1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
      a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
      b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
      c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
      d. Remove tools, construction equipment, machinery, and surplus material from Project site.
      e. Clean exposed exterior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces.
      f. Leave Project clean and ready for occupancy.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION

SECTION 01780
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Closeout submittals; maintenance manuals and record drawings and specifications.

B. Related Sections:
   1. Section 01330 - Submittal Procedures.
   2. Section 01770 - Closeout Procedures.

1.2 SUBMITTALS

A. Operating Instructions and Maintenance Manuals: Submit 2 sets of Operational and Maintenance Manuals.

B. Record Drawings: Submit one set of marked-up Record Prints.

C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

A. Provide operating instruction data and maintenance manuals in accordance with Section 01770 Closeout Procedures. At time of instructions to Owner, submit two copies of the manuals to the Owner.

B. Manual shall consist of neatly edited and typed manuals of instructions (in hard cover, indexed, loose leaf notebook) to explain use, function and control of equipment, materials and systems.

C. Printed information shall cover instructions and explanations.
   1. The instructions shall also include maintenance information, including:
      a. Terra cotta product data including cleaning instructions and maintenance data
      b. Replacement brick manufacturer and supplier
      c. Terra cotta patching material, supplier, installer including manufacturer representative name, address and phone numbers.
      d. Copy of restoration procedure documents.
      e. Copy of Contractor photographs with labels indicating photograph location.
      f. Other maintenance and repair data and a listing of names, addresses, and telephone numbers of appropriate service organizations for various items and equipment.

D. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
   1. Include procedures to follow and required notifications for warranty claims.

3.2 RECORD SET OF DRAWINGS

A. Contractor shall provide one copy of record set of drawings to the Architect at the completion of Contract.
   1. Refer to Section 01330 - Submittal Procedures for posted (updated) job site contract documents.

B. During construction, Contractor shall maintain a clean set of drawings for the sole purpose of recording changes and actual "as installed" information.

C. As a general guide, the type of information to be recorded on the record set includes:
   1. Changes, deviations or revisions made, except minor or non-critical dimensions, including those made by Change Order or Supplementary Instructions.
   2. Omissions, including work omitted by accepted alternates.
   3. Indicate location of each new piece of terra cotta
   4. Terra cotta units that require pinning and epoxy of broken areas.
   5. Terra cotta units that have been tied with new anchors to existing backup wall.
   6. Terra cotta units with structural crack repair.
   7. Indicate exact area of repointing of brick units on elevations.

D. Marking of the record set shall be done methodically as work progresses, clearly and neatly, in color.

3.3 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
   1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
   2. Record the name of the manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
   3. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
   4. Note related Change Orders and Record Drawings, where applicable.

END OF SECTION

SECTION 04901
TERRA COTTA RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes restoration of terra cotta as follows:
   1. Replacement of terra cotta units indicated to be replaced
   2. Repairing of terra cotta, including reattachment of loose pieces, and chips of terra cotta including pinning of large fragments, and reanchoring of terra cotta where units are determined to be unsound or where investigation indicates steel anchoring system is damaged.
      a. Repair of structural cracks
      b. Repair of non-structural cracks
   3. Repointing of all terra cotta mortar joints where indicated.
   4. Removing bituminous patching materials from terra cotta.
   5. Cleaning exposed terra cotta surfaces prior to repointing as indicated.
   6. Preparatory work necessary to obtain materials matching existing terra cotta and mortars.

B. Related Sections include the following:
   1. Division 4 Section "Brick Restoration" for repointing of brick and replacement of broken brick.
   2. Division 7 Section "Joint Sealants" for sealing joints in restored brick and terra cotta.

C. Unit Prices: Unit prices for terra cotta restoration and cleaning, and brick repointing are specified in Division 1 Section "Unit Prices."
   1. Unit prices apply to additions to and deletions from Work as authorized by Change Orders.

D. Allowances: Allowances for inspection and testing of terra cotta repointing mortar are specified in Division 1 Section "Allowances."
   1. Contract will be adjusted by Change Order to cover testing and inspection costs after invoices have been submitted and verified.

1.2 DEFINITIONS

A. Terra Cotta Definitions:
   1. Broken: Where units have large cracks or where a portion of terra cotta has broken away and has exposed the core of the unit. Unit has also pulled away or is out of alignment with adjacent units.
   2. Spalling: Two levels of spalling as follows:
      a. Major Spalling: Glaze and base material has fallen away and leaving an exposed base terra cotta base material. Generally greater than a 1/8 inch in depth but where core of unit is not visible.
      b. Minor Spalling: Areas where glazing has chipped away.
   3. Open Joints: At mortar joints between terra cotta units, either mortar is totally missing or is cracked and is loose within the joint, or motar is attached to one unit and the adjacent unit has pulled away from the joint.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.
   1. Terra cotta patching material
   2. Terra cotta finishing material
   3. Anchoring devices and fasteners
   4. Epoxy adhesives
   5. Grout materials.
   6. Mortar materials including mortar sand gradation and quality per ASTM C144.
   7. Design mix of pointing mortar including the following:
      a. Type and brand of Portland cement

b. Brand of hydrated lime
c. Supplier of masonry sand
d. Flows (initial and after suction)
e. Percent water retention
f. 7, 14 and 28 day compressive strength
g. Statement with compliance with specifications.

B. Shop Drawings: Full-size patterns for replacement terra cotta units showing sections, dimensions and connections with other work. Indicate steel fabrications needed for attachment to existing structure.

1. For terra cotta required to match existing color, Contractor to submit samples from building and provide dimensions and profiles of each piece to be replaced. Each piece numbered and keyed to elevations.

C. Samples for Finish Verification: Before erecting mockup, submit samples of the following:

1. Provide three samples of replacement terra cotta finished to match existing.
2. Provide three samples of terra cotta patching finish material indicating range of color to be expected, at least 6 inches long by 12 inches wide. Document each sample with manufacturer and stock number or other information necessary to order additional material.
   a. Samples to be based on manufacturer's testing and creation of color system for terra cotta patching from samples from existing terra cotta.
3. Each type of pointing mortar in the form of sample mortar strips, 6 inches long by 1/2 inch wide, set in aluminum or plastic channels.
   a. Include with each sample a list of ingredients with proportions of each. Identify sources, both supplier and quarry, of each type of sand and brand names of cementitious materials and pigments if any.

D. Qualification Data: For restoration specialists, including field supervisors, and terra cotta manufacturer.

E. Restoration Program: For each phase of restoration process, provide detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of restoration work including protection of surrounding materials on building and Project site.

1. Include methods for keeping pointing mortar damp during curing period.
2. Shoring: Indicate type and locations of shoring systems to be used. If required by Architect, submit shop drawings of shoring and bracing of existing terra cotta and brick work signed and by a professional Engineer licensed in the state where project is located.
3. If materials and methods other than those indicated are proposed for any phase of restoration work, provide a written description, including evidence of successful use on comparable projects, and a testing program to demonstrate their effectiveness for this Project.

F. Cleaning Program: Describe cleaning process in detail, including materials, methods, and equipment to be used and protection of surrounding materials on building and Project site, and control of runoff during operations.

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

G. Statement of Application: Submit letter from manufacturer verifying that new terra cotta units are suitable for intended use.

H. Test Reports:

1. Provide 3 copies of pre-construction test reports and mortar design mixes.
2. Provide 3 copies of field quality control tests reports and manufacturer field services reports.

1.4 QUALITY ASSURANCE

A. Restoration Specialist Qualifications: Engage an experienced, preapproved masonry restoration and cleaning firm to perform work of this Section. Firm shall have completed work, in the last 5 years, similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Firm to have preexisting and ongoing relationship with terra cotta manufacturer of at least 5 consecutive years. Firm must have trained workers in terra cotta repair products and maintain current manufacturer certifications for use of the patching compounds.

1. Field Supervision: Restoration specialist firms shall maintain experienced full-time supervisor on Project site during times that terra cotta restoration and cleaning are in progress. Supervisors shall not be changed during Project except for causes beyond the control of restoration specialist firm and with approval of the Architect and Owner.
2. Restoration Worker Qualifications: Persons who are experienced and specialize in restoration work of types they will be performing. When masonry units are being patched, assign at least one worker among those performing patching work who is trained and certified by manufacturer of patching compound to apply its products.

B. Terra Cotta Manufacturer Qualifications: A firm regularly engaged in manufacturing architectural terra cotta units of similar size and complexity as those required for the Work.

1. Acceptable Manufacturer: Gladdy, McBean.
2. Manufacturer has produced replacement terra cotta for this building in past restoration projects.
3. Provide an on site manufacturer's technical representative to instruct and review finalinstallation of new terra cotta.

C. Terra Cotta Patching and Repair Manufacturer Qualifications: A firm specializing in manufacturing of terra cotta patching and repair products, providing application certification training programs, and provide on site instruction and review of installation of patching products.

1. Manufacture to provide testing and color matching of patching materials to exiting terra cotta.
2. Manufacturer to provide on site training of surface preparation, material handling and installation methods.
3. Manufacturer to provide field inspection service of final installation.
4. Acceptable Manufacturer:
   a. Cathedral Stone Products, Inc.
   b. Keim Mineral Systems

D. Source Limitations: Obtain each type of material for masonry restoration (terra cotta, cement, sand, etc.) from one source with resources to provide materials of consistent quality in appearance and physical properties.

E. Preconstruction Testing Service: Engage a qualified independent testing agency or use terra cotta manufacturer's testing services to test the following. Provide test specimens and assemblies.

1. Replacement Terra Cotta: For the proposed replacement terra cotta, according to sampling and testing methods in ASTM C 67 and C126 for compressive strength, 24-hour cold-water absorption, 1-hour boil absorption, firing temperature, moisture expansion (reheat test), water uptake with and without glaze, shear strength, petrographic examination, x-ray defraction and fluourescence, glaze adhesion, coefficient of thermal expansion, and Young' modulus of elasticity.
2. Cleaning of Terra Cotta: Consult cleaning product manufacturer for best product or application on removal of bituminous compounds from terra cotta. Sample test terra cotta to determine best removal process.

F. Mockups: Prepare mockups of restoration and cleaning as follows to demonstrate aesthetic effects and qualities of materials and execution. Prepare mockups on existing walls under same weather conditions to be expected during remainder of the Work.

1. Terra cotta repair: Patch three large units with the following characteristics:
   a. Infill broken terra cotta unit where core of unit is exposed.Unit selected by Architect
   b. Large structural crack including pinning and anchoring methods, finishing of crack with patching materials and finishing material.
   c. Patch three small areas at least 1 inch in diameter for type of masonry material indicated to be patched.

2. Clean an area as indicated where bituminous compounds exist on surface.
   a. Test cleaners and methods on samples of adjacent materials for possible adverse reactions unless cleaners and methods are known not to have deleterious effect.
   b. Allow a waiting period of not less than seven days after completion of sample cleaning to permit a study of sample panels for negative reactions.
3. Rake out joints in two separate areas approximately 24 inches high by 72 inches wide for repointing. Repoint and maintain mock up as example of quality of work.

G. Pre-installation Conference:
1. Approximately 2 weeks prior to scheduled commencement of terra cotta restoration installation and associated work, meet at project site with installer and patching material manufacturer.
2. Contractor, Architect, Owner, and other representatives directly concerned with performance of work. Record discussions of conference and decisions and agreements (or disagreements) reached, and furnish copy of record to each participant.
3. Provide at least 72 hours advance notice to participants prior to convening pre-installation conference.
4. Review foreseeable methods and procedures related to roofing work; including but not necessarily limited to following:
   a. Tour representative areas of exterior terra cotta substrates, inspect and discuss condition of substrate, type of repair anticipated, reattachment methods, patching techniques, cleaning, and other work necessary for completing the work.
   b. Review required submittals, both completed and yet to be completed.
   c. Review approved patching mock-ups.
   d. Review terra cotta pieces to be removed for replacement.
   e. Review installation methods for installing new terra cotta.
   f. Review and finalize construction schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
   g. Review required inspection, testing, certifying and material usage accounting procedures.
   h. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver terra cotta units to Project site crated together in suitable packs or pallets or in heavy-duty cartons. Inspect terra cotta immediately upon delivery to site. Reject terra cotta units damaged in transit or failing to meet specification and samples. Notify manufacturer in writing.

B. Store terra cotta off the ground in a clean dry location. Prevent contamination by materials likely to cause staining and other defects. Remove materials which are damaged or otherwise unsuitable from project site.

C. Deliver other materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.

D. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

E. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.

F. Store lime putty covered with water in sealed containers.

G. Store sand where grading and other required characteristics can be maintained and contamination avoided.

1.6 PROJECT CONDITIONS

A. Repoint mortar joints and repair terra cotta only when air temperature is between and 40 and 90 deg F and is predicted to remain so for at least 7 days after completion of work.

B. Cold-Weather Requirements: Comply with the following procedures for masonry repair and mortar-joint pointing:
   1. When air temperature is below 40 deg F, heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 deg F (4 and 49 deg C).
   2. When mean daily air temperature is below 40 deg F (4 deg C), provide enclosure and heat to maintain temperatures above 32 deg F (0 deg C) within the enclosure for 7 days after repair and pointing.

C. Hot-Weather Requirements: Protect terra cotta repair and mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 90 deg F (32 deg C) and above.

D. Patch terra cotta only when air and surface temperatures are between and 55 and 100 deg F (13 and 38 deg C) and are predicted to remain above 55 deg F (13 deg C) for at least 7 days after completion of work. On days when air temperature is predicted to go above 90 deg F (32 deg C), schedule patching work to coincide with time that surface being patched will be in shade or during cooler morning hours.

E. Clean terra cotta surfaces only when air temperature is 40 deg F and above and is predicted to remain so for at least 7 days after completion of cleaning.

1.7 SEQUENCING AND SCHEDULING

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

B. Order sand for repointing mortar immediately after approval of mockups. Take delivery of and store at Project site a sufficient quantity of sand to complete Project.

C. Perform terra cotta restoration work in the following sequence:
   1. Investigate condition of terra cotta anchorage and report findings.
   2. Repoint and repair face brick prior to terra cotta work to comply with Division 4 "Face Brick Restoration" when brick is above terra cotta and is indicated to be repointed.
   3. Remove steel exposed at terra cotta prior to patching and repointing.
   4. Repair existing terra cotta.
   5. Rake out joints that are to be repointed. Cut in stress relieving joints and fill with sealant.
   6. Point mortar joints.
   7. Replace existing terra cotta with new terra cotta materials. Repoint joints at adjacent units after new units are installed.
   8. Clean terra cotta surfaces of bituminous compounds prior to repointing. Do not allow water or cleaning materials to enter terra cotta cavity.
   9. Repoint face brick below terra cotta after terra cotta work is complete to comply with Division 4 "Face Brick Restoration".
   10. Install sealants at window perimeter, stress joints, and as indicated to comply with Division 7 "Sealants".

D. As scaffolding is removed, patch anchor holes used to attach scaffolding. Patch holes in brick to comply with Part 3 "Masonry Unit Patching" Article. Patch holes in mortar joints to comply with Part 3 "Repointing Masonry" Article.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
   1. Products: Subject to compliance with requirements, provide one of the products specified.

2.2 TERRA COTTA MATERIALS

A. Terra Cotta: Provide new terra cotta units to match existing terra cotta units in compressive strength, color, gloss, surface texture, thickness and composition of surface glaze, composition of body, profile, and dimensions.

1. Manufacturers:
   a. Gladding, McBean.
   b. Boston Valley Terra Cotta.
   c. Studio S. Pottery.
   d. Superior Clay Corporation.
2. Joint Width: Match existing.
3. Face Dimension Tolerance: Length and width of exposed face of each unit not to vary more than 1/4 inch over or under dimensions on approved shop drawings.
4. Warpage Tolerances: Exposed face of each unit not to vary from a true plane by more than 1/8 inch.
5. Chipping: Location and depth and location of chip on an exposed face or edge not to exceed: 1/4 inch from edge and 3/8 inch from corners. Maximum number of chipped units not to exceed 2 units.
6. Properties of Finish: In accordance with ASTM C126, finished faces to be free from crazing, blisters, pinholes, crawling, staining or other imperfections detracting from the appearance of the unit when viewed from a distance of 5 feet. Finish to match approved sample.

2.3 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I.

1. Provide white cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S or I.

C. Mortar Sand: ASTM C 144, unless otherwise indicated.

1. Color: Provide natural sand ; of color necessary to produce required mortar color.
2. For pointing mortar, provide sand with rounded edges.
3. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands, if necessary, to achieve suitable match.

D. Mortar Pigments: Natural and synthetic iron oxides, compounded for mortar mixes. Use only pigments with a record of satisfactory performance in terra cotta mortars.

E. Water: Potable.

2.4 CLEANING MATERIALS

A. Water for Cleaning: Potable.

B. Hot Water: Heat water to a temperature of 140 to 160 deg F (60 to 71 deg C).

C. Job-Mixed Detergent Solution: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium polyphosphate (TSPP), 1/2 cup (125 mL) of laundry detergent, and 20 quarts (20 L) of hot water for every 5 gal. (20 L) of solution required.

D. Nonacidic Gel Cleaner: Manufacturer's standard gel formulation, with pH between 6 and 9, that contains detergents and chelating agents and is specifically formulated for cleaning terra cotta surfaces.

1. Available Products:
   a. Price Research, Ltd.; Price Marble Cleaner-Gel.
   b. ProSoCo; Sure Klean 942 Masonry Cleaner.

E. Nonacidic Liquid Cleaner: Manufacturer's standard mildly alkaline liquid cleaner formulated for removing mold, mildew, and other organic soiling from ordinary building materials, including polished stone, brick, aluminum, plastics, and wood.

1. Available Products:
   a. Dominion Restoration, Inc.; Bio-Cleanse.
   b. Dumond Chemicals, Inc.; Safe n' Easy Architectural Cleaner/Restorer.
   c. Price Research, Ltd.; Price Non-Acid Masonry Cleaner.
   d. ProSoCo; Enviro Klean Restoration Cleaner.

F Two-Part Chemical Cleaner: Manufacturer's standard system consisting of potassium or sodium hydroxide based, alkaline prewash cleaner and acidic afterwash cleaner that does not contain hydrofluoric acid.

1. Available Products:
   a. ProSoCo; Sure Klean 766 Limestone & Masonry Prewash and Afterwash.

2.5 MISCELLANEOUS MATERIALS

A. Terra cotta Patching Compound: Factory-mixed non-cementitious product that is custom manufactured for patching terra cotta, is vapor- and water permeable, exhibits low shrinkage, and develops high bond strength to all types of terra cotta.

1. Formulate patching compound used for patching unglazed terra cotta in colors to match terra cotta being patched.
2. Available Products:
   a. Cathedral Stone Products, Inc.; Jahn Restoration Mortar, M100
   b. Keim Mineral System; Keim Restauro Giess, or as recommended by manufacturer

B. Terra Cotta Glaze Replacement: A mineral silicate coating intended for exterior use as terra cotta glaze replacement. Product is custom mixed by manufacturer to match color and gloss of existing terra cotta glaze.

1. Available Products:
   a. Keim Mineral Systems: Keim Restauro Lasur or Purkristalat as recommended by manufacturer.
   b. Cathedral Stone Products, Inc, : Jahn Silin Glazing

C. Terra Cotta Anchors: Type and size indicated or, if not indicated, to match existing anchors in size and type. Fabricate anchors and dowels from Type 304 stainless steel.

D. Terra cotta Repair Anchors, Expansion Type: Mechanical fasteners designed for terra cotta veneer stabilization consisting of 1/4-inch- (6-mm-) diameter, Type 304 stainless-steel rod with brass expanding shells at each end and water-shedding washer in the middle. Expanding shells shall be designed to provide positive mechanical anchorage to veneer on one end and backup masonry on the other.

1. Available Products:
   a. Dur-O-Wal, a Dayton Superior Company; Mechanical Repair Anchors.
   b. Hohmann & Barnard, Inc.; #521RA Repair/Restoration Anchor.

E. Terra cotta Repair Anchors, Spiral Type: Type 304 stainless-steel spiral rods designed to anchor to backing and veneer. Anchors are flexible in plane of veneer but rigid perpendicular to it.

1. Provide adhesive-installed anchors complete with manufacturer's standard epoxy adhesive and injection tubes, screens, sleeves, or other devices required for installation.
2. Provide driven-in anchors designed to be installed in drilled holes and relying on screw effect rather than adhesive to secure them to backup and veneer.
3. Available Products:
   a. Dur-O-Wal, a Dayton Superior Company; Dur-O-Flex.
   b. Heckmann Building Products, Inc.; #391 Spiro Remedial Tie.
   c. Helifix Ltd.; Helifix HRT60 or Helifix HRT80.

F. Epoxy Adhesives for Setting Anchors and Reattaching Loose Pieces of Terra Cotta: High modulus, high strength, moisture insensitive, epoxy paste adhesive:

1. Available Products:
   a. Sikadur 31, Hi-Mod Gel, Sikastix 390:P Sika Corporation
   b. Anchor-It by Adhesive Technologies
   c. Hilti Eposy

d. Epcon Epoxy
e. Dur-O-Wall Epoxy

G. Sealants: Division 7 Section "Joint Sealants" for sealing joints in restored brick and terra cotta.

2.6 MORTAR MIXES

A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.

1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.

B. Colored Mortar: Produce mortar of color required by using selected ingredients. Do not alter specified proportions without Architect's approval.

1. Mortar Pigments: Where mortar pigments are indicated, do not exceed a pigment-to-cement ratio of 1:10 by weight.

C. Do not use admixtures of any kind in mortar, unless otherwise indicated.

D. Mortar Proportions: Mix mortar materials in the following proportions:

1. Pointing Mortar for Terra Cotta: 1 part white portland cement, 1 part lime, and 6 parts sand.
   a. Add mortar pigments to produce mortar colors required.
2. Rebuilding (Setting) Mortar: Comply with ASTM C 270, Proportion Specification, Type N, unless otherwise indicated; with cementitious material content limited to portland cement and lime.

PART 3 - EXECUTION

3.1 RESTORATION SPECIALISTS

A. Restoration Specialist Firms: Subject to compliance with requirements, provide clay terra cotta restoration and cleaning by one of the following:

1. Acceptable Restoration Firms:
   a. Townsend and McPherson
   b. Building Restoration Corporation
   c. Other restoration firms may submit qualifications and experience in terra cotta restoration, repair and replacement, and adequate references for consideration by the Architect and Owner prior to bidding and in conformance with the requirements for substitution submittals. Acceptance of other qualified restoration firms will be issued by Addendum stating the name of restoration firm qualified to bid the Work.

3.2 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from terra cotta restoration work.

1. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of restoration and cleaning work.

B. Prevent mortar from staining face of surrounding terra cotta and other surfaces.

1. Cover sills, ledges, and projections to protect from mortar droppings.
2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
3. Immediately remove mortar in contact with exposed terra cotta and other surfaces.
4. Clean mortar splatters from scaffolding at end of each day.

3.3 TERRA COTTA INVESTIGATION

A. Documents indicate water has entered terra cotta from other systems (ie. waterproofing at balcony deck, damage brick joints above terra cotta, etc.). Generally, damage to terra cotta is due to poorly maintained mortar joints and at terra cotta units that are damaged (i.e. cracks or broken units that are allowing water to enter the units). This investigation is needed to determine the condition of the supporting steel for terra cotta at location indicated. Architect and Structural Engineer will be working during construction to determine if additional supports or anchorages are required based on information of this investigation.

B. At locations indicated, investigate condition of steel anchorage by using a borascope to view inside of terra cotta units. At units where large chips can be removed, visual investigation is acceptable.

C. Remove enough mortar at joints to gain access to cavity. Drill hole in joint in necessary to gain access to cavity.

D Record location, and condition of steel anchorage and submit a report to Architect.

E Architect will review information and make recommendation for anchorage of existing units to building masonry walls.

3.4 TERRA COTTA REMOVAL AND REPLACEMENT

A. At locations indicated, remove terra cotta units that are damaged, spalled, or deteriorated. Carefully demolish or remove entire units from joint to joint, without damaging surrounding masonry, in a manner to permit replacement with full-size units.

B. Support and protect remaining masonry that was supported by removed units. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

C. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose masonry units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.

D. Clean masonry surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.

E. Set replacement units in a full bed of mortar with both horizontal and vertical joints of same width as existing units. Replace existing anchors with new anchors of size and type indicated.
   1. Embed anchors in and fill voids behind units with grout.
   2. Tool exposed mortar joints in repaired areas to match joints of surrounding existing terra cotta.
   3. Rake out mortar used for laying terra cotta before mortar sets and point new mortar joints in repaired area to comply with requirements for repointing existing masonry, and at same time as repointing of surrounding area.

3.5 REANCHORING VENEERS

A. Install masonry repair anchors in horizontal mortar joints at units that are unsound and have confirmed that supporting steel is damaged and according to manufacturer's written instructions. Install at not more than 16 inches (400 mm) o.c. vertically and 32 inches (800 mm) o.c. horizontally, unless otherwise indicated. Install at locations to avoid penetrating flashing.

B. Recess anchors at least 5/8 inch (16 mm) from surface of mortar joint and fill recess with pointing mortar.

3.6 TERRA COTTA PATCHING

A. General: A rating system has been established to determine the scope of patching and repair work for this Project. The rating system determines the severity of the damaged terra cotta. Refer to Drawings for scope of Work of patching of terra cotta. Additional work beyond the scope of the Base Bid will be done under a unit price structure.

B. Patching Terra Cotta:

1. Determine by sounding or by investigation with borascope, if unit is solidly attached to backup wall.
2. For unsound or loose units, use veneer anchors to reattach units to backup wall. Follow anchor manufacturer's instructions.
3. For units with minor cracks: Fill crack with injection epoxy, allow epoxy to full cure prior to finishing of glaze. Follow manufacturer's instructions for preparing existing surfaces to receive new glaze.
4. For major cracks or where large pieces of terra cotta are loose, install pins and anchorage as necessary to reattach broken terra cotta.
5. For damaged units:
   a. Remove deteriorated material as determined by sounding with a small hammer. Use chisel or saw to produce square or undercut edges on area to be patched. Remove additional material so patch will not have feathered edges and will be at least 3/4 inch thick, but not less than recommended by patching compound manufacturer.
   b. Where mortar joints adjacent to patch are open, fill back of joints with pointing mortar and allow to cure before patching terra cotta. Leave space for pointing joints according to "Repointing Masonry" Article.
   c. Mask surrounding mortar joints or rake out for repointing if patch will extend to edge of unit.
   d. Rinse surface to be patched and leave damp, but without standing water.
   e. Brush-coat surfaces with slurry coat of patching compound according to manufacturer's written instructions.
   f. Place patching compound in layers as recommended by patching compound manufacturer, but not less than 1/4 inch (6 mm) or more than 2 inches (50 mm) thick. Roughen surface of each layer to provide a key for next layer.
   g. Do not apply patching compound over mortar joints. If patching compound bridges mortar joints, cut out joints after patching compound hardens.
   h. Trowel, scrape, or carve surface of patch to match texture, details, and surface plane of surrounding terra cotta. Shape and finish surface before or after curing, as determined by testing to best match existing terra cotta.
   i. Keep each layer damp for 72 hours or until patching compound has set.
   j. After final layer of patching compound has cured, apply glaze replacement according to manufacturer's written instructions. Apply two or more coats, as needed, to match glaze of adjacent terra cotta units.

3.7 CLEANING TERRA COTTA, GENERAL

A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other.

B. Review cleaning procedure with Architect prior to start of work. Cleaning product manufacturer to provide recommendations on proper cleaning method including type of cleaning solution.

C. Use only those cleaning methods indicated for each masonry material and location by manufacturer.

1. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that cleaning methods do not damage masonry.
   a. Equip units with pressure gages.
2. For water spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.
3. For heated water spray application, use equipment capable of maintaining temperature between 140 and 160 deg F (60 and 71 deg C) at flow rates indicated.

D. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces.

E. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to cleaning methods being used. Extraneous substances include paint, calking, asphalt, and tar.

1. Carefully remove heavy accumulations of material from surface of masonry with a sharp chisel. Do not scratch or chip masonry surface.
2. Remove bituminous and tar with solvent-type paint remover.
   a. Apply only to bituminous and tar by brush without prewetting.
   b. Allow paint remover to remain on surface for 10 to 30 minutes.
   c. Rinse off with hot water using low-pressure spray.
   d. Repeat application if needed.

F. Water Spray Applications: Unless otherwise indicated, hold spray nozzle at least 6 inches (150 mm) from surface of masonry and apply water in horizontal back and forth sweeping motion, overlapping previous strokes to produce uniform coverage.

G. After cleaning is complete, remove protection no longer required. Remove tape and adhesive marks.

3.8 REPOINTING TERRA COTTA

A. Rake out and repoint mortar joints to the following extent:

1. All joints in areas indicated.
2. Joints where mortar is missing or where they contain holes.
3. Cracked joints where cracks can be penetrated at least 1/4 inch (6 mm) by a knife blade 0.027 inch (0.7 mm) thick.
4. Cracked joints where cracks are 1/8 inch (3 mm) or more in width and of any depth.
5. Joints where they sound hollow when tapped by metal object.
6. Joints where they are worn back 1/4 inch (6 mm) or more from surface.
7. Joints where they are deteriorated to point that mortar can be easily removed by hand.
8. Joints, other than those indicated as sealant-filled joints, where they have been filled with substances other than mortar.

B. Do not rake out and repoint joints where not required.

C. Rake out joints as follows:

1. Remove mortar from joints to depth of 2 times joint width, but not less than 1/2 inch (13 mm) or not less than that required to expose sound, unweathered mortar.
2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
3. Do not spall edges of masonry units or widen joints. Replace or patch damaged masonry units as directed by Architect.
   a. Cut out mortar by hand with chisel and mallet. Do not use power-operated grinders without Architect's written approval based on submission by Contractor of a satisfactory quality-control program and demonstrated ability of operators to use tools without damaging masonry. Quality-control program shall include provisions for supervising performance and preventing damage due to worker fatigue.

D. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.

E. Point joints as follows:

1. Rinse masonry-joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen masonry-joint surfaces before pointing.
2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch (9 mm) until a uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.

3. After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 3/8 inch (9 mm). Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing bricks have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar over edges onto exposed masonry surfaces or to featheredge mortar.
4. When mortar is thumbprint hard, tool joints to match original appearance of joints. Remove excess mortar from edge of joint by brushing.

F. Cure mortar by maintaining in thoroughly damp condition for at least 72 hours including weekends and holidays.
   1. Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.
   2. Adjust curing methods to ensure that pointing mortar is damp throughout its depth without eroding surface mortar.

G. Where repointing work precedes cleaning of existing masonry, allow mortar to harden at least 30 days before beginning cleaning work.

3.9 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.
   1. Do not use metal scrapers or brushes.
   2. Do not use acidic or alkaline cleaners.

B. Wash adjacent woodwork and other nonmasonry surfaces. Use detergent and soft brushes or cloths.

C. Clean masonry debris from roof; remove debris from gutters and downspouts. Rinse off roof and flush gutters and downspouts.

D. Sweep and rake adjacent pavement and grounds to remove masonry debris. Where necessary, pressure wash surfaces to remove mortar, dust, dirt, and stains.

3.10 FIELD QUALITY CONTROL

A. Inspectors: Owner will engage qualified independent inspectors to perform inspections and prepare test reports. Allow inspectors use of lift devices and scaffolding, as needed, to perform inspections.
   1. Payment of inspectors and testing will be from Testing Allowance.

B. Architect's Project Representatives: Architect will assign Project representatives to help carry out Architect's responsibilities at the site, including observing progress and quality of portion of the Work completed. Allow Architect's Project representatives use of scaffolding, as needed, to observe progress and quality of portion of the Work completed.

C. New Terra Cotta Inspection: Arrange for terra cotta manufacturer's technical personnel to inspect new installation on completion and submit report to Architect.

D. Terra Cotta Patching Inspection: Arrange for terra cotta patching material manufacturer's technical personnel to inspect patching installation on completion and submit report to Architect.

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

END OF SECTION

SECTION 04902
BRICK RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes restoration of brick as follows:
   1. Repointing of brick mortar joints.
   2. Replacement of broken and damaged brick.
   3. Preparatory work necessary to obtain materials for matching of existing brick and mortars.
   4. Sheet metal cap at balcony recess.

B. Related Sections include the following:
   1. Division 7 Section "Joint Sealants" for sealing joints in restored brick masonry.

C. Unit Prices: Unit prices for brick restoration and brick repointing are specified in Division 1 Section "Unit Prices."
   1. Unit prices apply to additions to and deletions from Work as authorized by Change Orders.

D. Allowances: Allowances for inspection and testing of brick repointing mortar are specified in Division 1 Section "Allowances."
   1. Contract will be adjusted by Change Order to cover testing and inspection costs after invoices have been submitted and verified.

1.2 DEFINITIONS

A. Brick Replacement Definitions:
   1. Broken: The actual separation of the brick unit into two or more parts or fragments. Broken brick masonry units with cracks exceeding 1/32 inch over the full height of brick unit: Removed and replace with matching brick.
   2. Spalling: The reduction of the finish surface area due to the breaking off or chipping off of the face of the brick unit. Face brick with spalling 1/8 inch or greater in depth over a portion of 20 percent or greater of the surface area an individual brick unit: Remove and replace with matching brick.
   3. Deterioration: The result of gradual erosion or weathering of brick unit: Review with Architect the extent of deterioration that will require removal and replacement of brick unit.
   4. Separation: The opening up of a space between adjoining units of brick between brick and mortar joint.

1.3 SUBMITTALS

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

B. Shop Drawings: Full-size patterns for terra cotta units showing sections, dimensions and connections with other work. Indicate steel fabrications needed for attachment to existing structure.
   1. For terra cotta required to match existing color, Contractor to submit sample from building and provide dimensions and profiles of each piece to be replaced.

C. Samples for Verification: Before erecting mockup, submit samples of the following:
   1. Provide one sample strap of brick to match existing, including range of colors to match existing.
   2. Each type of sand used for pointing mortar.
      a. For blended sands, provide samples of each component and blend.
      b. Identify sources, both supplier and quarry, of each type of sand.
   3. Each type of pointing mortar in the form of sample mortar strips, 6 inches (150 mm) long by 1/2 inch (13 mm) wide, set in aluminum or plastic channels.

a. Include with each sample a list of ingredients with proportions of each. Identify sources, both supplier and quarry, of each type of sand and brand names of cementitious materials and pigments if any.

D. Qualification Data: For restoration specialists, including field supervisors, and terra cotta manufacturer.

E. Restoration Program: For each phase of restoration process, provide detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of restoration work including protection of surrounding materials on building and Project site.

1. Include methods for keeping pointing mortar damp during curing period.

1.4 QUALITY ASSURANCE

A. Restoration Specialist Qualifications: Engage an experienced, preapproved masonry restoration (both brick and terra cotta work) firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance consecutively for 5 years .

1. Field Supervision: Restoration specialist firms shall maintain experienced full-time supervisors on Project site during times that clay masonry restoration and cleaning are in progress. Supervisors shall not be changed during Project except for causes beyond the control of restoration specialist firm.
2. Restoration Worker Qualifications: Persons who are experienced and specialize in restoration work of types they will be performing. When masonry units are being patched, assign at least one worker among those performing patching work who is trained and certified by manufacturer of patching compound to apply its products.

B. Source Limitations: Obtain each type of material for masonry restoration (face brick, cement, sand, etc.) from one source with resources to provide materials of consistent quality in appearance and physical properties.

C. Preconstruction Testing Service: Engage a qualified independent testing agency to test the following. Provide test specimens and assemblies as indicated.

1. Replacement Brick: For each proposed type of replacement brick, according to sampling and testing methods in ASTM C 67 for compressive strength, 24-hour cold-water absorption, 5-hour boil absorption, saturation coefficient, and initial rate of absorption (suction).

D. Mockups: Prepare mockups of restoration and cleaning as follows to demonstrate aesthetic effects and qualities of materials and execution. Prepare mockups on existing walls under same weather conditions to be expected during remainder of the Work.

1. Repoint joints in two separate areas an area approximately 48 inches (1200 mm) high by 48 inches (1200 mm) wide for each type of masonry material indicated to be repointed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver masonry units to Project site strapped together in suitable packs or pallets or in heavy-duty cartons.

B. Deliver other materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.

C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

D. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.

E. Store sand where grading and other required characteristics can be maintained and contamination avoided.

4. Concealed Membrane Flashing: 40 mil thick, rubberized asphalt sheet flashing consisting of 32 mil pliable and highly adhesive rubberized asphalt compound bonded completely and integrally to 8 mil density, cross-laminated polyethylene film.
   a. Acceptable Manufacturer:
      1) W.R.Grace & Company, Perm-A-Barrier Wall Flashing.
      2) Sealtight Air Shield by W.R. Meadows, Incorporated.
      3) Mirafi by Mirafi Systems

E. Sealants: Division 7 Section "Joint Sealants" for sealing joints in restored brick and terra cotta.

2.5 MORTAR MIXES

A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.
   1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.

B. Colored Mortar: Produce mortar of color required by using selected ingredients. Do not alter specified proportions without Architect's approval.
   1. Mortar Pigments: Where mortar pigments are indicated, do not exceed a pigment-to-cement ratio of 1:10 by weight.

C. Do not use admixtures of any kind in mortar, unless otherwise indicated.

D. Mortar Proportions: Mix mortar materials in the following proportions:
   1. Pointing Mortar for Brick: 1 part portland cement, 1 parts lime, and 5 parts sand.
      a. Add mortar pigments to produce mortar colors required.
      b. Restoration specialist to verify mix design is greater in compressive strength than existing brick or mortar.
   2. Rebuilding (Setting) Mortar: Comply with ASTM C 270, Proportion Specification, Type N, unless otherwise indicated; with cementitious material content limited to portland cement and lime.

PART 3 - EXECUTION

3.1 RESTORATION SPECIALISTS

A. Restoration Specialist Firms: Subject to compliance with requirements, provide clay masonry restoration and cleaning by one of the following:
   1. Acceptable Restoration Firms:
      a. Townsend and McPherson
      b. Building Restoration Corporation
      c. Other restoration firms may submit qualifications and experience in terra cotta restoration, repair and replacement, and adequate references for consideration by the Architect and Owner prior to bidding and in conformance with the requirements for substitution submittals. Acceptance of other qualified restoration firms will be issued by Addendum stating the name of restoration firm qualified to bid the Work

3.2 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from masonry restoration work.
   1. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of restoration and cleaning work.

B. Prevent mortar from staining face of surrounding masonry and other surfaces.
   1. Cover sills, ledges, and projections to protect from mortar droppings.
   2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
   3. Immediately remove mortar in contact with exposed masonry and other surfaces.
   4. Clean mortar splatters from scaffolding at end of each day.

STEEL PENETRANT REMOVAL

A. Remove penetrating steel elements indicated to be removed prior to masonry restoration. Extent of removal may include cutting steel back into wall to allow new brick to be set over steel. Coat steel with rust inhibitor if steel item cannot be fully removed.
   1. Remove items carefully to avoid spalling or cracking masonry.
   2. If item cannot be removed without damaging surrounding masonry, cut off item flush with surface and core drill surrounding masonry and item as close around item as practical.
   3. Replace brick where steel items were removed.

BRICK REMOVAL AND REPLACEMENT

A. At locations indicated, remove bricks that are damaged, spalled, or deteriorated. Carefully demolish or remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.
   1. When removing single bricks, remove material from center of brick and work toward outside edges.

B. Support and protect remaining masonry that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

C. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose masonry units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.

D. Remove in an undamaged condition as many whole bricks as possible.
   1. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, brushes, and water.
   2. Store brick for reuse, as indicated.
   3. Deliver cleaned brick not required for reuse to Owner, unless otherwise directed.

E. Clean bricks surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.

F. Install replacement brick into bonding and coursing pattern of existing brick. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.

G. Lay replacement brick with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet both replacement and surrounding bricks that have ASTM C 67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per min. (30 g/194 sq. cm per min.). Use wetting methods that ensure that units are nearly saturated but surface is dry when laid. Maintain joint width for replacement units to match existing joints.
   1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.
   2. Rake out mortar used for laying brick before mortar sets and point new mortar joints in repaired area to comply with requirements for repointing existing masonry, and at same time as repointing of surrounding area.

3.5 REANCHORING BRICK VENEERS

A. Based on field observation, notify Architect if existing brick work is unsound and should be reanchored to backup wall. Architect will issue a directive indicating scope of reanchoring.

B. Install masonry repair anchors in horizontal mortar joints and according to manufacturer's written instructions. Install at not more than 16 inches (400 mm) o.c. vertically and 32 inches (800 mm) o.c. horizontally, unless otherwise indicated. Install at locations to avoid penetrating flashing.

1.6 PROJECT CONDITIONS

A. Repoint mortar joints and repair masonry only when air temperature is between and 40 and 90 deg F and is predicted to remain so for at least 7 days after completion of work.

B. Cold-Weather Requirements: Comply with the following procedures for masonry repair and mortar-joint pointing:

1. When air temperature is below 40 deg F, heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 deg F (4 and 49 deg C).
2. When mean daily air temperature is below 40 deg F (4 deg C), provide enclosure and heat to maintain temperatures above 32 deg F (0 deg C) within the enclosure for 7 days after repair and pointing.

C. Hot-Weather Requirements: Protect masonry repair and mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 90 deg F (32 deg C) and above.

1.7 SEQUENCING AND SCHEDULING

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

B. Order sand for repointing mortar immediately after approval of mockups. Take delivery of and store at Project site a sufficient quantity of sand to complete Project.

C. Perform masonry restoration work in the following sequence:

1. Remove plant growth.
2. Repair existing masonry, including replacing existing masonry with new masonry materials.
3. Rake out joints that are to be repointed.
4. Point mortar joints.

D. As scaffolding is removed, patch anchor holes used to attach scaffolding. Patch holes in masonry units to comply with Part 3 "Masonry Unit Patching" Article. Patch holes in mortar joints to comply with Part 3 "Repointing Masonry" Article.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 MASONRY MATERIALS

A. Face Brick and Accessories: Provide face brick and accessories, including specially molded, ground, cut, or sawed shapes where required to complete masonry restoration work.

1. Provide units with colors, surface texture, size, and shape to match existing brickwork and with physical properties not less than those determined from preconstruction testing of selected existing units.
   a. For existing brickwork that exhibits a range of colors, provide brick that matches that range rather than brick that matches an individual color within that range.

B. Building Brick: Provide building brick complying with ASTM C 62, of same vertical dimension as face brick, for masonry work concealed from view.

1. Grade SW for concealed backup.

2.3 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type II.
   1. Provide white cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S.

C. Mortar Sand: ASTM C 144, unless otherwise indicated.
   1. Color: Provide natural sand; of color necessary to produce required mortar color.
   2. For pointing mortar, provide sand with rounded edges.
   3. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands, if necessary, to achieve suitable match.

D. Mortar Pigments: Natural and synthetic iron oxides, compounded for mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortars.

E. Water: Potable.

2.4 MISCELLANEOUS MATERIALS

A. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass, metal, and polished stone surfaces from damaging effects of acidic and alkaline masonry cleaners.
   1. Available Products:
      a. American Building Restoration Products, Inc.; LM 130 Acid Shield.
      b. Diedrich Technologies Inc.; Diedrich Acid Guard.
      c. Price Research, Ltd.; Price Mask.
      d. ProSoCo; Sure Klean Strippable Masking.

B. Masonry Repair Anchors, Expansion Type: Mechanical fasteners designed for masonry veneer stabilization consisting of 1/4-inch- (6-mm-) diameter, Type 304 stainless-steel rod with brass expanding shells at each end and water-shedding washer in the middle. Expanding shells shall be designed to provide positive mechanical anchorage to veneer on one end and backup masonry on the other.
   1. Available Products:
      a. Dur-O-Wal, a Dayton Superior Company; Mechanical Repair Anchors.
      b. Hohmann & Barnard, Inc.; #521RA Repair/Restoration Anchor.

C. Masonry Repair Anchors, Spiral Type: Type 304 stainless-steel spiral rods designed to anchor to backing and veneer. Anchors are flexible in plane of veneer but rigid perpendicular to it.
   1. Provide adhesive-installed anchors complete with manufacturer's standard epoxy adhesive and injection tubes, screens, sleeves, or other devices required for installation.
   2. Provide driven-in anchors designed to be installed in drilled holes and relying on screw effect rather than adhesive to secure them to backup and veneer.
   3. Available Products:
      a. Dur-O-Wal, a Dayton Superior Company; Dur-O-Flex.
      b. Heckmann Building Products, Inc.; #391 Spiro Remedial Tie.
      c. Helifix Ltd.; Helifix HRT60 or Helifix HRT80.

D. Sheet Metal for Caps at Balcony:
   1. Prefinished Sheet Metal: Prefinished, galvanized metal, ASTM A525 G-90 shop coated with Kynar fluoropolymer coating in color as selected from manufacturers standard colors.
   2. Acceptable manufacturers:
      a. Vincent Metals ColorKlad
      b. Peterson Aluminum Pac-Clad
      c. Copper Sales Una-Clad
   3. Anchorage: Nails and screws of hot dip zinc coated steel. Use screws where exposed anchorage is required. Screws minimum 1-1/2 inch long with neoprene washer under screw head. Exposed surfaces with finish to match color of sheet metal.

C. Recess anchors at least 5/8 inch (16 mm) from surface of mortar joint and fill recess with pointing mortar.

3.6 REPOINTING MASONRY

A. Rake out and repoint mortar joints to the following extent:
   1. All joints in areas indicated.
   2. Joints where mortar is missing or where they contain holes.
   3. Cracked joints where cracks can be penetrated at least 1/4 inch (6 mm) by a knife blade 0.027 inch (0.7 mm) thick.
   4. Cracked joints where cracks are 1/8 inch (3 mm) or more in width and of any depth.
   5. Joints where they sound hollow when tapped by metal object.
   6. Joints where they are worn back 1/4 inch (6 mm) or more from surface.
   7. Joints where they are deteriorated to point that mortar can be easily removed by hand.
   8. Joints, other than those indicated as sealant-filled joints, where they have been filled with substances other than mortar.

B. Do not rake out and repoint joints where not required.

C. Rake out joints as follows:
   1. Remove mortar from joints to depth of 2-1/2 times joint width, but not less than 1/2 inch (13 mm) or not less than that required to expose sound, unweathered mortar.
   2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
   3. Do not spall edges of masonry units or widen joints. Replace or patch damaged masonry units as directed by Architect.
      a. Cut out center of mortar bed joints using angle grinders with diamond-impregnated metal blades. Remove remaining mortar by hand with chisel and mallet. Strictly adhere to written quality-control program. Quality-control program shall include provisions for demonstrating ability of operators to use tools without damaging masonry, supervising performance, and preventing damage due to worker fatigue. Architect may require cutting out mortar by hand with chisel and mallet method if observed work is damaging brick and quality control program is not adhered to.

D. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.

E. Point joints as follows:
   1. Rinse masonry-joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen masonry-joint surfaces before pointing.
   2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch (9 mm) until a uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
   3. After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 3/8 inch (9 mm). Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing bricks have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar over edges onto exposed masonry surfaces or to featheredge mortar.
      a. Retempering shall be performed only upon approval of Architect. Mortars that have stiffened because of evaporation of water from mortar shall beretempered by adding water as neede to restore the required consistancy. Do not retemper mortar more than once. Discard mortar that is over 2-1/2 hours old.
   4. When mortar is thumbprint hard, tool joints to match original appearance of joints. Remove excess mortar from edge of joint by brushing.

F. Cure mortar by maintaining in thoroughly damp condition for at least 72 hours including weekends and holidays.

1. Acceptable curing method include periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.
2. Adjust curing methods to ensure that pointing mortar is damp throughout its depth without eroding surface mortar.

3.7 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.

1. Do not use metal scrapers or brushes.
2. Do not use acidic or alkaline cleaners.

B. Wash adjacent woodwork and other nonmasonry surfaces. Use detergent and soft brushes or cloths.

C. Clean masonry debris from roof; remove debris from gutters and downspouts.

D. Sweep and rake adjacent pavement and grounds to remove masonry debris. Where necessary, pressure wash surfaces to remove mortar, dust, dirt, and stains.

3.8 FIELD QUALITY CONTROL

A. Inspectors: Owner will engage qualified independent inspectors to perform inspections and prepare test reports. Allow inspectors use of lift devices and scaffolding, as needed, to perform inspections.

1. Payment of inspectors and testing will be from Testing Allowance.

B. Architect's Project Representatives: Architect will assign Project representatives to help carry out Architect's responsibilities at the site, including observing progress and quality of portion of the Work completed. Allow Architect's Project representatives use of scaffolding, as needed, to observe progress and quality of portion of the Work completed.

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

END OF SECTION

SECTION 05500
METAL FABRICATIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Miscellaneous support framing at new terra cotta.
   2. Sleeves for reattaching railings at exit stair concrete walls.

B. Related Sections include the following:
   1. Division 4 Section "Terra Cotta Restoration" for restored terra cotta masonry.

1.2 REFERENCES

A. AWS D1.1 - Structural Welding Code.

B. SSPC PS7.01 - Steel Structures Painting Council.

C. Specification for Design of Cold-Formed Steel Structural Members by American Iron and Steel Institute.

SUBMITTALS

A. Shop Drawings: Include setting drawings and templates for location and installation of items and anchorage devices. Coordinate with terra cotta shop drawings.

B. Submit steel shop drawings with terra cotta shop drawings.

QUALITY ASSURANCE

A. Applicable Standards: AISC "Specifications for Design of Cold-Formed Steel Structural Members" and AWS "Structural Welding Code".

B. Qualification for Welding Work: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".

C. Field Measurements: Take field measurements prior to fabrication to insure proper fitting of work.

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

1.5 HANDLING AND STORAGE

A. Load, unload, handle and store work in manner that will not bend, deform or otherwise damage metal.

B. Store so metal and shop coats will not be subject to weather or moisture, store off ground and provide covering for metal in storage.

1.6 COORDINATION

A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, temples, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 PRODUCTS

2.1 MATERIALS

A. Steel Plates, Shapes and Bars: ASTM A36.

B. Steel Pipe: ASTM A53, Type S, Grade A, standard weight and extra-strong as required, galvanized and plain.

C. Fasteners: As indicated and recommended by manufacturer. Provide zinc- coated fasteners for exterior use or where built into exterior walls.

1. Provide stainless steel fasteners where indicated and where dissimilar metals are connected. Where dissimilar metals are connected, provide neoprene spacer or washer for isolation.

D. Stainless Steel: ASTM A167, Type 304 with #4 finish. Passivate exterior stainless steel.

2.2 FINISH

A. VOC Classification: Provide high-performance coating materials, including primers, undercoats, and finish-coat materials, that have a VOC classification of 450 g/L or less.

B. Surface Preparation: SSPC SP6, Commercial Blast Cleaning

C. Zinc Primer Material: Aromatic Urethane, Zinc-rich, 2 component, moisture cured with the following requirements.

1. Volume Solids: 63 percent+/- 2 percent when mixed
2. Zinc dust: 83 percent by weight in dried film
3. VOC: 2.67 lbs/gallon
4. Recommended DFT: 2.5 – 3.5 mils
5. Available Manufacturer:
   a. Primer: Tnemec Zinc, Series 90-97.

D. Epoxy Primer Material: Polymide Epoxy, 2 part multi-surface epoxy primer with the following requirements.

1. Volume Solids: 56 percent+/- 2 percent when mixed
2. VOC: 3.04 lbs/gallon
3. Recommended DFT: 3.0 – 5.0 mils
4. Available Manufacturer:
   a. Intermediate Coat: Tnemec Epoxy, Series 66, DFT

E. Finish Material: Aliphatic Acrylic Polyurethane, 2 component, high solids coating with the following requirements.

1. Volume Solids: 70 percent+/- 2 percent when mixed
2. VOC: 2.45 lbs/gallon
3. Recommended DFT: 2.0 – 3.0 mils
4. Available Manufacturer:
   a. Finish Coat: Tnemec Series 1075 Endurashield, DFT

2.3 FABRICATION

A. Form work true to line and level with accurate angles and surfaces and straight sharp edges.

B. Weld corners and seams continuously and in accordance with AWS., where welding is indicated

C. Form exposed connections with hairline joints which are flush and smooth, using concealed fasteners wherever possible.

D. Fabricate and space anchoring devices to provide adequate support. Cut, reinforce, drill and tap metal work to receive finish hardware and similar items.

E. Shop Assembly: Preassemble metal items in shop to greatest extent possible, so as to minimize field splicing and assembly. Disassemble units only to extent necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

F. Shop Painting: Remove scale, rust and other deleterious materials before shop coat of paint is applied. Apply shop coat of metal primer to fabricated metal items in accordance with manufacturer's printed instructions, with full coverage of joints, corners and edges.

G. Pipe Sleeve Reattachment Fabrication:
   1. Fabricate sleeve to receive existing vertical pipe rail, size sleeve to be ¼ inch in diameter greater than pipe rail.
   2. Weld base plate to pipe sleeve, pre-drill holes in base plate for expansion anchors.
   3. Prime paint with zinc primer.
   4. Shop paint with high performance paint.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which miscellaneous metal items are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Provide setting drawings, diagrams, templates, instructions and directions for installation of anchorages, such as concrete inserts, anchor bolts, and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

B. Provide anchorage devices and fasteners where necessary for securing miscellaneous metal items to in-place construction; including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.

C. Perform cutting, drilling and fitting required for installation of miscellaneous metal items. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.

D. Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

E. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting.

F. Pipe Sleeve Installation:
   1. Cut existing pipe even at bottom of pipe
   2. Insert existing pipe into sleeve. Fill sleeve with grout prior to inserting pipe.
   3. Set sleeve with expansion bolts and grout base plate to concrete.

END OF SECTION

SECTION 07900
JOINT SEALANTS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes exterior sealant at:
   1. Vertical and horizontal joints at masonry to masonry.
   2. Joints at window frames to brick or terra cotta masonry
   3. Horizontal Joint at sidewalk to building masonry.
   4. Stress relief joints in terra cotta.
   5. Other sealant locations as indicated.

B. Assume access to indicated building faces will be required.

C. Once work has begun and upon closer visual inspection, deletion or addition per Unit Price may be required. Contract sum will be adjusted based on actual quantities.

D. Related Sections include the following:
   1. Division 4 Section "Brick Restoration" for restored brick masonry.
   2. Division 4 Section "Terra Cotta Restoration" for restored terra cotta masonry.

E. Unit Prices: Unit prices for sealant are specified in Division 1 Section "Unit Prices."
   1. Unit prices apply to additions to and deletions from Work as authorized by Change Orders.

1.2 SUBMITTALS

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

B. Color Samples: 2 sets of manufacturer's full color range for each type of sealant specified.

1.3 PROJECT CONDITIONS

A. Weather Conditions: Do not proceed with installation of sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended limitations for installation.
   1. Whenever joint width is affected by ambient temperature variation, apply elastomeric sealants only when temperature is in the lower third of manufacturer's recommended installation temperature range so that sealant will not be subject to excessive elongation and bond stress at subsequent low temperatures.

B. Joint Substrate Conditions: Do not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from joint substrates.

C. Joint Width Conditions: Do not proceed with installation of joint sealers when joint widths are less than allowed by joint sealer manufacturer for application indicated.

D. Compatibility and Adhesion Testing: Ascertain sealant compatibility and adhesion with adjacent materials using laboratory testing procedures.

PART 2 PRODUCTS

2.1 MATERIALS

A. Typical Sealant: ASTM C920, Type S, Class 12-1/2 or better, Grade NS; polyurethane based one part elastomeric sealant with elongation and compression of not less than 25 percent.
   1. Tremco: Dymonic

2. Sonneborn Building Products Division of ChemRex, Inc.: Sonolastic NP-2.
3. Pecorra Corp.: Dynatrol I GC-9.
4. Colors: Manufacturer's standard as selected by Architect.

B. Window Frame Sealant: ASTM D 412 and ASTM D 1149, one part silicone glazing sealant with elongation of not less than 50 percent.
   1. Dow Corning Corp.: 795 Silicone Building Sealant.
   2. Colors: Manufacturer's standard as selected by Architect

JOINT SEALANT BACKING

A. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable..

B. Backer Rod: Compressible rod stock, "non-gassing", "non-absorbing", closed cell polyethylene foam as recommended by sealant manufacturer.
   1. Provide rod diameter 25 percent greater than joint size.
   2. AvailableManufacturer:
      a. Applied Extrusion Technology: Sof-Rod.
      b. Ethfoam
      c. Polycel

ACCESSORIES

A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants with joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 EXECUTION

3.1 INSTALLATION

A. Examine and prepare surfaces and install sealant in accordance with manufacturer's printed instructions. Perform work in accordance with ASTM C804.

B. Examine joint dimensions and size materials to achieve required width/depth ratios. Use joint filler to achieve required joint depths, to allow sealant to perform properly.
   1. Install to depth shown or if not shown as recommended by sealant manufacturer.

C. Remove existing sealant and backing. Clean joint of debris.

D. Prime concrete or masonry joint surfaces as recommended by sealant manufacturer.

E. Install backer rod for sealants.

F. Install bond breaker tape where required by manufacturer's recommendations to ensure sealant will perform properly.

G. Deposit sealant in uniform, continuous ribbons without gaps or air pockets, with complete wetting of joint bond surfaces equally on opposite sides.
   1. Install sealant to depths indicated or as recommended by manufacturer.

H. Fill sealant rabbit to slightly concave surface, slightly below adjoining surfaces. Where horizontal joint are between horizontal and vertical surfaces, fill joint to form a slight cove, as to shed moisture.

I. At horizontal joints, remove existing sealant and backer, and debris from joint. Install new backer and sealant. Inspect existing weep system. Maintain weep system after installation of new sealant.

J. At screen holes in aluminum frames: Install sealant with slight protrusion at each hole.

END OF SECTION