SECTION 04 01 00
MAINTENANCE OF MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Repointing of all defective mortar joints in brick work.

B. Water and chemical cleaning of all brick surfaces.

C. Applying water repellant on all brick surfaces.

D. Replacing all defective bricks.

E. Cutting masonry and mortar joints and installing new "rake and seal" joints at all brick to concrete joints and where designated. Installing new weeps at 32 inches on center at bed joints where masonry abuts concrete and at lintels, ledge angles, and other locations where designated.

F. Installing new masonry control joints at designated locations, with sealant specified in Section 07 92 00 Joint Sealants.

G. Crack stitching designated cracks in stone, brick, and concrete, and patching designated concrete with concrete patch.

H. Installing weeps at 16 inches on center at designated openings, minimum 3 per opening, and removing existing sealant from weep joint at lintel, and repointing of joint.

I. Removing and replacing designated steel lintels, specified in Section 05 50 00 Metal Fabrications.

J. Cleaning, preparing, and painting all steel lintels and designated metal items with paint specified in Section 09 90 00 Painting and Coating.

K. Removing existing metal panel cover and infilling opening with brick.

L. Removing all sealant joints at perimeters of all windows, doors, louvers, and other penetrations of exterior walls, and installing new sealant joints at perimeter of same. Sealant specified in Section 07 92 00 Joint Sealants.

M. Remove and re-install all items that would interfere with the proper execution of work unless noted otherwise.

N. Miscellaneous items not specifically listed or shown on drawings but required for proper completion of Work.

1.02 DEFINITIONS

A. Defective Mortar Joints: Joints that are open, unsound, soft, loose, cracked (larger than.016 in.), broken, eroded more than 1/4 inch, crumbly or otherwise disintegrated mortar that would impair its proper performance.

B. Defective Brick: Brick that is unsound, cracked, broken, spalled, crazed, effloresced, or otherwise deteriorated that would impair its proper performance.

C. Defective Sealant Joints: Joints exhibiting loss of water tightness, degradation, weather checking, brittleness, loss of elasticity, improper material, improper installation, adhesion failure or detachment, cohesion failure or tears, excess compression causing sealant to bulge, or any other defect that would impair its proper performance.

1.03 UNIT PRICES

A. See Section 01 22 00, Unit Prices, for description of unit prices. Base Bid Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work and the Unit Prices bid for each category of work will determine the amount of adjustment of payment, up or down.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week prior to commencing work of this section.

1. Require attendance of parties directly affecting work of this section.
2. Review conditions of installation, installation procedures, and coordination with related work.

1.05 SUBMITTALS

A. See Division One, for submittal procedures.

B. Manufacturer's Product Data and Installation Instructions: Cleaning chemicals and water repellent: Provide data including product composition, test data, special preparation requirements, special precautionary measures, complete installation instructions and all other applicable application instructions.

C. Samples: Provide individual brick and stone samples, that illustrate full range of color and texture of brick and stone being replaced.

D. Reports: Submit reports on mortar indicating conformance of component mortar materials to requirements of ASTM C 270 and test and evaluation reports per ASTM C 780.

E. Product Data Mortar: Include design mix using the Proportion specification of ASTM C 270.

F. Restoration Company Qualifications: See 1.06, Quality Assurance.

G. Worker Qualifications: See 1.06, Quality Assurance.

H. Access, landscape and roof protection plan: Submit detailed written plan of how landscaping and roofing will be protected during construction operations and how construction will be accessed.

I. Contractor Work Plan: Submit detailed written plan indicating staging, access, protection, staffing and general work flow related to how work is proposed to be completed.

J. Manufacturer's Instructions: For cleaning materials, indicate special procedures, conditions requiring special attention.

1.06 QUALITY ASSURANCE

A. Comply with ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures and Related Commentaries; American Concrete Institute International; 2011.except where exceeded by requirements of the contract documents.

B. Comply with the Brick Industry Association Tech Notes publication Number 46, and the contract documents, whichever is most stringent.

C. Restoration Company Qualifications: Company specializing in masonry restoration with minimum five years of documented experience. Submit list of a minimum of five (5) similar completed projects with names and telephone numbers of contact person.

D. Restoration Worker Qualifications: Submit list of a minimum of five (5) similar completed projects with names and telephone numbers of contact person. Indicate the responsibilities of workers assigned to this project.

1.07 MOCK-UP

A. Clean and repoint an existing masonry wall area sized 8 feet long by 6 feet high; include in mock-up area instances of mortar.
   1. Repeat, using different cleaning methods for up to three different panels.

B. Use tools, methods and products that will be used on actual work. If it can not be successfully demonstrated to the satisfaction of the Owners Project Representative that power tools can be used to accomplish work without damage to adjacent materials, then hand tools will be required to perform work.

C. The masonry mockups shall demonstrate the minimum standard for the following:
   1. Repointing of stone.
   2. Rebuilding of brick
   3. Repointing of brick.
   4. Patching of concrete.
   5. Coating of stone.

6. Cleaning and sealing of stone.
7. Cleaning and sealing of brick.
8. Sealant joints specified in Section 07 92 00 Joint Sealants.
9. Cleaning and painting steel lintels designated to remain, specified in Section 09 90 00 Painting and Coating.

D. Locate where directed.

E. Acceptable panel and procedures employed will become the standard for work of this section.

F. Mock-up may remain as part of the Work.

G. Mock-up must be completed and approved before start of construction.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver masonry neatly stacked and tied on pallets. Store clear of ground with adequate waterproof covering.

B. Store restoration cleaner and water repellent materials in manufacturer's packaging.

1.09 FIELD CONDITIONS

A. Cold and Hot Weather Requirements: Comply with requirements of ACI 530.1/ASCE 6/TMS 602 or applicable building code, whichever is more stringent.

B. Protect landscaping and lawns from construction operations in a manner acceptable to Owners Project Representative.

C. Protect liquid materials from freezing.

D. Do not apply cleaner or water repellent when ambient temperature is lower than 50 degrees F or higher than 100 degrees F, or in any circumstances exceeds the manufacturers recommended environmental conditions for application.

E. Do not cut, grind, clean, seal or use process creating dust, dirt or airborne liquid when wind is over 10 mph, unless special precautions approved by the Owners Representative are implemented to prevent adjacent non-project related damage.

F. Coordinate all noisy or dirty operations closely with Owners Representative.

PART 2 PRODUCTS

2.01 BRICK UNITS

A. Facing Brick: Match existing brick adjacent to masonry being restored.

2.02 CLEANING MATERIALS

A. Manufacturers:
1. Basis of Design: PROSOCO; Product listed below: www.prosoco.com.
2. Diedrich Technologies, Inc: www.diedrichtechnologies.com.
3. HMK Stone Care System: www.hmkstonecare.com.
4. Substitutions: See Division One.

B. Brick Cleaning Agent: PROSOCO Light and Heavy Duty Restoration.

C. Stone Pre- Wash: PROSOCO 766 Limestone and Masonry Pre-Wash.

D. Stone After- wash: PROSOCO Limestone and Masonry After-Wash.

2.03 WATER REPELLENT

A. Water Repellent for Stone: PROSCO Natural Stone Treatment WB.

B. Water Repellent for Brick: PROSOCO Siloxane WB/PD.

2.04 MORTAR MATERIALS

A. Portland Cement: ASTM C150, Type I.
1. Not more than 0.60 percent alkali.

B. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.

1. Color(s): As required to match existing adjacent mortar. Adjust proportions as required by field conditions.

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

D. Mortar Aggregate: ASTM C 144.

E. Water: Clean and potable.

2.05 STONE / CAST STONE / CONCRETE PATCH

A. Cathedral Stone Products, Inc.; Jahn; Product M90-VG,HG, Concrete Repair Mortar; www.cathedralstone.com http://www.cathedralstone.com.

B. Color: Match adjacent surface of stone, cast stone, or concrete being repaired.

C. Substitutions: See Division One.

2.06 FLASHINGS

A. Drip Edge Flashing Specified in Section 07 62 00 Sheet Metal Flashing and Trim.

2.07 ACCESSORIES

A. Weeps: Polyethylene tubing.
   1. Manufacturers:
      a. Basis of Design: Hohmann & Barnard, Inc; Product #341 W/S: www.h-b.com.
      b. Substitutions: See Division One.

B. Crack Stitching Materials: Helical stainless steel bars grouted into designated joints.
   1. Manufacturers: Helifix; www.helifix.com.
      a. Products:
         1) 6mm, stainless steel HeliBar x length shown on drawings.
         2) HeliPrimer WB.
         3) HeliBond Grout.
      b. Substitutions: See Division 1.

2.08 MORTAR MIXES

A. Mortar for Unit Masonry: ASTM C 270, Proportion Specification.
   1. Exterior, loadbearing and non-loadbearing masonry: Type N.

2.09 MORTAR MIXING

A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C 270 and in quantities needed for immediate use.

B. Maintain sand uniformly damp immediately before the mixing process.

C. Do not use anti-freeze compounds to lower the freezing point of mortar.

D. If water is lost by evaporation, re-temper only within two hours of mixing.

E. Colored Mortar: Proportion selected pigments and other ingredients to match existing adjacent mortar without exceeding manufacturer's recommended pigment-to-cement ratio; mix in accordance with manufacturer's instructions; uniform in coloration.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces to be cleaned and restored are ready for work of this section.

3.02 PREPARATION

A. Protect surrounding elements from damage due to restoration procedures.

B. Carefully remove and store removable items located in areas to be restored that interfere with the work. Reinstall upon completion.

C. Verify joint sealants are installed and cured.

D. Verify surfaces to be coated with water repellent are dry, clean, and free of efflorescence, oil, or other matter detrimental to application of water repellent.

E. Separate areas to be protected from restoration areas using means adequate to prevent damage.

F. Protect existing landscaping in accordance with approved landscape protection plan.

G. Mask immediately adjacent surfaces with material that will withstand cleaning and restoration procedures.

H. Protect roof membrane and flashings from damage with 1/2 inch plywood laid over 1 inch polystyrene on roof surfaces over full extent of work area and traffic route in accordance with submitted plan. Other protection means may be used ONLY when requested in writting and approved in writing by Owners Representative.

I. Take precautions to avoid harm to building occupants, pedestrians and autos.

J. Construct covered pedestrian safe walkways in areas of pedestrian traffic.

K. When using cleaning methods that involve water or other liquids, install drainage devices to prevent runoff over adjacent surfaces unless those surfaces are impervious to damage from runoff.

3.03 REBUILDING

A. Cut out damaged and deteriorated masonry with care in a manner to prevent damage to any adjacent remaining materials.

B. Support structure as necessary in advance of cutting out units.

C. Cut away loose or unsound adjoining masonry and mortar as directed.

D. Mortar Mix: Colored and proportioned to match existing work.

E. Ensure that anchors and ties are correctly located and built in. Secure anchors to masonry back-up to bond veneer at maximum 1.77 sq ft of wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

F. Install built in masonry work to match and align with existing, with joints and coursing true and level, faces plumb and in line. Build in all openings, accessories and fittings.

3.04 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Brick Units
   1. Bond: Match existing. Cut bricks where required to match existing bond.
   2. Coursing: Match existing.
   3. Mortar Joints: Match existing.

3.05 REPAIR (CRACK STITCHING)

A. Perform installation of all crack stitching components in accordance with the manufacturers recommendations.

B. Cut out designated joints to a depth of approximately 1-1/2 inch.

C. After cleaning out joints, prime with primer.

D. Install approximately 1/2 inch layer of manufacturers grout and then insert HeliBar embedding into joint with another layer of approximately 1/2 inch of manufacturers grout.

E. Allow to cure.

F. Finish pointing with grout flush to adjacent surface. Match adjacent texture and finish of wall as closely as possible.

3.06 STONE / CAST STONE / CONCRETE PATCHING

A. Mix approximately 5 to 5-1/2 parts powder to 1 part powder to 1 part water by volume, depending on temperature and humidity. Add the powder to the water slowly. Continue mixing until the mortar is thoroughly mixed and is the approximate consistence of damp sand.
   1. Preparation: Prepare surfaces in accordance with Manufacturer's instructions. Surfaces to receive Concrete Repair Mortar must be sound and free of dust, dirt, grease, laitance and any other coating or foreign substance that would prevent proper adhesion. Remove all loose and deteriorated concrete from the repair area a minimum of 1/4 inch deep. Follow the direction of the crack being repaired using manual or pneumatic cutting techniques with square cut edges in accordance with the manufacturers installation instructions. Do not feather the edges of repair.
   2. Application: Apply in accordance with Manufacturer's instruction.
      a. Moisten with substrate using clean water. Apply to a glistening wet surface. Do not allow surface to dry out.
      b. Mix the mortar to the consistency of wet putty. Apply to the glistening wet substrate approximately 1/8 inch thick. Do not allow this coat to dry out prior to the application of the 5:1 mix.
      c. Build up the 5:1 material beyond the surface of the substrate. After achieving initial set, scape away excess mortar until profile is flush with adjacent surfaces.
   3. Curing and Clean Up: Cure and clean up in accordance with Manufacturer's instructions.
      a. Periodically mist repairs using clean water for at least a 72 hour period in accordance with manufacturer's instructions.
      b. Remove uncured mortar from the perimeter of repair before it dries using clean water and a rubber sponge. Repeat several times to prevent staining of adjacent material

3.07 REPOINTING

A. Inspect the entire building as the work progresses and field verifying locations and quantities of work to be performed. As work is identified and performed, provide lifts or other acceptable means of access to the work and notify Owners Representative for verification of quantities of work completed.

B. Perform repointing prior to cleaning masonry surfaces.

C. Cut out all mortar in joints to minimum 3/4 inch depth; maximum 1 inch depth or until sound mortar is reached. Cut out with a maximum 1/8 inch blade run through the center of the joint if approved in mock- up. Chip out remainder of mortar adjacent to the masonry using hand tools, unless it can be demonstrated that larger blade may be used with out damaging adjacent masonry in approved mock- up.

D. Use power tools only after test cuts determine no damage to masonry units will result.

E. Do not damage masonry units.

F. When cutting is complete, remove dust and loose material by brushing or with air jet.

G. Premoisten joint and apply mortar. Pack tightly in maximum 1/4 inch layers. Form a smooth, compact concave joint to match existing.

H. Moist cure for 72 hours.

3.08 SEALANT JOINTS

A. Sealant Joints: Carefully cut out mortar and sealant joints designated to receive new sealant. Cut to a minimum depth of 3/4", or to sound mortar. If deeper than 3/4", repoint with mortar up to a depth of 3/4" from the masonry surface. Clean void of all old sealant, loose particles and dust, in preparation to receive sealant specified in Section 07 92 00 Joint Sealants.

3.09 CHEMICAL CLEANING OF MASONRY

A. Before full-scale application of cleaning products begins, review manufacturers application data to determine suitability of cleaning of specific materials and surfaces. Apply cleaner to test area to determine optimum dwell time, compatibility, effectiveness, rinsing and other pertinent application procedures that would affect the effectiveness of the cleaning operations with

respect to desired results. Use the least caustic materials and methods required to produce desired results. Allow test areas to dry thoroughly before evaluating the final results with the Architect and Owner's Project Representative.

B. Apply cleaner in accordance with manufacturers recommendations. If improvements are necessary to achieve proper cleaning of surfaces, alternate cleaning methods may be used only with approval of the Owners Project Representative and the Architect.

C. Clean surfaces and remove large particles with wood scrapers or non-ferrous wire brush.

D. Spray coat each type masonry with cleaning agent, mixed into solution in accordance with manufacturer's instructions and tested on approved mock up panels.

E. Provide a second application if required to match mock-up area.

F. Allow sufficient time for solution to remain on masonry and agitate with soft fiber brush or sponge.

G. Rinse from the bottom up with potable water applied at recommended rate of 400 psi and at a rate of 4 gal/min.

H. Immediately after rinsing limestone and masonry prewash agent from masonry surface, apply the limestone and masonry afterwash in accordance with the Manufacturers installation instructions.

I. Pressure rinse from the bottom of the treated area to the top with potable water applied at rate of 400 psi and at a rate of 4 gal/min. Make sure to cover each portion of the masonry surface with a concentrated stream of water. To avoid streaking, keep wall surfaces immediately below area being cleaned running wet and free of cleaner rundown and residue

3.10 AGING

A. Rub in new masonry work to match, as close as possible, adjacent original work.
   1. Use carbon black in small amounts, rubbing in well with burlap rags.

B. After each application, dust off surplus and wash down with low pressure hose. Allow surface to dry before proceeding with succeeding applications.

C. Continue process until acceptance.

3.11 WATER REPELLENT APPLICATION

A. Provide manufacturer's field service representative to inspect preparation and application work for at least 3 hours on first day to ensure that manufacturer's "best practices" for preparation and application are being followed.

B. Apply water repellent in accordance with manufacturer's instructions, using procedures and application methods recommended as producing the best results.

C. Apply at rate recommended by manufacturer, continuously over entire surface.

D. For vertical application, apply "wet-on-wet" to a visibly dry and absorbent surface.

E. For spray application, saturate from the bottom up creating a 4"- 8" rundown below the spray contact point. Let the first application penetrate for 5-10 minutes. Re-saturate.

F. For Brush or roller application, saturate uniformly. Let penetrate for 5-10 minutes. Brush out heavy runs and drips that don't penetrate.

G. For horizontal application, saturate in a single application. Use enough to keep the surface wet for 2-3 minutes before penetration. Brush out puddles until they soak in.

H. For dense surface application, apply a single coat. Use enough to wet the surface without creating drips, puddles or rundown. Do not over apply. Test for application rate.

I. Protect treated surfaces from rainfall for a minimum of six hours following treatment.

J. Apply water repellent in accordance with manufacturers installation instructions, using procedures and

3.12 CLEANING

A. Immediately remove stains, efflorescence, or other excess resulting from the work of this section.

B. Remove excess mortar, smears, and droppings as work proceeds and upon completion.

C. Clean surrounding surfaces.

D. Clean all windows after all work is completed to polished, streak free condition.

END OF SECTION