SECTION 01 1000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Work covered by the Contract Documents.
2. Work phases.
3. Work under other contracts.
4. Work hours.
5. Use of premises.
6. Owner's occupancy requirements.
7. Specification formats and conventions.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: DOC 1JD DPP Tuckpointing And Roof Replacement. DAS Project No. 9391.00.

1. Project Location: 745 Main Street, Dubuque, IA 52001.

B. Owner: Iowa Department of Administrative Services, 109 SE 13th Street, Des Moines, IA 50319

1. Owner's Representative: Jennifer Kleene.

C. Client: Iowa Dept. of Corrections, First Judicial District, 745 Main Street, Dubuque, IA 52001.

D. Construction Manager: Jarrad Boever, Project Manager, DCI Group, 220 S.E. 6th Street, Suite 200, Des Moines, IA 50309.

E. Architect: Edward Matt, AIA, GENESIS Architectural Design, 939 Office Park Road, Suite 101, West Des Moines, IA 50265

F. The Work consists of the following:

1. Tuckpointing Bid Package: Scope consists of masonry repairs and tuckpointing to brick, terra cotta, and clay tile walls. Mortar joint repointing will be done using a Portland lime mortar. Work includes some deep bed joint repointing, brick replacement, masonry cleaning, application of masonry water repellent, and sealant removal. Scope includes concrete patching repairs to exterior concrete post and beam construction consisting of concrete crack and spall demolition, priming existing steel reinforcing bars, and applying concrete patching compounds. Scope also includes applying waterproofing cementitious coatings, sealants, and painting.

2. Roof Replacement Bid Package: The roof area is approximately 5,500 sq. ft. Scope consists of tear off of an existing adhered EPDM membrane and cover board and new roof replacement. New roof system consists of vapor retarder underlayment over existing plywood and concrete deck, with fully adhered polyisocyanurate rigid insulation and 60 mil EPDM membrane. All metal trim flashings will be removed and replaced with new prefinished metal trim to include gutters and downspouts. In addition, there will be some plywood deck sheathing replacement. Work also includes removal and installation of a new heat trace snow and ice melting system.

G. Project will be constructed under multiple bid packages contracted under the direction of the Owner's Construction Manager.

1.3 WORK UNDER OTHER CONTRACTS

1. Owner may contract for other services. Coordinate with Owner for work interface and cooperate with Owner's other contractors.

1.4 WORK HOURS

A. See Division 01 for work hours.

1. Extended hours beyond this time frame may be arranged upon mutual understanding between Owner and Contractor.

2. Contractor must close and secure all areas of construction at the end of each day's work activities.

1.5 USE OF PREMISES

A. General: Contractor shall have limited use of premises for construction operations, as described herein, and as indicated on Drawings by the Contract limits. Do not disturb portions of building and site beyond areas in which Work is indicated. Contractor's use of premises may be limited by Owner's right to perform work or to retain other contractors on portions of Project.

B. Use of Site: Limit use of premises to work in areas indicated.

C. Limits: Confine construction operations and repair any drive or sidewalk damage that may occur due to unloading or deliveries. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways and Entrances: Keep adjacent roads and driveways serving building clear and available to Owner, Owner's employees, and emergency vehicles at all times. Coordinate areas for parking or storage of materials with Construction Manager.

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

shall be limited as much as possible while keeping the buildings secure at all times.

c. Coordinate with Owner for locations available for a job trailer or enclosed material storage container.

1.6 OWNER'S OCCUPANCY REQUIREMENTS

A. Full Owner Occupancy: Owner and public will occupy site and existing buildings during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits, unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, exits, or other occupied areas or use facilities without written permission from Owner and authorities having jurisdiction.

2. Rules for Construction Workers. The State of Iowa, has a responsibility to protect the public by providing a secure environment at all of its institutions. All site rules must be followed to the letter, at all times. A copy of the Rules for Construction Workers is included in Section 01 1200.

1.7 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 31-division format and CSI/CSC's "MasterFormat" numbering system.

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 meaning 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 subjective 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.

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 1000

SECTION 01 2200 - UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for unit prices.

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, 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, insurance, applicable taxes, overhead, and profit.

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

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

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 LIST OF UNIT PRICES

A. UNIT PRICE NO. 1: ADDITIONAL TUCK POINTING

1. Description: Provide a Unit Cost for additional repointing of mortar joints in existing brick. Price the Unit Cost for cutting out existing mortar 3/4” deep at head and bed joints around existing face brick and repointing with new lime mortar according to Division 04, Section 04 0120 Maintenance of Unit Masonry.

2. Unit of Measurement: Four (4) Square Feet.

B. UNIT PRICE NO. 2: ADDITIONAL TUCK POINTING – DEEP JOINT REPAIRS

1. Description: Provide a Unit Cost for additional repointing of deep head and bed joints that are deeper than 3/4 inch deep in existing brick. Repoint with new lime mortar according to Division 04, Section 04 0120 Maintenance of Unit Masonry. Fully cure bed joints before performing final joint pointing.

2. Unit of Measurement: Two (2) Square Feet.

C. UNIT PRICE NO. 3: ADDITIONAL BRICK REPLACEMENT

1. Description: Provide a Unit Cost to replace additional damaged brick units. Price the Unit Cost to cut out existing damaged face brick as identified in the Drawings and lay matching replacement brick into wall with new lime mortar according to Division 04, Section 04 0120 Maintenance of Unit Masonry.

2. Unit of Measurement: One (1) Each.

D. UNIT PRICE NO. 4: ADDITIONAL CRACK REPAIR.

1. Description: Provide a Unit Cost to rout out and apply crack repair compound in cracks in the existing back wall concrete parge coat or the upper wall concrete columns and beams. Prepare the area and install according to Division 03, Section 03 0137 - Rehabilitation of Cast-In-Place Concrete.

2. Unit of Measurement: One (1) Lineal Foot.

E. UNIT PRICE No. 5: ADDITIONAL SHEATHING REPAIRS

1. Description: Provide a Unit Cost to remove and replace existing water damaged roof deck sheathing beyond that indicated in the Drawings. Provide 5/8” thick exterior grade sheathing nailed to the existing wood roof framing. Verify and match thickness of existing sheathing. Cut out damaged sections of sheathing from center to center of framing members.

Unit of Measurement: 4 Square Feet. (half sheet)

END OF SECTION 01 2200

SECTION 02 4119 - SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of building or structure.
2. Salvage of existing items to be reused.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction and deliver them to Owner.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 SUBMITTALS

A. Schedule of Selective Demolition Activities: Submit proposed demolition schedule to Owner/Architect for review, discussion, coordination and approval at Pre-Demolition Conference. Indicate detailed sequence of selective demolition and removal work, with starting and ending dates for each activity, interruption of utility services, use of elevator and stairs, and locations of temporary partitions and means of egress.

B. Predemolition Photographs or Videotapes: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by selective demolition operations.

1.4 QUALITY ASSURANCE

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

B. Standards: Comply with ANSI A10.6 and NFPA 241.

C. Pre-demolition Conference: Conduct conference at Project site.

1.5 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

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

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

D. Hazardous Materials: Hazardous materials are present in construction to be selectively demolished.

1. Reports on the presence of hazardous materials are included in the specification manual for review and use. Examine the reports to become aware of locations where hazardous materials are present.

2. Asbestos containing material removal is not a part of this contract. Asbestos containing materials will be removed under a separate contract by the Owner before start of the Work.

3. Lead paint abatement is to be performed by the contractor using lead paint certified workers.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.6 WARRANTY

A. Existing Warranties: On adjacent work areas; remove, replace, patch, and repair materials and surfaces cut, punctured or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

D. Contact Architect or Construction Manager if there is concern that removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.

E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

3.2 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Division 01 Section "Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Arrange to shut off indicated utilities with utility companies. Coordinate 72 hours prior with Owner.
2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.4 PROTECTION

A. Temporary Protection: Provide temporary barricades to include signage and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. Do not use cutting torches. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting cutting operations. Maintain portable fire-suppression devices during cutting operations.
4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
5. Dispose of demolished items and materials promptly.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Protect items from damage during storage.
3. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

B. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 4119

SECTION 03 0137 - REHABILITATION OF CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Concrete patching compounds with a one-component shrinkage-compensated, cement-based mortar with extended working time for repairing vertical concrete surfaces.
2. Crack repair sealant for small cracks using a 100% solid, 2-component elastomeric epoxy.
3. Repairing steel reinforcing bars.
4. Priming and protecting reinforcing steel with a zinc-rich epoxy primer.
5. Waterproofing cement based coating concrete for light-pedestrian horizontal surfaces.

1.2 DESCRIPTION

A. Perform and provide all labor, products, and equipment required for repairing all defects on exterior cast-in-place concrete.

B. Work includes, but is not limited to:

1. Pressure wash cleaning prior to examination of all concrete surfaces.
2. Removal and cut-out of all delaminated, scaled, and spall damaged areas of existing concrete.
3. Preparation, cleaning and priming of all repair surfaces to receive patching compound.
5. Application of rust inhibitor on abrasion cleaned steel reinforcing.
6. Mixing, transportation and application of patching compound.
7. Finishing and curing of patches.
8. Application of cement based waterproofing coating.

1.3 SUBMITTALS

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

B. Submit substitutions for pre-approval during bidding.

1.4 QUALITY ASSURANCE

A. Source of Materials: Obtain materials for patching, coating, sealing and crack repair from a single source manufacturer to ensure match quality, color, texture and detailing.

1.5 MOCK UPS

A. The samples of each type of repair work shall be done in an area that will be exposed to the same weathering conditions as the building. Allow samples to cure at least three days before obtaining acceptance of color, texture and detailing match.

B. Patching: Prepare a 12” x 12” sample area for each type of construction to be patched, rebuilt and/or replaced (e.g. one vertical surface). Patching shall demonstrate methods and quality of workmanship expected of repair work. Coordinate with Construction Manager and/or Architect for review.

C. Crack Repair: Prepare a 4 foot long sample area for each type of crack repair required for concrete. (i.e. cracks and voids larger than 1/8") Repair shall demonstrate methods and quality of workmanship expected for crack repair. Coordinate with Construction Manager and/or Architect for review.

D. Acceptable completed mock ups can remain as a part of the final work. Mock ups that are not acceptable are to be corrected and reworked for review.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

1.7 PROJECT CONDITIONS

A. Do not apply below 40° F or above 90° or when rain, fog or mist is anticipated within twelve hours after application. Protect from conditions that may cause early water loss: high winds, low humidity, high temperature, and direct sunlight.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide products from a single source manufacturer to ensure product compatibility.

2.2 REPAIR MORTAR: A single component, non-sag, cementitious gel patch, repair and reprofiling mortar for repairing vertical concrete surfaces.

A. Manufacturers: Basis of Design –MasterEmaco 425 by Master Builders Solutions. (vertical and overhead surfaces)

1. Acceptable Products:
   a. Meadow-crete GPS by W. R. Meadows
   b. SikaEmaco, by Sika Corp.
   c. Others as pre-approved.

2. Product Properties:
   a. Thickness: Minimum 1/4 inch to maximum 2 inch lifts.
   b. Compressive Strength, ASTM C109. 1000 psi at 1 day 6000 psi at 7 days, and 7500 psi @ 28 days.
   c. Shear Bond Strength, ASTM C882. 1300 psi at 1 day 2000 psi at 7 days, and 2200 psi @ 28 days.
   d. Modulus of Elasticity, ASTM C469 4.30x10^6 psi (2.96X10^4 MPa).
   e. Drying Shrinkage, ASTM C157 <0.1 % (830 μ strain)
   f. Flexural Strength, ASTM C293. 800 psi at 1 day, 950 psi at 7 days, 1100 psi at 28 days.

B. Bonding Agent: Apply bonding agents to enhance bonding between repair mortar to existing concrete where recommended by manufacturer.

C. Admixtures: Provide Power Pak admixtures per manufacturer's recommendations for each application.

2.3 CONCRETE CRACK REPAIR: A two-component, epoxy paste bonding adhesive.

A. Basis of Design – Sikadur 35 by Sika Corp. (vertical surfaces).

1. Acceptable Products:

   a. Flex-Seal 510 by Edison Coatings
   b. Rezi-Weld LV State by W. R. Meadows
   c. Others as pre-approved.

2.4 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 galvanized reinforcing bars deformed.

2.5 ACCESSORIES

A. Zinc-Rich Primer: One-component or two-component zinc-rich epoxy primer. Basis of Design – MasterProtect P 8100AP by Master Builders Solutions.

1. Acceptable Products:

   a. Fosroc Nitoprime Zincrich by Parchem Construction Supplies Ltd.
   b. Others as pre-approved.

2.6 WATERPROOFING: Portland-cement based concrete waterproofing coating that resists both positive and negative hydrostatic pressure. Basis of Design – MasterSeal 581, formerly Thoroseal) by Master Builders Solutions.

1. Acceptable Products:
   a. Gem-Crete TWM Plus by W. R. Meadows

b. Tamoseal by Euclid Chemical Co.
c. Others as pre-approved.

2. Product Properties:
a. Breathable to allow water vapor to escape.

3. Provide 1 to 3 coats per Drawings.

2.7 WATERPROOF COATING: High build acrylic waterproofing coating that seals and provides color finishes for exterior masonry and concrete surfaces. Basis of Design – MasterProtect HB 400, formerly ThoroCoat) by Master Builders Solutions.

1. Acceptable Products:
a. Sika Thorocoat 400, by Sika Corp.
b. Others as pre-approved.

2. Product Properties:
a. Breathable to allow water vapor to escape.
b. Low VOC content.
c. UV resistant to provide long term color retention.

3. Provide 2 coats over all waterproofed areas.

4. Color: As selected from manufacturer's standard colors.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Protect adjacent Work areas and finish surfaces from damage during mortar system application.

B. Concrete:
1. Remove unsound or delaminated concrete, providing minimum of 1/4 inch substrate profile and 1/2 inch clearance behind corroded reinforcing steel.
2. After removal of concrete, but before placement, mechanically abrade concrete surface to remove bond-inhibiting materials and to provide additional mechanical bond. Do not use method of surface preparation that will fracture concrete.
3. Saw-cut straight edges along repair area perimeters minimum of 1/4 inch deep to eliminate featheredges. Do not cut reinforcement.
4. Report cracks that appear in interface area of patch or overlay to Architect, and repair as directed.
5. Power wash clean to remove area of sand, grit and dust.

3.2 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Repair steel bars as shown in the Drawings. For slabs exposed to weather, build out repair product to provide 3/4 inches of cover.
2. Fully expose any corroded steel in the repair area. Remove all loose scale and corrosion deposits, paying particular attention to the back of exposed steel bars. Base metal should be free from rust , scales, grease, oils and any other impurities which would impair the adhesion of coating.
3. Mechanically abrade all exposed steel to remove corrosion from pits and imperfections within its surface. Use mechanical grinders, needle guns, tap hammers, or rotary wire brushes fitted to an angle grinder or drill.
4. Clean with degreasing agents as recommended by manufacturer to ensure that the surface is free from grease or oil.
5. Apply zinc rich primer as soon as possible to dried, prepared surfaces to prevent further oxidation of the steel.
6. Thoroughly stir primer prior to use. Apply one continuous coat with suitable brush, making sure the back sides of the exposed steel reinforcing bars are completely coated.
7. Two coats of 4 mils wet film thickness are required to ensure complete coverage of the surface. Allow the first coat to fully dry before applying the second.
8. Provide splices and wire ties per ASTM A 615/A 615M where needed.
9. Concrete-repair materials can be applied as soon as the primer is fully dry. Do not leave the primed surfaces exposed to the elements for longer than 7 days before recoating or applying repair materials.

3.3 CONCRETE PATCHING

A. Prior to patching, all repair areas to be patched shall be kept continuously wet for at least 20 minutes prior to application of patching compound. Before placing patch, excess water shall be removed from the surface, leaving the surface damp or saturated/surface dry.

B. If bonding agents are recommended by the manufacturer for the system, apply bonding agent into all cavity surfaces. Apply bonding agent undiluted by brush, roller or garden-type sprayer on to prepared surface or in accordance with manufacturer’s instructions if different.

C. While bonding agent is still wet, mix and place patching compound in accordance with manufacturer's instructions.

D. Mix the precisely measured quantity of water specified by the manufacturer with full bags of patching compound only. Mix per the manufacturer’s instructions. Mix to a uniform consistency, free of lumps or dry material. Do not over mix or whip air into the mix.

E. Hand or Trowel Placement:

1. Compact mortar into properly prepared substrate prior to bulk placement.
2. Apply mortar up to 3” (76.2 mm) horizontally and vertically and 2” (50.8 mm) overhead, dependent on patch size and configuration.
3. Finish surface with a wood or steel trowel, or a sponge float.
4. Do not re-temper or over-work.

F. Do not open to traffic or expose to weather until adequate strength has been reached, as affected by Working and curing conditions.

3.4 CONCRETE CRACK REPAIR

A. All surfaces to be bonded must be free of standing water and completely clean of dirt, rust, curing compounds, grease, oil, paint, waxes, and other materials which would prevent an optimal bond.

B. Cracks should be v-notched and then mechanical abraded to a sound surface.

C. Mix per the manufacturer's written instructions. Mix with properly colored sand for cracks over 1/4 inch wide. If mixing with sand, mix in ratios per manufacturer's recommendations.

D. Application: Trowel apply product into v-notched crack. Work product into cracks until completely filled.

E. For use on larger patching areas:
   1. Use washed, kiln-dried, and bagged graded silica sand. Carefully selected blend of sands with low void content will require less epoxy for given volume of mortar compared to ungraded sands.
      a. "Skip" gradation for low void content is blend by weight of 2 parts No. 12 or No. 16 mesh to 1 part No. 80 or No. 100 mesh. When graded sands are not available, general purpose sand is No. 30 mesh silica.
   2. Maximum placement depth: 1 inch (25 mm).

F. Clean tools immediately after use with xylene or mineral spirits. Remove cured materials with commercial epoxy or paint stripper solvents.

3.5 WATERPROOFING (1 to 3 Coats per Drawings)

A. Surfaces should be structurally sound, clean, and free from loose particles, oil, grease, or any other contaminants.

B. Patch all holes, spalled or cracked concrete prior to coating.

C. Dampen the prepared substrate with clean water before applying waterproofing coat.

D. Mix product per the manufacturer's written instructions.

E. Base coat where 3 coat applications are called out may be extended with sand in proportions as recommended by manufacturer.

F. Apply within temperature ranges per manufacturer. Do not apply in rain or when rain is expected within 24 hours.

G. Apply product evenly with a stiff brush or by spray, onto the prepared surface, to give a continuous film. Apply in at least two coats, the second coat applied at right angles to the direction of the first and after an overnight's cure.

H. Allow previous coats to cure for 24 hours before applying additional coats.

3.6 WATERPROOF COATING (2 Coats)

A. Surfaces should be structurally sound, clean, and free of all bond-inhibiting contaminants.

B. Repair all holes, spalled or cracked concrete prior to coating.

C. Apply product by roller or spray per the manufacturer's written instructions. Backroll if product is spray applied.

D. Apply 2 coats to a achieve a total dry-film thickness (DFT) of 12–16 mils.

E. Apply product evenly with a roller or by spray, onto the prepared surface, to give a continuous film. Apply in at least two coats, the second coat applied at right angles to the direction of the first and after an overnight's cure.

3.7 CURING:

A. Cure all concrete repair products accordance with manufacturer's instructions. Protect against rapid drying due to high temperatures or wind.

3.8 CLEANING

A. Clean wet mortar material from tools and equipment with water. Remove cured materials mechanically.

B. Clean up and properly dispose of any debris remaining on Project site related to application.

C. Do not use storm inlets, floor drains, or facility sinks for cleaning. Coordinate with Owner for appropriate wash out locations.

END OF SECTION 03 0137

SECTION 04 0322 - HISTORIC BRICK UNIT MASONRY REPAIR

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes historic treatment work consisting of repairing historic clay brick masonry.

1.2 UNIT PRICES

A. Work of this Section is affected by unit prices specified in Section 01 2200 "Unit Prices."

1.3 DEFINITIONS

A. Consolidate: To strengthen loose or deteriorated materials in place.

B. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.

C. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.

D. Rebuilding (Setting) Mortar: Mortar used to set and anchor masonry in a structure, distinct from pointing mortar installed after masonry is set in place.

1.4 PRESERVATION TERMS

A. "Preservation": To apply measures necessary to sustain the existing form, integrity, and materials of a historic property. Work may include preliminary measures to protect and stabilize the property.

B. "Rehabilitation": To make possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features that convey its historical, cultural, or architectural values.

C. "Restoration": To accurately depict the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and the reconstruction of missing features from the restoration period.

D. "Reconstruction": To reproduce in the exact form and detail a building, structure, or artifact as it appeared at a specific period in time.

E. "Existing to Remain" or "Retain": Existing items of construction that are not to be removed and that are not otherwise indicated to be removed and salvaged, or removed and reinstalled.

F. "Material in Kind": Material that matches existing materials, as much as possible, in species, cut, color, grain, and finish.

G. "Protect and Maintain": To remove deteriorating materials, apply protective products, and install protective measures such as temporary guards; to provide the least degree of intervention.

H. “Refinish”: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.

I. “Reinstall”: To take a removed or dismantled item, repair and clean it as indicated for reuse, and reinstall it in original position, or where indicated.

J. "Remove": To detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

K. "Remove and Reinstall": To detach items from existing construction, repair and clean them for reuse, and reinstall them where indicated.

L. "Repair": To stabilize, consolidate, or conserve; to retain existing materials and features while employing as little new material as possible. Repair includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials. Within restoration, repair also includes limited replacement in kind, rehabilitation, and reconstruction, with compatible substitute materials for deteriorated or missing parts of features when there are surviving prototypes.

M. "Replace": To duplicate and replace entire features with new material in kind. Replacement includes the following conditions:

1. Duplication: Includes replacing elements damaged beyond repair or missing. Original material is indicated as the pattern for creating new duplicated elements.
2. Replacement with New Materials: Includes replacement with new material when original material is not available as patterns for creating new duplicated elements.
3. Replacement with Substitute Materials: Includes replacement with compatible substitute materials. Substitute materials are not allowed, unless otherwise indicated.

N. “Reproduce”: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.

O. “Restore”: To consolidate, replicate, reproduce, repair, and refinish as required to achieve the indicated results.

P. “Retain”: To keep existing items that are not to be removed or dismantled.

Q. “Reversible”: New construction work, treatments, or processes that can be removed or undone in the future without damaging historic materials unless otherwise indicated.

R. “Salvage”: To protect removed or dismantled items and deliver them to Owner.

S. “Stabilize”: To provide structural reinforcement of unsafe or deteriorated items while maintaining the essential form as it exists at present; also, to reestablish a weather-resistant enclosure.

1.5 PREINSTALLATION MEETINGS

A. Pre-installation Conference: Conduct conference on historic masonry repair and repointing at Project site.

1. Review methods and procedures related to repairing historic brick masonry.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed brick product and for each color and texture specified.

1.7 QUALITY ASSURANCE

A. Mockups: Prepare mockups of historic treatment on existing surfaces to demonstrate aesthetic effects and to set quality standards for materials and execution, and for fabrication and installation.

1. Masonry Repair: Prepare sample areas for each type of masonry material indicated to have repair work performed. If not otherwise indicated, size each mockup not smaller than two adjacent whole units or approximately 24 inches in least dimension. Construct sample areas in locations in existing walls where directed by Architect unless otherwise indicated. Demonstrate quality of materials, workmanship, and blending with existing work. Include the following as a minimum:

a. Replacement: Four brick units replaced.
b. Patching: Three small holes at least 1 inch in diameter for each type of brick material indicated to be patched, so as to leave no evidence of repair.

PART 2 - PRODUCTS

2.1 MASONRY MATERIALS

A. Face Brick: Provide face brick where required to complete masonry repair work.

1. Brick Matching Existing: Provide units with physical properties, colors, color variation within units, surface texture, size, and shape to match existing brickwork.

a. Existing Brick:

1) Size: Nominal 8” x 2 1/4” x 4”. Field verify and match exact actual size.
2) Color, Texture, and Pattern: Verify and match existing color blend and texture.

b. For existing brickwork that exhibits a range of colors or color variation within units, provide brick that proportionally matches that range and variation rather than brick that matches an individual color within that range.

2.2 MORTAR MATERIALS

A. See Section 04 0323 - Historic Brick Unit Masonry Repointing.

2.3 MANUFACTURED REPAIR MATERIALS (OPTION TO BRICK REPLACEMENT)

A. Masonry Patching Compound: Factory-mixed cementitious product that is custom manufactured for patching masonry.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Cathedral Stone Products, Inc.; Jahn M100 Terra Cotta and Brick Repair Mortar.
b. Conproco Corporation; Matrix.
c. Edison Coatings, Inc.; Custom System 45.
d. Others as pre-approved.

2. Use formulation that is vapor and water permeable (equal to or more than the masonry unit), exhibits low shrinkage, has lower modulus of elasticity than the masonry units being repaired, and develops high bond strength to all types of masonry.
3. Formulate patching compound used for patching brick in colors and textures to match each type of masonry being patched.

2.4 ACCESSORY MATERIALS

A. Setting Buttons and Shims: Resilient plastic, nonstaining to masonry, sized to suit joint thicknesses and bed depths of masonry units, less the required depth of pointing materials unless removed before pointing.

2.5 MORTAR MIXES

A. Mixes:

1. For Historic Masonry Mortar Mix Design refer to Section 04 0323 - Historic Brick Unit Masonry Repointing.

PART 3 - EXECUTION

3.1 BRICK REMOVAL AND REPLACEMENT

A. At locations indicated, remove bricks that are damaged, spalled, or deteriorated or are to be reused. Carefully remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.

B. Support and protect remaining masonry that surrounds removal area.

C. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

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

E. Remove in an undamaged condition as many whole bricks as possible. Remove mortar and sealant from surfaces of removed units.

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

G. Replace removed damaged brick with other removed brick in good condition, where possible, or new matching brick. Do not use broken units unless they can be cut to usable size.

H. 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.

1. Maintain joint width for replacement units to match existing joints.
2. Use setting buttons or shims to set units accurately spaced with uniform joints.

I. Lay replacement brick with rebuilding (setting) mortar and 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. Use wetting methods that ensure that units are nearly saturated but surface is dry when laid.

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 according to Section 04 0323 "Historic Brick Unit Masonry Repointing." Point at same time as repointing of surrounding area.
3. When mortar is sufficiently hard to support units, remove shims and other devices interfering with pointing of joints.

J. Curing: Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours, including weekends and holidays.

1. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

3.2 MASONRY UNIT PATCHING

A. Patch the following masonry units unless another type of repair or replacement is indicated:

1. Units indicated to be replaced.
2. Units with holes.
3. Units with chipped edges or corners. Patch chipped edges or corners measuring more than 3/4 inch.

4. Units with small areas of deep deterioration. Patch deep deteriorations measuring more than 1 inch in least dimension and more than 1/4 inch deep.

B. Patching Bricks:

1. Remove loose material from masonry surface. Carefully remove additional material so patch does not have feathered edges but has square or slightly undercut edges on area to be patched and is at least 1/4 inch thick, but not less than recommended in writing by patching compound manufacturer.
2. If patching cracked brick units, cut brick 3/8” to 1/2” wide full depth and patch with compound.
3. Mask adjacent mortar joint or rake out for repointing if patch extends to edge of masonry unit.
4. Mix patching compound in individual batches to match each unit being patched. Combine one or more colors of patching compound, as needed, to produce exact match.
5. Rinse surface to be patched and leave damp, but without standing water.
6. Brush-coat surfaces with slurry coat of patching compound according to manufacturer's written instructions.
7. Place patching compound in layers as recommended in writing by patching compound manufacturer, but not less than 1/4 inch or more than 2 inches thick. Roughen surface of each layer to provide a key for next layer.
8. Trowel, scrape, or carve surface of patch to match texture and surrounding surface plane or contour of the masonry unit. Shape and finish surface before or after curing, as determined by testing, to best match existing masonry unit.
9. Keep each layer damp for 72 hours or until patching compound has set.

3.3 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, applied by low-pressure spray.

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

END OF SECTION 04 0322

SECTION 04 0323 - HISTORIC BRICK UNIT MASONRY REPOINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes historic treatment work consisting of repointing brick masonry joints.

1.2 UNIT PRICES

A. Work of this Section is affected by unit prices specified in Section 01 2200 "Unit Prices."

1.3 DEFINITIONS

A. Low-Pressure Spray: 100 to 400 psi; 4 to to 6 gpm.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference historic masonry repair and repointing at Project site.

1. Review methods and procedures related to repointing historic brick masonry.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified.

1.6 QUALITY ASSURANCE

A. Refer to National Park Service Preservation Brief 2, “Repointing Mortar Joints in Historic Masonry Buildings”.

B. Mockups: Prepare mockups of historic treatment on existing surfaces to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Repointing: Rake out joints in an area approximately 36 inches high by 48 inches for each type of repointing required, and repoint the area for review and approval.

PART 2 - PRODUCTS

2.1 MORTAR MATERIALS

A. Hydrated Lime: ASTM C 207, Type S, or Natural Hydrated Lime.

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

1. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.
2. Color: Provide natural sand of color necessary to produce required mortar color.
3. Provide sand with rounded edges.
4. Size: Fine pointing mortar, use aggregate graded with 100 percent passing No. 30 sieve.
5. Size: Coarse pointing mortar, use aggregate graded with 100 percent passing No. 16 sieve.

C. Mortar Pigments: ASTM C 979/C 979M, compounded for use in mortar mixes, and having a record of satisfactory performance in masonry mortars.

D. Water: Potable.

2.2 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: Use color pigment only if colored sands cannot produce a matching colored mortar. Produce mortar of color required by using specified ingredients. Do not alter specified proportions without Architect's approval.

1. Mortar Pigments: Where mortar pigments are indicated, do not add pigment exceeding 10 percent by weight of the cementitious or binder materials, except for carbon black, which is limited to 2 percent, unless otherwise demonstrated by a satisfactory history of performance.

C. Do not use admixtures in mortar unless otherwise indicated.

A. Mixes: Mix mortar materials in the following proportions:

1. Setting and Pointing Mortar for Limestone: Comply with ASTM C 270, Proportion Specification, Type L (lime only) unless otherwise indicated.

a. Pointing Mortar Mix:

0 Portland Cement, (not allowed)
1 part Hydrated Lime,
3 parts sand

2. Pigmented Pointing Mortar: Do not exceed pigment-to-cement ratio of 1:10, by weight.

a. Add mortar pigments to produce mortar colors required. Verify use of lime in the mix with color pigment manufacturer.

B. Mortar Colors:

1. Deep Setting Bed Mortar Color:

a. Gray color to match different areas of work.

2. Pointing Mortar Colors: Multiple mortar colors are required for different areas of the building to match the existing mortars.

a. Mortar on East Front Facade: Light Buff color with fine colored sand to match existing mortar.

b. Mortar on Back Side of Facade: Tan color with fine colored sand to match existing mortar.

c. Rear 2nd Story Clay Tile: Gray color to match existing mortar.

PART 3 - EXECUTION

3.1 PROTECTION

A. Prevent mortar from staining face of surrounding masonry and other surfaces.

B. Remove downspouts and adjacent to immediate work area and store during masonry repointing work. Reinstall when repointing is complete. Work around existing conduits.

3.2 REPOINTING MASONRY

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

1. All joints in areas indicated.
2. Joints at locations of the following defects: (per indicated areas on Drawings)

a. Holes and missing mortar.
b. Cracks that can be penetrated 1/4 inch or more by a knife blade 0.027 inch thick.
c. Cracks 1/8 inch or more in width and of any depth.
d. Hollow-sounding joints when tapped by metal object.
e. Eroded surfaces 1/4 inch or more deep.

f. Deterioration to point that mortar can be easily removed by hand, without tools.
g. Joints filled with substances other than mortar.

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

C. Rake out joints as follows, according to procedures demonstrated in approved mockup:

1. Remove mortar from joints to depth of 3/4 inch or not less than that required to expose sound, unweathered mortar. Do not remove unsound mortar more than 2 1/2 inches deep; consult Architect for direction. See Unit Costs for deep joint repairs.
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 resilient mallet. Do not use power-operated grinders without Architect's written approval based on approved quality-control program.
b. Cut out center of mortar bed joints using angle grinders with diamond-impregnated metal blades. Remove remaining mortar in bed joints and mortar in head joints by hand with chisel and resilient mallet.
c. Over cut head joints are not acceptable. Over cut head joints will require brick repairs to adjacent damaged brick units.

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. Pointing with Mortar:

1. Rinse 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 joint surfaces before pointing.
2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than pointing depth. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
3. After deep areas have been filled to same depth as remaining joints, point joints by placing mortar in layers not greater than 3/8 inch. Fully compact each layer and allow it to become thumbprint hard before applying next layer. Where existing masonry units 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 beyond joint edges onto exposed masonry surfaces or to featheredge the mortar.
4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.

a. Mortar Joint Profile: Concave Tooled.

5. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Remove mortar and repoint.

F. Mortar Curing:

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

    a. 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.
    b. Adjust curing methods to ensure that pointing mortar is damp throughout its depth without eroding surface mortar.

G. Allow mortar to harden at least 14 days before beginning final cleaning work.

3.3 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, applied by low-pressure spray.

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

END OF SECTION 04 0323

SECTION 04 0326 - TERRA COTTA UNIT MASONRY REPAIR

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes historic treatment work consisting of repairing historic terra cotta masonry.

1.2 DEFINITIONS

A. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference on historic masonry repair and repointing at Project site.

1. Review methods and procedures related to repairing historic terra cotta masonry.

a. Historic treatment specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
b. Materials, material application, sequencing, tolerances, and required clearances.
c. Quality-control program.
d. Fire-protection plan.
e. Terra cotta historic treatment program.
f. Cleaning program.
g. Coordination with building occupants.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and glaze specified.

1.5 QUALITY ASSURANCE

A. Mockups: Prepare mockups of historic treatment on existing surfaces to demonstrate aesthetic effects and to set quality standards for materials and execution and for fabrication and installation.

1. Terra Cotta Repair: Prepare sample areas for each type of terra cotta material and assembly indicated to have repair work performed. Construct sample areas in locations in existing walls where directed by Architect unless otherwise indicated. Demonstrate

quality of materials, workmanship, and blending with existing work. Include the following as a minimum:

a. Patching: Three small holes at least 1 inch in diameter for each type of terra cotta material indicated to be patched, so as to leave no evidence of repair.

PART 2 - PRODUCTS

2.1 MORTAR MATERIALS

A. Portland Cement: Not allowed for Lime Mortar.

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

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

1. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.
2. Colored Mortar: Provide natural sand or ground marble, granite, or other sound stone of color necessary to produce required mortar color.
3. For exposed mortar, provide sand with rounded edges.

D. Mortar Pigments: ASTM C 979/C 979M, compounded for use in mortar mixes, and having a record of satisfactory performance in masonry mortars.

E. Water: Potable.

2.2 MANUFACTURED REPAIR MATERIALS

A. Terra Cotta Patching Compound: Factory-mixed cementitious product that is custom manufactured for patching terra cotta masonry.

1. Manufacturers and Products:

a. Jahn M100 Terra Cotta and Brick Repair Mortar. (Basis of Design)
b. Conproco Corp.
c. Edison Coatings, Inc.
d. Others as pre-approved.

2. Use formulation that is vapor and water permeable (equal to or more than the masonry unit), exhibits low shrinkage, has lower modulus of elasticity than the terra cotta units being repaired, and develops high bond strength to all types of masonry.
3. Formulate patching compound used for patching terra cotta in colors and textures to match each unit being patched. Provide sample colors to enable matching the color, texture, and variation of each unit.

B. Terra Cotta Glaze Replacement: A high-solids, nonyellowing, fade-resistant, waterborne acrylic latex, polyurethane polymer, or CSP potassium silicate coating intended for exterior use as terra cotta glaze replacement.

1. Manufacturers and Products:

a. Cathedral Stone Terra Coat Glaze Repair. (Basis of Design)
b. Conproco Corp.
c. Edison Coatings, Inc.
d. Others as pre-approved

2. Color:

a. Product shall be custom mixed by manufacturer to match color and gloss of existing terra cotta glaze.

2.3 ACCESSORY MATERIALS

A. Setting Buttons and Shims: Resilient plastic, nonstaining to masonry, sized to suit joint thicknesses and bed depths of terra cotta units, less the required depth of pointing materials unless removed before pointing.

2.4 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.

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

1. Mortar Pigments: Where mortar pigments are indicated, do not add pigment exceeding 10 percent by weight of the cementitious or binder materials, except for carbon black, which is limited to 2 percent, unless otherwise demonstrated by a satisfactory history of performance.

C. Do not use admixtures in mortar unless otherwise indicated.

D. Mixes: Mix mortar materials in the following proportions:

1. Pointing Mortar Mix:

a. 0 Portland Cement, (not allowed)
b. 1 part Hydrated Lime
c. 3 parts sand

2. Colored Mortar: Add mortar pigments to produce exposed, setting (rebuilding) mortar of colors required.

PART 3 - EXECUTION

3.1 PROTECTION

A. Prevent mortar from staining face of surrounding masonry and other surfaces.

3.2 TERRA COTTA PATCHING

A. Patch the following terra cotta units unless another type of repair or replacement is indicated:

1. Units indicated to be patched.
2. Units with holes.
3. Units with chipped edges or corners. Patch chipped edges or corners measuring more than 3/4 inch (19 mm) in least dimension.
4. Units with small areas of deep deterioration. Patch deep deteriorations measuring more than 3/4 inch (19 mm) in least dimension and more than 1/4 inch (6 mm) deep.

B. Patching Terra Cotta:

1. Remove deteriorated material as determined by sounding gently with a small hammer. Carefully remove additional material so patch does not have feathered edges but has square or slightly undercut edges on area to be patched and is at least 1/4 inch thick, but not less than recommended in writing by patching compound manufacturer.
2. Mask adjacent mortar joint or rake out for repointing if patch extends to edge of unit.
3. Mix patching compound in individual batches to match each unit being patched. Combine one or more colors of patching compound, as needed, to produce exact match.
4. Rinse surface to be patched and leave damp, but without standing water.
5. Brush-coat surfaces with slurry coat of patching compound according to manufacturer's written instructions.
6. Place patching compound in layers as recommended in writing by patching compound manufacturer, but not less than 1/4 inch or more than 2 inches thick. Roughen surface of each layer to provide a key for next layer.
7. Do not apply patching compound over mortar joints. If patching compound bridges mortar joints, cut out joints after patching compound hardens.
8. Trowel, scrape, or carve surface of patch to match texture, details, and surrounding surface plane or contour of terra cotta. Shape and finish surface before or after curing, as determined by testing, to best match existing terra cotta.
9. Keep each layer damp for 72 hours or until patching compound has set.
10. After final layer of patching compound has cured, apply terra cotta glaze replacement according to manufacturer's written instructions. Apply two or more coats, as needed, to match glaze of adjacent terra cotta units.

3.3 TERRA COTTA GLAZE REPAIR

A. Repair the glaze on the following terra cotta units that are otherwise sound unless another type of repair or replacement is indicated:

1. Units indicated to be repaired or to have glaze repaired.

2. Units with abraded or chipped glaze.
3. Units with spots or areas of shallow deterioration greater than glaze thickness and less up to 1/4 inch.

B. Application: After other repairs have cured, apply terra cotta glaze replacement according to manufacturer's written instructions. Do not apply glaze to joint surfaces between units or within joints that will be mortared or sealed.

1. Apply two coats, minimum, or more to match glaze of adjacent terra cotta units.

3.4 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, applied by low-pressure spray.

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

END OF SECTION 04 0326

SECTION 06 1600 - SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:

1. Roof sheathing.

1.2 DELIVERY, STORAGE, AND HANDLING

A. Stack boards flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. General: Provide kiln-dried finished (surfaced) material without finger-jointing, unless otherwise indicated.

2.2 WOOD PANEL PRODUCTS, GENERAL

A. Plywood: DOC Standards, – or APA standards PS-1-09. Provide rated or structural exterior grade sheathing in thicknesses as indicated in the drawings.

2.3 ROOF SHEATHING

A. Board Sheathing: Provide board sheathing in 3/4 inch thickness or as indicated in the drawings. Board width may vary to match and align with existing boards.

B. For concealed boards, provide lumber No. 2 grade boards with 19 percent maximum moisture content and any of the following species and grades:

1. Eastern white pine; NeLMA or NLGA.

C. Plywood Roof Sheathing: CDX or Exterior grade plywood sheathing

1. Thickness: 5/8 inch as indicated. Verify to match existing thickness.

2.4 FASTENERS

A. General: Where carpentry is exposed to weather, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Securely attach to substrate by fastening per Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."

3.2 WOOD SHEATHING INSTALLATION

A. General: Comply with applicable recommendations in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial."

B. Fastening Methods: Fasten panels as indicated below:

1. Roof Sheathing:

a. Nail to wood rafter framing.
b. Space panels 1/8 inch apart at edges and ends.

C. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.

D. Do not splice structural members between supports, unless otherwise indicated. Do not attach or anchor with fasteners at locations between blocking or supports.

1. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

2. When cutting out damaged sheathing, cut sections out between centers of framing members.

3.3 PROTECTION

A. Cover sheathing permanently by covering exposed exterior surface with vapor barrier underlayment immediately after sheathing is installed.

END OF SECTION 06 1600

SECTION 07 0150 - PREPARATION FOR RE-ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Roof tear-off.
2. Roofing preparation.

1.2 SUBMITTALS

A. Roofing Schedule. Immediately upon award of contract, submit proposed roofing schedule indicating separate areas and total number of days scheduled for each roof or section of roof. Revise and distribute at Pre-Installation Conference for discussion, coordination and approval.

B. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces that might be misconstrued as having been damaged by reroofing operations.

1.3 QUALITY ASSURANCE

A. Verify Existing Conditions: Immediately verify existing conditions as called out in the contract drawings. Contact Architect if any existing conditions vary and submit an RFI for any variations in existing conditions that may affect the work as called out in the Contract Documents.

B. Pre-installation Conference: Conduct conference at Project site.

C. The Construction Manager will be responsible for coordinating pre-roofing conference at least one week prior to initiation of roofing work. The Construction Manager, the foreman for roofing contractor, the owner’s representative, and the sheet metal contractor are recommended to be present to discuss the execution of the work. Discussion topics will include the following:

1. Schedule for each building or section of roof.
2. Roof access.
3. Demolition clean up
4. Protection of grounds and landscaping.
5. Deck observations.
6. Coordination and timing of other subcontractors.
7. Demolition disposal.

1.4 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately below reroofing area. Conduct reroofing so Owner's operations will not be disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.

1. Coordinate work activities daily with Owner so Owner can place protective dust or water leakage covers over sensitive equipment if needed.

B. Protect building to be reroofed, adjacent buildings and roof areas, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.

C. Limit construction loads on roof or coordinate with Owner in advance.

D. Cores samples have been taken of existing roofing system and the descriptive results of the samples have been provided in the section labeled “Existing Roof Construction” and “Core Samples” on the roof plans.

E. Weather Limitations: Proceed with reroofing preparation and work only when existing and forecasted weather conditions permit Work to proceed without water entering into existing roofing system or building.

PART 2 - PRODUCTS

2.1 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with components of new membrane roofing system.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect existing adjacent roofing areas that are indicated not to be reroofed.

B. Seal or isolate windows that may be exposed to airborne substances created in removal of existing materials.

C. Coordinate with Owner to shut down air intake equipment in the vicinity of the Work.

D. Maintain roof drains or downspouts in functioning condition to ensure roof drainage at end of each workday.

1. Prevent debris from entering or blocking roof drains and conductors.

2. Do not permit water to enter into or under existing roofing system components that are to remain.

E. Coordinate any rooftop utilities and service piping that need to be shut off before commencing Work.

3.2 ROOF TEAR-OFF

A. General: Prepare schedule for Owner indicating each day of extent of roof tear-off proposed and obtain authorization to proceed.

B. Full Roof Tear-Off: Remove existing roofing membrane and other membrane roofing system components down to the deck.

1. Remove substrate boards, vapor retarders, roof insulation and cover boards.
2. Remove base flashings and counter flashings.
3. Remove perimeter edge flashing and gravel stops.
4. Remove copings.
5. Remove flashings at pipes, curbs, mechanical equipment, and other penetrations.
6. Remove fasteners and any loose debris from deck.
7. Inspect wood blocking, curbs, and nailers for deterioration and damage. If wood blocking, curbs, or nailers have deteriorated, immediately notify Architect.
8. Inspect plywood deck sheathing for deterioration and damage. If plywood sheathing is deteriorated, immediately notify Architect.
9. Remove any underlayments or felts that may not be acceptable in meeting manufacturer's installation requirements.
10. Remove fasteners from deck or cut fasteners off slightly above deck surface.
11. Remove any excess asphalts or tars from deck.

3.3 DECK PREPARATION

A. Inspect deck after tear-off of membrane roofing system.

B. If broken or loose fasteners that secure deck panels to one another or to structure are observed, or if deck appears or feels inadequately attached, immediately notify Architect. Do not proceed with installation until directed by Architect.

C. If deck surface is not suitable for receiving new roofing, or if structural integrity of deck is suspect, immediately notify Architect. Do not proceed with installation until directed by Architect.

D. Replace plywood roof sheathing as indicated in the Drawings and Specifications.

3.4 ROOF RE-COVER PREPARATION

A. Remove glues, mastic, any mechanically attached roofing fasteners projecting above roofing, and other substrate irregularities from existing roofing that inhibit new roofing from conforming to substrate.

1. Broom clean existing substrate.
2. Verify that existing substrate is dry.

3.5 BASE FLASHING REMOVAL

A. Remove existing base flashings around parapets, curbs, walls, and penetrations.

1. Coordinate removal of base flashing that are noted as having asbestos containing materials with the Construction Manager prior to removal.

2. Clean substrates of contaminants such as asphalt, sheet materials, dirt, and debris.

B. Inspect parapets, wood blocking, curbs, and nailers for deterioration and damage.

1. If parapet sheathing, wood blocking, curbs, or nailers have deteriorated, immediately notify Architect.

3.6 DISPOSAL

A. Contractor will be responsible for cleaning up and disposing of any loose debris, trash, or other materials at the end of each work day. Contractor is to maintain a clean work area and site.

B. Collect and place demolished materials in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

C. Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION 07 0150

SECTION 07 1900 - WATER REPELLENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes penetrating water-repellent coatings for the following surfaces:

1. Brick masonry.

1.2 SUBMITTALS

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

1.3 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that can apply the product to meet performance and testing requirements.

B. Pre-installation Conference: Conduct conference at project site.

1.4 PERFORMANCE REQUIREMENTS

A. General: Water-repellent coatings shall be capable of performing as a continuous barrier preventing water penetration through the exterior vertical surface of porous masonry surfaces and be capable of providing the specified material warranty after testing.

1.5 WARRANTY

A. Material Warranty: Manufacturer's standard form in which manufacturer, when notified in writing from Owner, Manufacturer shall, promptly and without inconvenience and cost to Owner correct said deficiencies. Manufacturer agrees to repair materials that fail to maintain water repellency for a period of time as follows:

1. Warranty Period: Two (2) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

2.2 PENETRATING WATER REPELLENTS

A. Siloxane, Penetrating Water Repellent: Clear, water-based silane/siloxane water repellent for concrete and most masonry and stucco surfaces with 10 percent or more solids and with 30 g/L or less of VOCs.

1. Available Products:

a. ProSoCo, Inc.; Sure Klean Siloxane PD.
b. MasterProtect by Master Builders Solutions (formerly Enviroseal).
c. Others as pre-approved.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements and conditions affecting performance of the Work.

1. Verify that surfaces are clean and dry according to water-repellent manufacturer's requirements. Check moisture content in representative locations by method recommended by manufacturer.
2. Verify that required repairs are complete, cured, and dry before applying water repellent.

3.2 PREPARATION

A. Clean substrate of substances that might interfere with penetration or performance of water repellents. Test for moisture content, according to water-repellent manufacturer's written instructions, to ensure that surface is dry enough.

B. Test for pH level, according to water-repellent manufacturer's written instructions, to ensure chemical bond to silicate minerals.

C. Protect adjoining work, including sealant bond surfaces, from spillage or blow-over of water repellent. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of water repellent being deposited on surfaces. Cover live plants and grass.

D. Coordination with Mortar Joints: Do not apply water repellent until pointing mortar for joints adjacent to surfaces receiving water-repellent treatment has been installed and cured.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 APPLICATION

A. Manufacturer's Field Service: Engage a factory-authorized service representative as needed to inspect the substrate before application of water repellent and to instruct applicator on the product and application method to be used to ensure warranty compliance.

B. For concentrates, mix in accordance with manufacturer’s instructions providing the recommended dilution ratio for porous vertical surfaces.

C. Apply a heavy-saturation spray coating of water repellent on surfaces indicated for treatment using low-pressure spray equipment. Comply with manufacturer's written instructions for using airless spraying procedure, unless otherwise indicated.

D. Apply a second saturation spray coating, repeating first application. Comply with manufacturer's written instructions for limitations on drying time between coats and after rainstorm wetting of surfaces between coats. Consult manufacturer's technical representative if written instructions are not applicable to Project conditions.

E. Apply at temperature and weather conditions recommended by the manufacturer. Protect treated surfaces from rain for a minimum of 4 hours or as recommended by the manufacturer.

3.4 TESTING

A. A manufacturer’s representative will test sections of vertical wall where product has been properly applied in accordance with the manufacturer’s warranty requirements.

1. Applications that fail to meet the manufacturer’s warranty requirements shall be corrected before proceeding with testing procedures.
2. Tests that fail to meet the manufacturer’s requirements will be corrected until the applied product passes the test procedure.

3.5 CLEANING

A. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses. Repair damage caused by water-repellent application.

B. Comply with manufacturer's written cleaning instructions.

END OF SECTION 07 1900

SECTION 07 5323 - ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:

1. Vapor Barrier.
2. Adhered ethylene-propylene-diene-terpolymer (EPDM) roofing system.
3. Roof insulation.
4. Walkways.

1.2 SUBMITTALS

A. Product Data: For each product indicated or proposed for use.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other Work. Plans and details are to have field measurements documenting existing conditions. Submit only details that comply with the required warranty listed below.

1. Rigid Insulation: Submit layout diagrams for board insulation. Indicate layer thickness, staggers, areas with tapered insulation, crickets, etc.
2. Base flashings and membrane terminations.
3. Flashing details at penetrations.

C. Sample Warranties: Submit manufacturer's standard and/or special warranties.

D. Care and Maintenance Data. Refer to section for Operation and Maintenance Manuals for submittal of the Owner’s copies.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: A company that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

B. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in sales of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection to determine Installer’s compliance with the requirements of the project, and approved by the manufacturer to issue warranty certification.

C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.

D. Source Limitations: Obtain components for membrane roofing system approved by roofing membrane manufacturer.

E. Pre-installation Conference: Conduct conference at the project site. Conduct meeting at least 1 week prior to start of Work.

1.4 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to cover labor and materials to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks. Warranty shall not be pro-rated. The maximum wind speed coverage shall be peak gusts of 72 mph measured at 10 meters above ground level.

1. Warranty Period: 25 years from date of Substantial Completion.

2. Manufacturer’s representative shall inspect the roof at Substantial Completion to ensure the conditions of the warranty.

B. Special Installer’s Warranty: Installer shall provide a watertight warranty for the roof in which the Roof Installer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within 1 year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.

B. Roofing System Design: The roof is required to meet a Building Risk Category II, Exposure B. Provide a roof system that is a tested assembly for the following conditions:

1. Wind Resistance: 90 MPH Peak Gust Wind Zone.
2. Hail Damage Resistance: Design is based on SH requirements.

C. Wind Uplift Resistance: Design roofing system to resist wind uplift pressures when tested based on FM Approvals 4474, UL 580, or UL 1897:

1. Zone 1 (Roof Area Field): Center area of roof excluding perimeter and corners.

2. Zone 2 (Roof Area Perimeter): Location: From roof edge to inside roof edge.
3. Zone 3 (Roof Area Corners): Location: Each direction from building corner.

D. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs as indicated in the Drawings. Identify products with appropriate markings of applicable testing agency.

E. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

2.2 EPDM ROOFING MEMBRANE

A. EPDM Roofing Membrane: ASTM D 4637, Type I, non-reinforced uniform, flexible sheet made from EPDM, and as follows:

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

    a. Carlisle SynTec Incorporated.
    b. Holcim Elevate (Firestone).
    c. GAF Materials Corp.
    d. GenFlex Roofing Systems.
    e. Mule-Hide Products Co., Inc.
    f. Versico Inc.
    g. Others as pre-approved.

2. Thickness: 60 mils, nominal.
3. Sheet Width: Factory fabricated to the largest width possible.
4. Exposed Face Color: Black.
5. Elongation: 400 percent as measured per ASTM D 412.

2.3 VAPOR RETARDER

A. Vapor Retarder: Provide self-adhering rubberized asphalt membrane vapor retarder for air and vapor control. Products with a permeability rating (ÅSTM E-96) of 0.05 perms and fully compatible with insulation adhesive.

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

    a. Carlisle SynTec Incorporated.
    b. Holcim Elevate (Firestone).
    c. GAF Materials Corp.
    d. Grace Ultra, by GCP Applied Technologies.
    e. Versico Inc.
    f. Others as pre-approved.

B. Properties:

1. Thickness: 30 mils minimum.
2. Exposed Face Color: Grey-black.
3. Physical Properties: Permeance: 0.05 Perms.
4. Elongation: 250%.
5. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C) or higher.
6. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C) or lower.

2.4 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.

B. Sheet Flashing: Manufacturer's standard sheet flashing, partially cured or uncured. Thickness, and color same as the sheet membrane.

C. Cold Fluid-Applied Adhesive: Manufacturer's standard cold fluid-applied adhesive formulated to adhere roof insulation to substrate and substrate to deck.

D. Bonding Adhesive: Manufacturer's standard polymer blend bonding adhesive to adhere membrane to approved substrate.

E. Seaming Material: Single-component butyl splicing adhesive and splice cleaner or manufacturer's standard synthetic-rubber polymer primer and 3 inch wide minimum, butyl splice tape with release film or per manufacturer’s warranty requirements.

F. Molded Pipe Seals: A pre-molded flashing and clamping ring used for pipe penetrations. Available for 0.75 inch to 8 inch diameter pipes. Color to match membrane.

G. Small Cable Flashing Boots: Provide small size tapered EPDM flashing boots for utility cable penetrations. Boot sized for 1/4” to 2 1/4” equal to Dektite or pre-approved equal.

H. AC Utility Flashing Boots: Provide tapered aluminum or EPDM flashing boots for multiple small utility cable penetrations specifically designed for AC condensing units. See Roof Specialties. Pitch pockets are not allowed.

I. Lap Sealant: Manufacturer's standard, single-component sealant.

J. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.

K. Metal Termination Bars: 1/8” thick by 1” wide steel bar material or aluminum termination bars as provided by manufacturer. Attachment spacing may vary depending upon style of bar and manufacturer’s warranty requirements.

L. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

M. Manufactured Flashing Accessories: Provide manufacturer's standard flashings, such as roof expansion joints, wall expansion joint flashings, roof curb flashings, and other accessories in accordance with manufacturer's requirements for the warranty period indicated.

N. Miscellaneous Accessories: Pourable sealers, preformed vent stack cones and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories in accordance with manufacturer's requirements for the warranty period indicated.

2.5 ROOF INSULATION

A. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, glass-fiber mat Class 1 with facer on both major surfaces. Grade 3 (25 psi density).

B. Minimum Long-Term Thermal Resistance (LTTR) value of 5.7 per inch of thickness.

C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain.

1. Fabricate to saddles and crickets to slope of 1/2 inch per 12 inches unless otherwise indicated.

2.6 INSULATION ACCESSORIES

A. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

B. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:

1. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
2. Full-spread, spray-applied, low-rise, two-component urethane adhesive.

C. Cover Board: ASTM C 1289 Type II, Class 4, Grade 1, 1/2-inch- thick high density polyisocyanurate, with a maximum compressive strength of 110 psi.

1. Note: Provide cover board only if required by manufacturer to meet the warranty period indicated.

2.7 WALKWAYS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkways, approximately 3/16 inch thick, and compatible with membrane roofing system by manufacturer.

1. Pad Size: 30 by 30 inches and approximately 3/16 inch thick.
2. Roll Size: Rolls, approximately 3/16 inch thick, 30 inches wide, and compatible with membrane roofing system by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

3.2 PREPARATION

A. See Section 07 0150 Preparation for Re-roofing.

3.3 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.4 VAPOR RETARDER

A. Vapor Retarder: Ensure substrate board is clean, smooth, dry, and free of sharp edges, loose and foreign materials, oil, grease, and other contaminants. Apply any primers recommended by the manufacturer for the products being installed.

B. Install self-adhering rubberized asphalt membrane vapor retarder for air and vapor control per the manufacturer’s installation requirements.

C. Overlap sheets and seam edges per the manufacturer’s installation requirements to provide a continuous membrane that is capable of providing temporary roof protection.

D. Turn up edges at perimeter and at curbs and roof penetration minimum of 3 inches. Seal all penetrations according to manufacturer’s instructions and drawings.

3.5 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.

C. Install one or more layers of insulation under area of roofing to achieve required thickness. Stagger layers of insulation with joints of each layer offset not less than 12 inches from previous

layer of insulation. Where overall insulation thickness is 2 inches or greater, install 2 or more layers with joints of each succeeding layer staggered not less than 24 inches in adjacent rows, and end joints staggered not less than 12 inches in adjacent rows.

D. Make joints between adjacent insulation boards not more than 1/4 inch in width.

E. Fill gaps exceeding 1/4 inch with insulation.

F. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

G. Provide an average of R-25 unless otherwise indicated. Provide a minimum of 2" insulation at low elevations areas on the roof around the roof drains unless noted otherwise.

H. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows:

1. Prime surface of concrete deck with asphalt primer at rate of 3/4 gal./100 sq. ft. allow primer to dry.
2. Set each layer of insulation in a cold fluid-applied adhesive. (applied above 32 deg F or per manufacturer’s recommendations)

I. Mechanically Fastened and Adhered Insulation: (THIS OPTION ONLY APPLIES IF DECK WILL NOT ACCEPT NEW SUBSTRATE) Roof deck conditions will allow for a combination of mechanically fastened and adhered roof insulation. Apply all top layers under roof membrane by adhering with glue to include tapered sheets. Ensure that mechanical fasteners are never in direct contact with the top membrane.

1. Install bottom layer (only) of insulation to deck using mechanical fasteners designed and sized for fastening specified board-type roof insulation to the deck type provided.
2. Fasten lower layers of insulation to resist uplift pressure at corners, perimeter, and field of roof.
3. Install all consecutive layers of insulation in a cold fluid-applied adhesive per manufacturer’s recommendations.

3.6 ADHERED ROOFING MEMBRANE INSTALLATION

A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.

B. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

C. Bonding Adhesive: Apply bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry. Do not apply bonding adhesive to splice area of roofing membrane.

D. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.

E. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.

F. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation.

G. Lap Sealant: Apply lap sealant and seal exposed cut edges of roofing membrane terminations where required by manufacturer and at other locations as indicated on the Drawings.

H. Repair tears, voids, and lapped seams in roofing that does not meet requirements.

I. Metal Termination Bars: Set termination bars in continuous bed of mastic tape. Attachment spacing may vary depending upon style of bar and manufacturer’s warranty requirements.

3.7 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation.

E. Apply lap sealant and seal exposed edges of sheet flashing terminations.

F. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.8 WALKWAY INSTALLATION

A. Roof-Paver Walkways: Install walkway roof pavers according to manufacturer's written instructions.

1. Install roof paver walkways at the following locations:

a. Perimeter of each rooftop unit and exhaust fan.
b. Other locations as indicated on Drawings.

B. If installing rolled walkways, do not install sections longer than 5 feet leaving a 1/2 inch gap between sections.

C. Install walkway products to substrate with compatible adhesive and in accordance with manufacturer’s recommendations.

3.9 FIELD QUALITY CONTROL

A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.

B. Repair or make known corrections in roofing system prior to contacting Architect for Substantial Completion Inspection.

C. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with Architect’s specified requirements or manufacturer’s warranty requirements.

3.10 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period.

B. Clean overspray, adhesive spillage, sealants and any other spills from the membrane using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 5323

SECTION 07 6200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Formed roof drainage sheet metal fabrications.
2. Formed low-slope roof sheet metal fabrications.

1.2 SUBMITTALS

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

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

1. Include details for forming, joining, supporting, and securing sheet metal flashing and trim, including pattern of seams, termination points, fixed points, expansion joints, expansion-joint covers, edge conditions, special conditions, and connections to adjoining work.

C. Warranty: Sample of special finish warranty.

1.3 QUALITY ASSURANCE

A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

B. Flashings and fasteners shall be designed and installed for maximum wind speed peak gusts of 90 mph measured at 30 meters above ground level.

1.4 WARRANTY

A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide products for the following approved manufacturers:

1. Available Products:

a. ColorKlad by Vincent Materials.
b. PAC-Clad by Peterson Aluminum.
c. UNA-Clad by Copper Sales/Firestone.
d. Others as pre-approved.

2.2 SHEET METALS

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

B. Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process and pre-painted by the coil-coating process to comply with ASTM A 755/A 755M.

1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality. 24 gauge sheet metal, primed on both sides with an acrylic wash coat on the back side. Pre-finished face side shall have a factory installed strippable film for protection during fabrication and installation.

a. Two-Coat Fluoropolymer: AAMA 621. Kynar 500 or equivalent fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat.

2. Color: From manufacturer's standard colors as indicated on the Drawings.

2.3 UNDERLAYMENT MATERIALS

A. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.

B. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. minimum.

2.4 MISCELLANEOUS MATERIALS

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

B. Fasteners: Provide suitable fasteners designed to withstand I-90 design loads and as recommended by manufacturer of primary sheet metal.

1. General: Fasteners or self-drilling screws, gasketed, with hex-washer head.

a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.

2. Concealed fasteners for Zinc-Coated or Galvanized **S**teel: Provide zinc coated or hot-dip galvanized steel roofing nails according to ASTM A 153/A 153M or ASTM F 2329.

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

D. Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.

1. Obtain field measurements for accurate fit before shop fabrication.
2. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

B. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant.

C. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.

D. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

E. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.

2.6 ROOF DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters: Fabricate to cross section indicated, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters.

1. Fabricate from the following materials: Pre-finished Galvanized Steel: 22 gauge thick.
2. Provide gutter clips, spacers, hangers at 16” spacing.

B. Downspouts: Rectangular closed-face with mitered elbows, manufactured from the following exposed metal.

1. Fabricate from the following materials: Pre-finished Galvanized Steel: 24 gauge thick.
2. Size: Rectangular downspouts. Size as indicated on the Drawings.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Roof Edge Flashing and Fascias: Fabricate in minimum 96 inch long, but not exceeding 12 foot long sections. Furnish with 6-inch wide, joint cover plates. Shop fabricate interior and exterior corners.

1. Fabricate from the Following Materials: Pre-finished Galvanized Steel: 24 gauge thick.
2. Fabricate special flashings to match profile indicated in drawing details. Field verify dimensions.

B. Counterflashing: Fabricate from the following materials:

1. Fabricate from the following materials: Pre-finished Galvanized Steel: 24 gauge thick.

PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

A. Felt Underlayment: Install felt underlayment with adhesive for temporary anchorage. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

3.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement so that completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches (300 mm) apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.

5. Install sealant tape where indicated.
6. Torch cutting of sheet metal flashing and trim is not permitted.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action with felt paper, or by other permanent separation as recommended by SMACNA.

1. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.

D. Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws as recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Seal joints as shown and as required for watertight construction.

3.3 ROOF DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.

B. Hanging Gutters: Join sections with riveted and soldered joints or with lapped joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave to firmly anchored gutter spacer clips spaced not more than 24 inches apart. Provide end closures and seal watertight with sealant.

1. Install gutter with expansion joints at locations indicated, but not exceeding, 50 feet apart.
2. Slope gutters to downspouts. Provide separate gutter apron flashing to allow for sloped gutter installation.

C. Downspouts: Secure sections together using screw fasteners. Do not fabricate with any exposed unfinished metal.

3.4 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate.

C. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with sealant.

3.5 CLEANING AND PROTECTION

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

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

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

END OF SECTION 07 6200

SECTION 07 7100 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes the following:

1. Roof and Gutter de-icing systems to include controller unit, sensors and heat cable.
2. Utility Boots.

1.2 SUBMITTALS

A. Product Data: For each type of product and component in the de-icing system.

B. Shop Drawings: Show diagrammatic layout of manufactured roof specialties, including plans and elevations. Identify factory vs. field-assembled work. Provide controller/power panel information to include data sheet and wiring diagram.

1.3 QUALITY ASSURANCE

A. Manufacturers' Qualifications: Manufacturer to be ISO-9001 registered and show minimum of ten (10) years experience in manufacturing electric self-regulating heating cables.

B. Installer Qualifications: System installer shall have complete understanding of product and product literature from manufacturer or authorized representative prior to installation. Electrical connections shall be performed by a licensed electrician.

C. Electrical Requirements: The system (heating cable, connection kits, and controller) shall be UL Listed, CSA Certified and FM Approved for roof and gutter de-icing.

D. Electrical Components, Devices, and Accessories: Listed and labelled as defined in NFPA 70 by a Nationally Recognized Testing Laboratory and marked for intended use.

1.4 WARRANTY

A. Roof and Gutter De-icing System: Provide manufacturer's standard ten (10) year limited warranty for heating cables. Provide manufacturer's standard one (1) year warranty for system controller unit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following manufacturers;

1. nVent RayChem Roof & Gutter Deicing Systems – (Basis of Design)
   15375 Memorial Dr., Houston nTX 77079 Ph: 800-545-6258
   Local: PowerCon Company, Phone: 402-895-6697.
   National: Pentair Thermal Management, LLC, Phone: (800) 545-6258
   7433 Harwin Drive, Houston, TX 77036
2. Danfoss Heating: (Electric Heating Division).
   Phone: (888) 676-8062, Email: Heating.TS.Electric.NA@Danfoss.com
3. Delta-Therm Corporation.
   6711 Sands Road Suite A, Crystal Lake, IL 60014
   Phone: 800-526-7887, (847) 526-2407, Fax (847) 526-4456.
4. Thermon Heat Trace Systems
   Local: Jasper Engineering, Medina MN, Phone: (800)-776-6184.
   Regional: Pentair Thermal Management, LLC, Phone: 913-396-2085
   13424 W 105th Terrace, Overland Park, KS 66215
5. Others as pre-approved.

2.2 ROOF AND GUTTER DE-ICING SYSTEM

A. System Performance Requirements: Provide a complete self regulated roof and gutter heat cable system for roof and gutter de-icing with ambient and moisture sensing control, snow sensing control, indoor mounted contoller unit for system monitoring, with integrated ground-fault circuit protection. Coordinate installation in conjunction with Owner provided electrical power. Provide to complete vertical runs of heating cable as shown on the Drawings.

B. Basis of Design: nVent Raychem IceStop self-regulating heating cable as manufactured by RayChem Thermal Management as owned by nVent.

C. Heat Cables: Equal to GM-1X IceStop self –regulating, 120V heating cable with polyolefin jacket and continuous conductive core. Cable shall be capable of field cutting and splicing.

D. Cable Fasteners: Manufacturer's standard roof clips for EPDM roof applications. Use only adhesive mounting for clips. Penetrating fasteners are not allowed.

E. Sensors: Moisture Sensors equal to: GIT-1 combination moisture and temperature for gutter mounting with a set point of 38 deg.F. Snow Sensors equal to: CIT-1 aerial snow sensor, calls for snow melting with a set point of 38 deg.F.

F. Controller: Automatic Snow and Ice Melting system controller equal to APS-3C Snow Controller for min. 2 sensors, 120 volt, 30 amp. rating, in manufacturer's standard box housing for wall mounting.

F. Power Connection Kit: Equal to FTC-P with End Seal Kit for use with IceStop cable.

G. Power: 120 volt dedicated power circuit with 20 amp (min) to 30 amp. breaker to each controller, wiring back to nearest power distribution panel. Contractor to verify wiring run distance.

H. Accessories: Provide manufacturer's standard splicing, gutter sensors, hanging in downspouts, and lighted end seals (to be visible at downspout discharge).

2.2 UTILITY SLEEVE PENETRATION CURBS

A. Provide tapered aluminum or EPDM flashing boots for multiple small utility cable penetrations specifically designed for AC condensing units. Boot cap sized for four 3/8" to 1 1/4" pipes.

B. Available Manufacturers:
1. L-Arden: www.L-ARDEN.com
2. Mara-Boot by Marathon.
3. Architect pre-approved equivalent.

C. Basis-of-Design Product: L-Arden. Manufacturer's standard pipe sleeve curb cap for multiple utility penetrations. Verify and provide roof curbs sized to fit manufacturer's standard curb cap.

D. Curb components shall include the following:

1. Prefinished metal or molded PVC cap. Boot cap sized for four 3/8" to 1 1/4" pipes.
2. Optional separate molded EPDM rubber cap provide a flexible seal at each penetration.
3. Integral pipe sleeves with graduated boots in varying sizes.
4. Pipe sleeve combinations based upon job site conditions
5. Stainless steel pipe clamps for each utility penetration boot.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, separators, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Fasteners: Manufacturer's recommended fasteners, suitable for application.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install manufactured roof specialties according to manufacturer's written instructions. Anchor manufactured roof specialties securely in place and capable of resisting forces specified in performance requirements. Use fasteners, separators, sealants, and other miscellaneous items as required to complete manufactured roof specialty systems.

1. Install manufactured roof specialties with provisions for thermal and structural movement.

B. Install manufactured roof specialties level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil-canning, buckling, or tool marks.

C. Install manufactured roof specialties to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.

D. Fasteners: Use fasteners of type and size recommended by manufacturer but of sizes that will penetrate substrate not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.

3.2 ROOF AND GUTTER DE-ICING SYSTEM

A. Install and secure electric heating cable according to the manufacturer's instructions. The installer shall be responsible for providing a complete functional system, installed in accordance with applicable local electrical requirements.

B. Install a dedicated power circuit to each controller, wiring back to nearest power distribution panel in accordance with applicable state and local electrical codes.

C. Install roof cables with adhesive clips in a loop pattern on the roof membrane areas as shown on the Drawings or as required by the manufacturer.

D. Provide single cable run down into gutters terminating at discharge pre manufacturer's installation requirements. Provide a lighted end seal termination at the point of discharge for visual monitoring.

E. Install heat cable, cable connector kits, sensors, and all system accessories as shown on the Drawings or as required by the manufacturer.

F. Grounding of controller unit and other system accessories shall be meet NEC wiring requirements and other applicable code electrical requirements.

G. Provide training to owner's staff and provide manufacturer's Operation Manual upon completion.

3.3 FIELD TESTING AND INSPECTION

A. The system shall be installed and tested in accordance to the manufacturer's installation and operation manual.

B. Provide field testing and start up inspections by a factory technician or factory representative per the manufacturer's start up requirements.

C. Document field testing results in a recorded report presented to the Owner.

3.4 UTILITY SLEEVE PENETRATION CURBS

D. Boot curbs shall be installed and flashed in accordance to the manufacturer's installation instructions. Install any additional blocking or accessories as needed to provide a complete system installation.

1. Provide stainless steel pipe clamps and water cut off mastic for each utility penetration.

END OF SECTION 07 7100

SECTION 07 7200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

1. Section includes Roof Pipe Supports.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data, including installation instructions.

B. Shop Drawings: Submit manufacturer's shop drawings indicating dimensions, materials, hardware, and installation layout including sizes and spacing.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage and Handling Requirements:

1. Store and handle materials in accordance with manufacturer's instructions.
2. Keep materials in manufacturer's original, unopened containers and packaging until installation.

PART 2 - PRODUCTS

2.1 ROOF PIPE SUPPORTS

A. Products: Equal to PipeGuard by OMG Roofing Products, Ph: 800-633-3800.

1. Others as pre-approved.

B. Rooftop Pipe Supports: Provide manufactured pipe supports made from weather resistant EPDM, designed to set freely on roof, installs without fasteners or accessory hardware. Provide supports sized to fit snug around pipe and wrap partially over top of pipe to retain in place.

C. Model: Small.

1. Material: Smooth, flexible, black, EPDM rubber.
2. Protects roof system from damage due to movement.
3. Pipe Support Height: 3-1/2 inches (90 mm).
4. Drainage Slots: Prevent pipes from sitting in standing water.

5. Supports Nominal Pipe Size: 3/4 inch to 2 inches (20 mm to 50 mm).
6. Maximum Load Capacity per Support: 650 lbs (295 kg).

D. Pipe Support Accessories: Provide rubber riser base pads under pipe supports where pipe height requires shimming.

PART 3 - EXECUTION

3.1 ROOF PIPE SUPPORTS

A. General: Install rooftop pipe supports in accordance with manufacturer's instructions at locations indicated on the Drawings.

B. Spacing of Rooftop Pipe Supports:

1. Pipe Diameters 2 inches to 5 inches: Space maximum 8 feet apart.

END OF SECTION 07 7200

SECTION 07 9200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes joint sealants for the following applications:

1. Exterior joints on vertical and horizontal surfaces.

1.2 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

1.3 SUBMITTALS

A. Product Data: Provide product certificates, compatibility and adhesion test reports for each joint-sealant product indicated.

B. Color Samples: Submit color charts or actual samples for the color of joint sealant required.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealant:

1. Match adjacent concrete or masonry materials.

2.3 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

C. Single-Component Nonsag Urethane Sealant: Application: Exterior horizontal and vertical joints between different materials.

1. Type and Grade: S (single component) and NS (nonsag).
2. Class: 25.
3. Uses Related to Exposure: T (traffic). Uses Related to Joint Substrates: M, and O as applicable to joint substrates indicated.

4. Available Products:

a. Bostik Findley Inc.
b. Pecora Corporation; Dynatrol I-XL.
c. Polymeric Systems Inc.
d. MasterSeal Sonneborn: NP-1.
e. Tremco; DyMonic.
f. Tremco; Vulkem 116.
g. Others as pre-approved.

2.4 SOLVENT-RELEASE-CURING JOINT SEALANTS

A. Butyl-Rubber-Based Joint Sealant: ASTM C 1311.

B. Available Products:

a. Bostik, Inc.
b. DAP Products, Inc.
c. Pecora Corporation.
d. Tremco Incorporated.
e. Others as pre-approved.

2.5 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or

harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. 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.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants.

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant.

a. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.

b. Existing Work: Mechanically remove existing sealant. Clean joint surfaces of residual sealant and other contaminates capable of affecting sealant bond to joint surface. Allow joint surfaces to dry before installing new sealants.

B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2 INSTALLATION

A. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

B. For exterior sealants, the temperature must be 40°F (5°C) or above at the time the sealant is applied.

C. Install sealants using proven techniques that comply with the following:

1. Install joint backing to maintain the following joint ratios:

    a. Joints up to 1/2 inch wide: 1:1 width to depth ratio.

2. Place sealants so they directly contact with joint substrates.
3. Completely fill recesses in each joint configuration.
4. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

D. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

E. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

F. For polyurethane sealants, tool clean up and excess sealant smears can be removed with xylene or mineral spirits.

END OF SECTION 07 9200

SECTION 09 9113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes surface preparation and the application of paint systems on the following exterior substrates:

1. Concrete.
2. Steel.
3. Galvanized metal.
4. Wood.
5. Stucco.

1.2 SUBMITTALS

A. Product Data: For each type of product. Include recommended primers, preparation requirements, and application instructions.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products by the following:

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

a. Behr Paint Company.
b. Benjamin Moore &Co.
c. Diamond Vogel.
d. PPG Paints.
e. Pratt & Lambert.
f. Rust-Oleum Corp.
g. Sherwin-Williams Company.
h. Others as pre-approved.

C. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another to include substrates and sealants as indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. Do not paint over colored sealants or sealants that are not paintable products.

D. Colors: As selected or pre-selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Wood: 15 percent.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.

B. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

C. New surfaces should be fully primed, and previously painted surfaces may be primed or spot primed as necessary.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."

B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections.

3.4 CLEANING AND PROTECTION

A. Protect adjacent work against damage from paint application.

B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

A. Steel Façade Signage Panel:

1. Acrylic Paint System: (Equal to Behr E600.)

a. Topcoat: Two coats sand motif exterior acrylic (flat sheen).
b. Option to use sand additive to an appropriate base paint.

B. Other Steel Substrates:

1. Alkyd Enamel System:

a. Prime Coat: Alkyd anticorrosive metal primer. MPI #79.
b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
c. Topcoat: Exterior alkyd enamel (satin gloss). MPI #94.

C. Galvanized-Metal Substrates:

1. Alkyd Enamel System:

a. Prime Coat: Cementitious galvanized-metal primer.
b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
c. Topcoat: Exterior alkyd enamel (satin-gloss). MPI #94.

D. Exterior Wood Panel Substrates:

1. Latex System:

a. Prime Coat: Exterior latex wood primer.
b. Intermediate Coat: Exterior latex matching topcoat.
c. Topcoat: Exterior latex (flat).

E. Other Substrates: Provide primer and topcoats in accordance with manufacturer’s recommendations.

END OF SECTION 09 9113