SECTION 04 43 13
THIN NATURAL STONE VENEER

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Thin natural stone veneers for field application.

1.02 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 07 60 00 - Flashing and Sheet Metal.

1.03 REFERENCES

A. Masonry Veneer Manufacturers Association (MVMA): Installation Guide for Adhered Masonry Veneer.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Cleaning and maintenance instructions.

C. Shop Drawings: Provide shop drawings indicating details of construction, control joints and installation requirements.

D. Selection Samples: Submit two sets of samples showing all available colors, patterns, textures, and finishes.

E. Verification Samples: For each product specified, two samples, representing colors, patterns, textures, and finishes to be installed.

1.05 QUALITY ASSURANCE

A. Mock-Up: Provide a mock-up for evaluation of preparation techniques and application workmanship.
   1. Construct a separate (not part of the actual building) sample wall panel not less than 4 feet by 4 feet (1.2 m x 1.2 m) with units in the pattern, color, texture, finish and shape as indicated on Drawings and specifications. Cleaning agents and methods shall be performed prior to approval by the Owner's representative of the sample panel.
   2. Do not proceed with remaining work until workmanship, colors, patterns, textures, and finishes are approved by the Owner's representative.
   3. Refinish mock-up area as required to produce acceptable work.

B. Control Joints: Comply with requirements on the Drawings, designed to reduce restraint and permit longitudinal movement, and as recommended by NCMA Tek Note 10-2C and 10-4.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations. Store materials within manufacturer's recommended limits for temperature and humidity. Protect from damage.
B. Store products in manufacturer's labeled packaging until ready for installation.

1.07 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Temperature and Weather:
1. Temperatures between 40 and 90 degrees F (4.4 and 32.2 degrees C) do not require special procedures or protection protocols.
2. When ambient temperatures fall below 40 degrees F (4.4 degrees C), utilize special construction procedures as recommended in MSJC Code and Specification for Masonry Structures.
3. Do not continue stone panel construction during heavy rains, as partially set or plastic mortar is susceptible to washout until 8 to 24 hours of curing occurs (depending upon environmental conditions).
4. When rain is likely, cover construction materials. Newly constructed stone panels shall be protected from rain by draping a weather-resistant covering over the assembly. The cover shall be secured in place and extend over all mortar that is susceptible to washout.

PART 2 PRODUCTS

2.01 THIN NATURAL STONE VENEERS FOR FIELD-APPLICATION

A. Thin Natural Stone Veneers: For field application as shown on the Drawings.
1. Finish: Stone: Refer to Drawings and as selected by the Architect.
2. Colors: As selected from the manufacturer by the Architect.
3. Mortar: As recommended by manufacturer, pre-blended polymer-modified mortar.
4. Mortar Color: As selected by the Architect.

PART 3 EXECUTION

3.01 PREPARATION

A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.02 INSTALLATION

A. Install stone thin veneers in accordance with manufacturer's written instructions and recommendations.
1. For Field Applications: Install according to the Masonry Veneer Manufacturers Association Installation Guide for Adhered Masonry Veneer and local building codes.

B. Assembly:
1. Units shall be mixed from several boxes at a time to insure proper color blending; includes flats and corners.
2. Surfaces for application shall be structurally sound, clean, dry and free from contaminants that would prevent a good bond. Newly prepared concrete shall be

cured for 28 days and then troweled smooth and textured to a fine broom finish. Existing surfaces shall be scarified and leveled, and all defects shall be repaired. Glossy or painted surfaces shall be sanded, stripped and cleaned of waxes, dirt and other contaminants.

3. Installation shall comply with the requirements of all applicable local, state and federal code jurisdictions. Stones shall only be applied to structurally sound surfaces incorporating good building practices.
4. Cementitious Surfaces: Concrete shall be fully cured and shall accept water penetration. Test by sprinkling water on various areas of the substrate. If water penetrates, a good bond may be achieved; if water beads, surface contaminants are present, and loss of adhesion may occur. Contaminants shall be mechanically removed before installation. Concrete shall be free of efflorescence and not subject to hydrostatic pressure.
5. Setting Material: Use a pre-blended polymer-modified mortar as a setting material following the manufacturer's guidelines, for use with stone.
6. Expansion Joints: Do not bridge expansion joints, control joints and cold joints with setting material. Bring through the finished masonry work and filled with an approved elastomeric sealant.
7. Hot/Dry Applications (wetting the substrate): Under certain conditions, the substrate may need to be wetted. If the stone panel is being installed onto a very hot/dry surface, the wall surface shall be wet to prevent excessive absorption of moisture from the mortar. This can be done by spraying water on the wall surface.
    a. Control Joints: Designed to reduce restraint and permit longitudinal movement. Per NCMA Tek Note 10-2C and 10-4, proper control joint spacing is required for all concrete masonry walls.
    b. Mortar and Mortar Joints for Field Applications: Strike mortar joints when the mortar is thumbprint hard. Raked, flush, beaded, or extruded joints are not recommended by manufacturer as they do not compact the mortar and create ledges that intercept water running down the face of the wall.
    c. During construction minimize mortar, grout, and concrete smears on the face of the units.
    d. Curing: Allow to cure 24 hours before filling joints with Pointing Mortar, depending upon temperature and humidity.
    e. Sealing: Not required.

3.03 CLEANING AND PROTECTION

A. Cleaning Procedures For Field Application:
    1 .Clean stone panels as work progresses. Remove mortar fins and smears before tooling joints.
    2. After 36 hours, wet the stonework down with water and then apply a mild cleaning detergent with a soft bristle brush to remove any dirt or mortar smear left from the installation. Do not use any type of acid or metal brush. Non muriatic acid cleaner as recommended by manufacturer. Comply with manufacturer's cleaning and sealing recommendations.

B. Protection: Protect installed work from damage due to subsequent construction activity on the site.
    1. Strong acids, acid washes, chemicals with a strong acid reaction and abrasives may not be used, as they may etch the surface and distort color.

** END OF SECTION **

SECTION 04 43 20
STONE PAVERS, STEPS

PART 1GENERAL

1.01 SUMMARY

A. SECTION INCLUDES
   1. Exterior stone paving.
   2. Stone Countertop,
   3. Installation materials.
   4. Joint sealant and filler.
   5. Miscellaneous materials

1.02 RELATED SECTIONS

A. Section 01 50 50 – Construction And Demolition Waste Management.

B. Section 07 90 00 – Joint Sealers

1.03 DEFINITIONS

A. Definitions contained in ASTM C 119 apply to this Section.

1.04 REFERENCES

A. ASTM C 97-02: Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone

B. ASTM C 119-04: Terminology Relating to Dimension Stone

C. ASTM C 170-90 (1999): Test Method for Compressive Strength of Dimension Stone

D. ASTM C 270-03: Specification for Mortar for Unit Masonry

E. ASTM C 615-03: Specification for Granite Dimension Stone

F. ASTM C 880-98: Test Method for Flexural Strength of Dimensional Stone

G. National Building Granite Quarriers Association, Inc. (NGBQA

1.05 SUBMITTALS

A. Product Data:
   1. For each granite type and each manufactured product shown on Drawings or specified.
   2. For each granite variety used on Project, include physical property data.

B. Shop Drawings:
   1. Show fabrication and installation details for granite.
   2. Show locations of each type of granite paving and paving pattern.
   3. Include dimensions and profiles of granite units.

C. Granite Samples: Submit samples for each stone type required, exhibiting the full range of color characteristics expected in the completed work.

1. Submit a minimum of 2 each, 12 inches by 12 inches in size, and in each color and finish selected.
2. In the case of more variegated granite, color photos shall be submitted in addition to the number of samples to show the full range of color and markings to be expected.

D. Other Samples:
1. Mortar: Full range of exposed color and texture.
2. Sealant: For each type and color of joint sealant required.
3. Grout: Full range of exposed color and texture.

E. Certificates: Submit a letter of certification from the granite fabricator, stating the material being furnished is the specified material and there are sufficient reserves available to supply the project and furnish replacement units if needed.

1.06 QUALITY ASSURANCE

A. Granite Supply: Obtain each stone variety from a single quarry.

B. Installer Qualifications: Engage experienced installer that has completed stone installation similar in material and design to that indicated for the project.

C. Fabricator Qualifications: Engage experienced fabricator that has completed stone fabrication similar in material and design to that indicated for the project. [Specifier: delete Section below if not required.]

D. Mockups: Build mockup of typical areas As Required.
1. Size:
   a. 10 x 10 feet – Paving Area.
   b. 3 steps - Stairs
2. Color consistency: demonstrate color consistency with mockup; color range shall not exceed range of color established by samples.
3. Include sealant joints installed as required by Division 07 Section "Joint Sealers."
4. When approved, Mockups will become standard for the Project.
5. Remove mock-up at Substantial Completion or when requested by Architect. Approved mockups may become part of completed Work

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store and handle materials to prevent deterioration or damage.
1. Carefully pack and load granite for shipment using reasonable care and customary precautions against damage in transit. Do not use material for blocking or packing, which may cause staining or discoloration.
2. Stack granite on timber or platforms at least 4 inches above the ground. Exercise care to prevent staining or discoloration during storage.
3. Lift granite with wide-belt slings; do not use ropes that may cause damage.
4. If storage is to be for a prolonged period, place polyethylene or other suitable plastic film between wood and finished surfaces of completely dry stone.

B. Field Conditions
1. Cold-Weather Requirements for Exterior Stone Paving: ACI 530.1/ASCE 6/TMS 602.
2. Hot-Weather Requirements for Exterior Stone Paving: ACI 530.1/ASCE 6/TMS 602.

PART 2 PRODUCTS

2.01 GRANITE MATERIAL

A. Granite: ASTM C 615.

B. Granite Type Refer to Drawings.
   1. Stone Variety: As selected by the Architect.
   2. Finish:
      a. To be selected by the Architect.
   3. Thickness: As shown on the Drawings.
   4. Countertop: Refer to Drawings.

2.02 GRANITE FABRICATION

A. Select stone for intended use to prevent fabricated units from containing cracks, seams, and starts that could impair structural integrity or function.

B. Fabricate stone to comply with requirements indicated and with the following references:
   1. Granite: NBGQA's "Specifications for Architectural Granite."

C. Cut stone to produce pieces of thickness, size, and shape indicated, including details on Drawings and Shop Drawings.

D. Carefully inspect finished stone units at fabrication plant for compliance with requirements. Replace defective units. Clean backs of stones to remove rust stains and iron particles

2.03 GROUT MATERIALS

A. Grout Colors:
   1. Match stone.
   2. As selected by Architect from manufacturer's full range.

B. Polymer Modified Cement Grout: ANSI A118.7.
   1. Polymer Type: Acrylic resin in liquid-latex form for addition to prepackaged dry grout mix. Grout shall be compatible with the stone.

2.04 MORTAR MATERIAL

A. Portland Cement: ASTM C 150, Type I or Type II, except Type III may be used for cold-weather construction.

B. Hydrated Lime: ASTM C 207.

C. Portland Cement-Lime Mix: ASTM C 150, Type I or Type III, and ASTM C 207.

D. Colored Portland Cement-Lime Mix: ASTM C 150, Type I or Type III; ASTM C 207; and mortar pigments.

E. Aggregate: ASTM C 144.

F. Mortar Pigments: Natural and synthetic iron oxides. Use only pigments with a record of satisfactory performance in mortar and containing no carbon black.

G. Latex Additive: Acrylic-resin water emulsion recommended by additive manufacturer for use with field-mixed portland cement mortar bed.

H. Thin-Set Mortar: Latex-Portland Cement Mortar: ANSI A118.4. Provide products by one of the following: I. Water: Potable.

2.05 MISCELLANEOUS MATERIALS

A. Mortar: Comply with referenced standards and with manufacturers' written instructions. Do not use calcium chloride. Combine mortar materials and mix thoroughly. Discard mortar when it has reached initial set.

B. Latex-Modified Portland Cement Setting Mortar: Proportion and mix portland cement, aggregate, and latex additive to comply with manufacturer's written instructions.

C. Mortar-Bed Bond Coat: Mix neat cement and latex additive to a creamy consistency.

D. Latex-Modified Portland Cement Bond Coat: Proportion and mix portland cement, aggregate, and latex additive to comply with manufacturer's written instructions.

E. Cement-Paste Bond Coat: Mix either neat cement or cement and sand with water to a consistency similar to that of thick cream.

F. Joint Grout: Comply with mixing requirements in referenced ANSI standards and with manufacturer's written instructions

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine surfaces indicated to receive stone.

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

3.02 PREPARATION

A. Sweep concrete substrates to remove dirt, dust, debris, and loose particles.

B. Remove substances from concrete substrates that could impair mortar bond.

C. Clean dirty or stained stone surfaces before setting.
1. Scrub with fiber brushes; drench with clear water.
2. Use mild cleaning compounds.

3.03 INSTALLATION

A. Do necessary field cutting as stone is set. Cut lines straight and true and finish field-cut edges to match shop-cut edges.
1. Use power saws with diamond blades to cut stone.

B. Set stone to comply with Drawings and Shop Drawings.

C. Scribe and field-cut stone as necessary to fit at obstructions. Produce neat joints of size specified or indicated.

D. Expansion- and Control-Joint Installation: Locate and install according to Drawings and Shop Drawings.

3.04 INSTALLATION TOLERANCES

A. Variation in Line: Do not exceed 1/8 inch in 96 inches (3 mm in 2400 mm), 1/4 inch in 20 feet (6 mm in 6 m), or 3/8 inch (10 mm) maximum.

B. Variation in Joint Width: Do not vary joint thickness more than 1/16 inch (1.5 mm) or 1/4 of nominal joint width, whichever is less.

C. Variation in Surface Plane: 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 3/8 inch (10 mm) maximum from level or slope indicated.

D. Variation in Plane between Adjacent Units (Lipping): Do not exceed 1/32-inch (0.8- mm) difference between planes of adjacent units

3.05 INSTALLATION OF STONE DIRECTLY OVER CONCRETE

A. Saturate concrete with clean water several hours before placing setting bed. Remove surface water about one hour before placing setting bed.

B. Apply mortar-bed bond coat to damp concrete and broom to provide an even coating that completely covers the concrete. Do not exceed 1/16-inch (1.5-mm) thickness. Limit area of mortar-bed bond coat to avoid its drying out before placing setting bed.
   1. Place reinforcing wire mesh over concrete, lapped at joints by at least one full mesh and supported so mesh becomes embedded in middle of setting bed. Hold edges back from vertical surfaces about 1/2 inch (13 mm).

C. Apply mortar bed to finished elevations indicated immediately after applying mortar-bed bond coat.

D. Mix and place only that amount of mortar bed that can be covered with stone before initial set. Cut back, bevel edge, and discard material that has reached initial set before stone can be placed.

E. Place stone before initial set of mortar occurs. Immediately before placing stone on setting bed, apply uniform 1/16-inch- (1.5-mm-) thick bond coat to bed or to back of each stone unit.

F. Tamp and beat stone with a wooden block or rubber mallet. 1. Set each unit in a single operation before initial set of mortar; do not return to areas already set.

G. Rake out joints to depth required to receive grout or pointing mortar as units are set.

H. Point joints after setting.

3.06 GROUTING

A. Polymer-Modified Cement Grout for Stone Joints: ANSI A108.10 and manufacturer's written instructions.
   1. Do not use sanded grout for polished stone.
   2. Grout joints as soon as possible after initial set of setting bed. Finish joints by tooling to produce a slightly concave polished joint, free of drying cracks.
   3. Maintain grout in damp condition for seven days.

3.07 ADJUSTING

A. Remove and replace stone not matching final samples and mockups.

B. Remove and replace stone not complying with requirements.

C. Replace non-complying stone to match final samples and mockups, comply with specified requirements. Replacement stone shall show no evidence of replacement.

D. Patching: Minor patching in small areas may be acceptable if the repair does not distract from the overall appearance of the finished project.

3.08 PROTECTION

A. Prohibit traffic from installed stone for a minimum of 48 hours. No rolling or heavy traffic should be permitted on stone surfaces for at least two weeks after the floor has been grouted or caulked.

B. Protect during construction with non-staining kraft paper, and cover with a layer of untreated plywood where adjoining areas require construction work access.

3.09 CLEANING

A. Clean stone as work progresses. Remove mortar, sealant, and stains before tooling joints.

B. Final Cleaning: Clean stone as recommended by fabricator or stone producer.
   1. Clean all finished stonework with a mild detergent using a fiber brush.
   2. After cleaning, rinse with clean water.
   3. Do not use acid or other caustic materials.

C. When cleaning is completed, remove temporary protection.

** END OF SECTION **