SECTION 047300 - CAST STONE CONCRETE MASONRY VENEER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Cast stone concrete masonry veneer (Monumental Stone Masonry).

B. Related Sections include the following:

1. Division 4 Section "Unit Masonry" for mortar and grout.
2. Division 7 Section "Joint Sealants."
3. Division 4 Section "Cast Stone"

1.3 DEFINITIONS

A. Cast Stone Concrete Masonry Veneer: An architectural stone unit manufactured to copy fine grain texture and color of natural cut stone. Meets ASTM C 90 requirements.

B. Dry Cast Concrete Products: Manufactured from zero-slump concrete.

C. Machine Casting Method: Vibratory compaction by machine of earth-moist, zero-slump concrete against rigid mold until it is densely compacted.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for cast stone units.

B. Shop Drawings: Show fabrication and installation details for cast stone units. Include dimensions; details for reinforcement and anchorages, if any; and indication of finished faces.

1. Include building elevations showing layout of units and locations of joints and anchors.

C. Samples for Verification:

1. For each color and texture of cast stone required, 12 inches (305 mm) square in size.
2. For each mortar color required, showing the full range expected in the finished construction. Make samples using the same sand and mortar ingredients to be used on Project. Label samples to indicate type and amount of colorant used. Provide sample for masonry mock-up panel.

D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

E. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of cast stone with requirements indicated.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Sufficient plant facilities to provide quality, shapes, quantities, and sizes of architectural stone units required without delaying progress of the Work.
2. Minimum of 10 years experience in producing masonry units.
3. Custom Cast Stone Series and Architectural Masonry Veneer Series are to be manufactured from a similar mix design to match color and texture.
4. Manufacturer shall have an internal Quality Assurance Testing Program with certified laboratory technician(s).

F. Mockup: Prior to installing cast stone concrete masonry, construct mockup wall panels to verify selections made under sample submittals and from sample panels to demonstrate aesthetic effects of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final unit of Work.

1. Locate mockups on site in the locations indicated or, if not indicated, as directed by Architect.
2. Build mockup of typical wall area as shown on drawings.

   a. Include sealant-filled joint complying with requirements of Division 7 Section "Joint Sealants."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery:

1. Deliver architectural stone units secured to shipping pallets and protected from damage and discoloration.
2. Provide itemized shipping list.
3. Number each piece individually, as required, to match shop drawings and schedules.

B. Storage:

1. Store architectural stone units and installation materials in accordance with manufacturer's instructions.
2. Store architectural stone units on pallets with nonstaining, waterproof covers.
3. Do not double stack pallets.
4. Ventilate units under covers to prevent condensation.
5. Prevent contact with dirt and splashing.

C. Handling:

1. Protect architectural stone units, including corners and edges, during storage, handling, and installation to prevent chipping, cracking, staining, or other damage.
2. Handle long units at center and both ends simultaneously to prevent cracking.
3. Do not use pry bars or other equipment in a manner that could damage units.

1.7 COORDINATION

A. Coordinate production and delivery of cast stone with unit masonry work to minimize the need for on-site storage and to avoid delaying the Work.

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:

1. Reading Rock, Inc. (Basis of Design)

2. Advanced Cast Stone, Inc.

B. Substitutions: Requests for substitutions shall be made in writing at least ten days prior to the date of the Bid Opening and must meet the requirements set forth in Instructions to Bidders.

2.2 CAST STONE CONCRETE MASONRY VENEER

A. Compliance: ASTM C 90.

C. Casting Method: Machine.

D. Finish:

1. Type MSM-1: Size: 3-5/8 x 15-5/8 x 23-5/8 (WxHxL)

a. Include one of the following selections:

1) Reading Rock's Rockcast Architectural Masonry Veneer, Canyon Gray Smooth
2) Advanced Cast Stone equivalent product.

G. Test Results:

1. Compressive Strength, ASTM C 140: 4,000 - 6,000 psi at 28 days.
2. Absorption, ASTM C 140: Less than 6 percent at 28 days.
3. Linear Shrinkage, ASTM C 426: Maximum .065 percent.
4. Density, ASTM C 140: Greater than 120 pounds per cubic foot.
5. Freeze-Thaw, ASTM C 666: Less than 5 percent cumulative mass loss after 300 cycles.

H. Curing: Cure in enclosed chamber at 95 percent relative humidity and 95 to 120 degrees F for 12 to 18 hours and yard cure for 350 degree-days.

2.4 ARCHITECTURAL STONE VENEER MATERIALS

A. Portland Cement: ASTM C 150, Type I or III. White and/or gray as required to match specified color.

B. Coarse Aggregates: ASTM C 33, except for gradation. Granite, quartz, or limestone.

C. Fine Aggregates: ASTM C 33, except for gradation. Manufactured or natural sands.

D. Pigments: ASTM C 979, except do not use carbon black pigments. Inorganic iron oxide pigments.

E. Water Reducing, Retarding, and Accelerating Admixtures: ASTM C 494.

F. Other admixtures: integral water repellents and other chemicals, for which no ASTM Standard exists, shall be previously established as suitable for use in concrete by proven field performance or through laboratory testing.

G. Water: Potable.

2.5 TEXTURE AND COLOR

A. General: Match texture and color of full-size sample on file with Architect.

B. Texture of Surfaces Exposed to View:

1. Fine-grained texture similar to natural stone and architectural stone units.
2. Approximately equal to approved sample when viewed in direct daylight at 10 feet.

C. Surface Air Voids:

1. Size: Maximum 1/32 inch.
2. Density: Less than 3 occurrences per any 1 square inch.
3. Viewing Conditions: Not obvious under direct daylight at 10 feet.

D. Finish:

2. Minor chips shall not be obvious under direct daylight at 20 feet, as determined by Architect.
3. The occurrence of crazing or efflorescence shall not constitute a cause for rejection.

E. Color Variation:

1. Viewing Conditions: Compare in direct daylight at 10 feet, between units of similar age, subjected to similar weathering conditions.

2.6 MORTAR

A. Mortar: As specified in Section 042000.

B. Mortar Materials: As specified in Section 042000.

2.7 ACCESSORIES

A. Anchors: Non-corrosive type, sized for conditions. Type 304 stainless steel.

B. Sealant: As specified in Section 079200.

C. Cleaner: Prosoco Sure Klean Custom Masonry Cleaner, Prosoco Sure Klean 600 Detergent, or Prosoco Sure Klean Vana Trol.

2.8 FABRICATION

A. Shapes: As indicated on drawings.

2.9 TOLERANCES

A. General: Manufacture architectural stone units within tolerances in accordance with ASTM C 90, unless otherwise specified.

B. Length, height, width: Do not deviate by more than plus or minus 1/8 inch from approved dimensions. These requirements do not apply to split faced units.

2.10 PRODUCTION QUALITY CONTROL

A. Mix Designs: Test new and existing mix designs for applicable compressive strength and absorption compliance before manufacturing architectural stone units.

B. Plant Production Testing: Tests to be conducted by certified laboratory testing technicians. Test from specimens selected at random from plant production in accordance with ASTM C 140.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine construction to receive architectural stone units. Notify Architect if construction is not acceptable. Do not begin installation until unacceptable conditions have been corrected.

B. Examine architectural stone units before installation. Do not install unacceptable units.

3.2 INSTALLATION

A. Install units in conjunction with masonry, as specified in Section 042000.

B. Pull units from multiple cubes during installation to minimize variation in color and help with natural blending.

C. Cut units using motor-driven masonry saws. Finished ends should be turned to the visible side and the saw cut turned to the inside of the mortar joint to hide exposed aggregates and saw marks.

D. Do not use pry bars or other equipment in a manner that could damage units.

E. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.

F. Use Type N mortar (ASTM C 270), unless specified otherwise.

G. Per ACI 530.1, it is not necessary, nor recommended, to wet the units prior to installation.

H. Set units in full bed of mortar, unless otherwise indicated on the drawings.

I. Fill vertical joints with mortar.

J. Make joints 3/8 inch, unless otherwise indicated on the drawings.

K. Tuck point mortar joints to slight concave profile (unless specified otherwise).

L. Remove excess mortar immediately.

M. Remove mortar fins and smears before tooling joints.

N. Cover wainscot for protection and bond separation with plastic, felt paper or other approved products.

O. Cover freshly installed masonry products as required to assist with the curing process.

P. Sealant Joints:

1. As specified in Section 079200.
2. Prime ends of units, insert properly sized backing rod, and install sealant.
3. Provide sealant joints at following locations:
   a. Joints at relieving angles.
   b. Control and expansion joints.
   c. As indicated on the drawings.

3.3 TOLERANCES

A. Installation Tolerances:

1. Variation from Plumb: Do not exceed 1/8 inch in 5 feet or 1/4 inch in 20 feet or more.
2. Variation from Level: Do not exceed 1/8 inch in 5 feet, 1/4 inch in 20 feet, or 3/8 inch maximum.
3. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch or 1/4 of nominal joint width, whichever is greater.
4. Variation in Plane Between Adjacent Surfaces: Do not exceed 1/8-inch difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

3.4 CLEANING

A. Clean exposed units after mortar is thoroughly set and cured.

B. Perform test of cleaner on small area of 4' x 4' on each type and color and receive approval by Architect before full cleaning. Let test area dry 4 to 5 days before inspection. Keep test area for future comparison.

C. Clean units by wetting down the surface first, before using the specified cleaner (as specified in Section 2.7.C). Brush on cleaner, let dwell for 2 to 3 minutes. Reapply cleaner, scrub surface with masonry brush and rinse off thoroughly. Areas with heavy soiling use a wood block or non-metallic scraper.

D. Apply cleaner to units in accordance with cleaner manufacturer's instructions.

E. Do not use the following to clean units:

1. Muriatic acid.
2. Power washing.
3. Sandblasting.
4. Harsh cleaning materials or methods that would damage or discolor surfaces.

3.5 REPAIR

A. Repair chips and other surface damage noticeable when viewed in direct daylight at 20 feet.

B. Repair with touchup materials provided by manufacturer in accordance with manufacturer's instructions.

C. Repair methods and results to be approved by Architect.

3.6 INSPECTION AND ACCEPTANCE

A. Inspect completed installation in accordance with ACI 530 requirements.

3.8 PROTECTION

A. Protect installed units from splashing, stains, mortar, and other damage.

END OF SECTION 047300