BAR DOWN STUDIO

SECTION 040342 - HISTORIC STONE MASONRY REPAIR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Stone trim including the following:
   a. Coping.
   b. Embedded flashing.

1.3 REFERENCE STANDARDS

A. ASTM C503, Standard Specification for Marble Dimension Stone (Exterior).

B. ASTM C97, Standard Test Method for Absorption and Bulk Specific Gravity of Dimension Stone.

C. ASTM C99, Standard Test Method for Modulus of Rupture of Dimension Stone.

D. ASTM C119, Standard Terminology Relating to Dimension Stone.

E. ASTM C170: Standard Test Method for Compressive Strength of Dimension Stone.

F. ASTM C1354, Standard Test Method for Strength of Individual Stone Anchorages in Dimension Stone.

G. ANSI A41.1, American Standard Building Code Requirements for Masonry (NBS Miscellaneous Publication 211).

1.4 ACTION SUBMITTALS

A. Product Data: For each type of natural stone.

B. Shop Drawings: Showing general layout, jointing, anchoring, stone thickness, and such other pertinent information. Drawings shall show all bedding, bonding, jointing, and anchoring details along with the net piece dimensions of each marble unit.

C. Samples for Initial Selection:

1. Submit three (3) stone and finish samples not less than 12” square for each stone type required, together with Manufacturer’s technical data for each stone, showing full range of color, texture, grain, veining, and finish to be expected. Where necessary to show variations in color and markings, larger samples or range sets of samples should be submitted.
   a. If marble is to be matched, a minimum of two sets each containing four matched samples showing proposed veining and range of color in each set must be supplied. Samples designating finished face shall be clearly labeled on the back with the name of the marble, the group classification for soundness, and the use for which the marble is intended.

2. Submit six (6) cured sample mortar strips as specified in this Section, for each different type/finish color of mortar to be used.

D. Samples for Verification: For the following:

1. Full-Size Samples: For each shape of stone unit required.
   a. Make available for Architect's review at Project site.

2. For mortar. Make Samples using same sand and mortar ingredients to be used on Project. Label Samples to indicated types and amounts of pigments used.
3. Approved Samples may be installed in the Work.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Material Test Reports: For each type of natural stone indicating compliance with Specifications.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Engage a firm with a minimum of 10 years successful experience in the fabrication and installation of stone of similar sizes, shapes, and finishes to the units required for this project, and which has ample production facilities to produce, furnish, and supply the quantity of units as required for installation without delay to the work.

1. Firm shall be Accredited by Natural Stone Institute as a Commercial A Contractor or Commercial B Contractor.

B. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

C. Source Limitations for Stone: Obtain stone units through single source from single fabricator.

1. All marble shall be obtained from quarries having adequate capacity and facilities to meet the specified requirements, and by a firm equipped to process the material promptly on order and in strict accord with specifications. The Specifying Authority (architect, designer, engineer, contracting officer, end user, etc.) reserves the right to approve the Material Supplier prior to the award of this contract. Stone and workmanship quality shall be in accordance with Industry Standards and Practices as set forth by the MIA.

D. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

F. Defective Work: Any piece of marble or onyx showing flaws or imperfections upon receipt at the storage yard or building site shall be referred to the Specifying Authority for determination as to responsibility and decision as to whether it shall be rejected, patched, or redressed for use.

G. Repairing Damaged Stone: Small chips at the edges or corners of marble may be patched provided the structural integrity of the stone is not affected and the patch matches the color and finish of the marble so that the patch does not detract from the stone’s appearance.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Coordinate delivery of stone to avoid delaying the Work and to minimize the need for on-site storage.

B. Pack, handle, and ship stone units in suitable packs or pallets.

1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move stone units, if required, using dollies with wood supports.
2. Store stone units on wood skids or pallets with nonstaining, waterproof covers, securely tied. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.

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

D. Store mortar aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

1.8 PROJECT CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and above and will remain so until stone has dried, but no fewer than seven days after completing cleaning.

B. Hot-Weather Requirements: Comply with hot-weather construction requirements in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MARBLE

A. General: All marble shall be of kind or kinds shown on the Architect's drawing or as specified herein, conforming to or within the range of approved samples and in accordance with the characteristics and working qualities set forth under their respective Soundness Group Classifications, A, B, C, or D, as defined by the Marble Institute of America. Care shall be taken in selection to produce as harmonious effects as possible. Patching and waxing, where permitted under the Marble Institute of America Group Classifications, shall be carefully done to conform to the marble's general character and finish. Texture and finish shall be within the range of sample(s) approved by the Architect.

B. Material Standard: Comply with ASTM C503.

1. MIA Soundness Classification: Group A.

2.2 MARBLE UNITS

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

1. A. Ottavino Corp.
2. International Dimensional Stone.
3. Petrillo Stone Corporation.

B. Description:

1. Vermont Quarries Corp.; Olympian White Danby (Mountain White).
   a. Color: Uniform fine-grained, white to match existing.
   b. Finish: Honed.

C. Fabrication:

1. All stones shall be cut accurately to shape and dimension required with jointing to match existing. All exposed faces shall be dressed true. Beds and joints shall be at right angles to the face.

2.3 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.

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

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.
4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

E. Water: Potable.

2.4 MORTAR MIXES

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

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

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

1. Bedding Mix: one 1 part portland cement, 1/2 part lime, and 4-1/2 parts sand.
   a. The bedding mix is subject to approval by the Architect for color and texture match.

2. Grout: 1 part portland cement, 2-1/2 parts sand.
   a. Grout shall be made with the same cement and sand used in bedding mix. Hydrated lime may be added (up to 15% volume) to insure workability.
   b. Grout used to set reinforcing bars shall have a minimum compressive strength of 2000 psi.

2.5 ACCESSORIES

A. Anchors: Type and size indicated, fabricated from Type 304 stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666.

B. Dowels: 1/2-inch- (12-mm-) diameter, round bars, fabricated from Type 304 stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666.

C. Setting Shims: High-impact plastic.

D. Lead Tee Joint Closures:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Litsco
   b. Nuclead Co, Inc.
   c. Weathercap, Inc.

2.6 MORTAR MIXES

A. Comply with requirements in Section 042000 "Unit Masonry" for mortar mixes.

B. Do not use admixtures including pigments, air-entraining agents, accelerators, retarders, water- repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Use portland cement-lime mortar unless otherwise indicated.

C. Comply with ASTM C 270, Proportion Specification.

1. For setting mortar, use Type S.

2.7 EMBEDDED FLASHING

A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:

1. Copper: ASTM B 370, Temper H00, cold-rolled copper sheet, 16-oz./sq. ft. (4.9-kg/sq. m) weight or 0.0216 inch (0.55 mm) thick or ASTM B 370, Temper H01, high-yield copper sheet, 12-oz./sq. ft. (3.7-kg/sq. m) weight or 0.0162 inch (0.41 mm) thick.
2. Fabricate continuous flashings in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.7 m). Provide splice plates at joints of formed, smooth metal flashing.
3. Fabricate through-wall metal flashing embedded in masonry from copper, with ribs at 3-inch (76-mm) intervals along length of flashing to provide an integral mortar bond.
4. Fabricate through-wall flashing with snaplock receiver on interior face where indicated to receive counterflashing.
5. Fabricate through-wall flashing with drip edge where indicated. Fabricate by extending flashing 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
6. Solder metal items at corners.

2.8 SOURCE QUALITY CONTROL

A. Engage a qualified independent testing agency to sample and test stone units according to ASTM C 503.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

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

3.2 PROTECTION

A. Protect windows, doors and frames, hardware, trim and other surfaces from damage and immediately remove stains, mortar droppings, efflorescence or other unsightly excess resulting from the work of this section.

B. Protect adjacent exposed masonry surfaces to remain from damage during work. While masonry areas under repair are subject to weather penetration, they shall be protected with tarpaulins or other devices to prevent damage to interior surfaces.

C. Protect roof membranes, flashing and existing masonry walls scheduled to remain with sheets of 1/2" plywood over full extent of work area or traffic route or any other means of protection receiving written approval by the Architect.

3.3 SETTING STONE IN MORTAR

A. Set stone as indicated on Drawings. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.

1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.

B. Wet joint surfaces thoroughly before applying mortar or setting in mortar.

C. Set units in full bed of mortar with full head joints unless otherwise indicated.

1. Set units with joints 3/8 to 1/2 inch (10 to 13 mm) wide unless otherwise indicated.
2. Build anchors and ties into mortar joints as units are set.
3. Fill dowel holes and anchor slots with mortar.
4. Fill collar joints solid as units are set.
5. Build concealed flashing into mortar joints as units are set.
6. Keep head joints in coping and other units with exposed horizontal surfaces open to receive sealant.

D. Rake out joints for joint cover to depths of not less than 3/4 inch (19 mm). Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.

1. Prime stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
2. Install lead joint closure according to manufacturer's written instructions.

E. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.4 INSTALLATION TOLERANCES

A. Variation from Level: Do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.

B. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches (3 mm in 900 mm) or one-fourth of nominal joint width, whichever is less.

C. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch (1.5 mm), except where variation is due to warpage of units within tolerances specified.

3.5 ADJUSTING AND CLEANING

A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Stone may be repaired if methods and results are approved by Architect.

B. Replace units in a manner that results in stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.

C. In-Progress Cleaning: Clean stone as work progresses.

1. Remove mortar fins and smears before tooling joints.
2. Remove excess sealant immediately, including spills, smears, and spatter.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed stone as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of stone.
3. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
5. Clean stone by bucket-and-brush hand-cleaning method.

END OF SECTION 047200