

## SECTION 044300 - STONE MASONRY

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes the following applications of stone masonry:
  - 1. Anchored to concrete backup.
  - 2. Anchored to cold-formed metal framing and sheathing.
- B. Related Sections:
  - 1. Section 033000 "Cast-in-Place Concrete" for dovetail slots in concrete for anchoring stone.
  - 2. Section 047200 "Cast Stone Masonry" for precast spillway stones.
  - 3. Section 076200 "Sheet Metal Flashing and Trim" for exposed sheet metal flashing.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. LEED Submittals:
  - 1. Product Certificates for Credit MR 5: For products and materials required to comply with requirements for regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered LEED regional.
- C. Samples for Verification:
  - 1. For each stone type indicated. Include at least four samples in each set for each type of stone, exhibiting extremes of the full range of color and other visual characteristics expected in completed Work. Samples will establish the standard by which stone provided will be judged.
  - 2. For each color of mortar required. Label Samples to indicate types and amounts of pigments used.

#### 1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs experienced stonemasons and stone fitters.
- B. Source Limitations for Stone: Obtain stone, from one quarry with resources to provide materials of consistent quality in appearance and physical properties.

- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.
- D. Mockups: Build mockups to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockups for typical metal stud exterior wall in sizes approximately 48 inches long by 48 inches high by full thickness, including face and backup wythes and accessories.
    - a. Include through-wall flashing installed for a 24-inch length in corner of mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit stone masonry above half of flashing).
    - b. Include metal studs, sheathing, veneer anchors, flashing, and weep holes in exterior masonry-veneer wall mockup.
  - 2. Protect accepted mockups from the elements with weather-resistant membrane.
  - 3. Approval of mockups is for color, texture, and blending of stone; relationship of mortar and sealant colors to stone colors; tooling of joints; and aesthetic qualities of workmanship.
    - a. Approval of mockups is also for other material and construction qualities Architect specifically approves in writing.
    - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
- E. Preinstallation Conference: Conduct conference at Project site.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- B. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- C. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

#### 1.5 PROJECT CONDITIONS

- A. Protection of Stone Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed stone masonry

when construction is not in progress.

1. Extend cover a minimum of **24 inches** down both sides and hold cover securely in place.
- B. Stain Prevention: Immediately remove mortar and soil to prevent them from staining the face of stone masonry.
1. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on the ground and over the wall surface.
  2. Protect sills, ledges, and projections from mortar droppings.
  3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  4. Turn scaffold boards near the wall on edge at end of each day to prevent rain from splashing mortar and dirt on completed stone masonry.
- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace stone masonry damaged by frost or freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is **40 deg F** and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

## 1.6 COORDINATION

- A. Advise installers of other work about specific requirements for placement of reinforcement, veneer anchors, flashing, and similar items to be built into stone masonry.

## PART 2 - PRODUCTS

### 2.1 STONE SOURCE

- A. Varieties and Sources: Subject to compliance with requirements, provide stone of varieties and from sources as follows:
1. Minick Materials Company, no substitutions; Bryan Moore, 405-834-8280.

### 2.2 SANDSTONE

- A. Regional Materials: Stone shall be fabricated within **500 miles** of Project site from stone that has been extracted within **500 miles** of Project site.
- B. General: All sandstone shall be of structural sandstone, buff color Engineering Grade, and

hard and durable. Sandstone shall be free from seams which impair its structural integrity, and shall be of smooth splitting character. Natural variations characteristic of the deposit will be permitted for all pavers and cobbles. Sandstone shall come from an approved quarry. Test samples of sandstone shall conform to the requirements of ASTM C 616, Classification I Sandstone.

- C. All sandstone to be used under this contract shall be quarried from the same parent material source and shipped to the Contractor at the same time. Contractor shall store sandstone pavers in a dry and covered condition until such time as they shall be installed.
- D. Stone shall conform to the following minimum requirements as demonstrated by submitted certified test results.

<u>Density</u>	<u>% Absorp.</u>	<u>Comn.PSI</u>	<u>Mod. Of Rupture PSI</u>
1551bs/CF		3%	15,000 2,500

### 2.3 MORTAR MATERIALS

- A. Regional Materials: Aggregate for mortar, cement, and lime shall be manufactured within **500 miles** of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within **500 miles** of Project site.
- B. 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. Low-Alkali Cement: Not more than 0.60 percent total alkali when tested according to ASTM C 114.
- C. Hydrated Lime: ASTM C 207, Type S.
- D. Preblended Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or III, and hydrated lime complying with ASTM C 207.
- E. Mortar Cement: UBC Standard 21-14.
- F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in stone masonry mortar.
  - 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. Bayer Corporation, Industrial Chemicals Div.; Bayferrox Iron Oxide Pigments.
    - b. Davis Colors; True Tone Mortar Colors.
    - c. Lafarge Corporation; Centurion Pigments.
    - d. Solomon Colors; SGS Mortar Colors.
- G. Aggregate: ASTM C 144 and as follows:

1. For pointing mortar, use aggregate graded with 100 percent passing **No. 16** sieve.
2. Colored Aggregates: Natural-colored sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar color.

H. Water: Potable.

## 2.4 VENEER ANCHORS

A. Materials:

1. Hot-Dip Galvanized-Steel Wire: ASTM A 82, with ASTM A 153/A 153M, Class B-2.

B. Size: Sufficient to extend at least halfway, but not less than **1-1/2 inches**, through stone masonry and with at least **5/8-inch** cover on outside face.

C. Adjustable, Screw-Attached Veneer Anchors: Units consisting of a wire tie section and a metal anchor section that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:

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. Dur-O-Wal, a Dayton Superior Company; D/A 210 with D/A 700-708.
  - b. Heckmann Building Products Inc.; 315-D with 316.
  - c. Hohmann & Barnard, Inc.; DW-10HS.
2. Structural Performance Characteristics: Capable of withstanding a **100-lbf** load in both tension and compression without deforming or developing play in excess of **0.05 inch**.
3. Anchor Section: Sheet metal plate, **1-1/4 inches** wide by **6 inches** long, with screw holes top and bottom and with raised rib-stiffened strap, **5/8 inch** wide by **3-5/8 inches** long, stamped into center to provide a slot between strap and plate for inserting wire tie.
4. Fabricate sheet metal anchor sections and other sheet metal parts from **0.067-inch-** thick, steel sheet, galvanized after fabrication.
5. Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from **0.188-inch-**diameter, hot-dip galvanized -steel wire.

D. Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene washer, **No. 10** by length required to penetrate steel stud flange with not less than 3 exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours per ASTM B 117.

## 2.5 EMBEDDED FLASHING MATERIALS

A. Flexible Flashing: For flashing not exposed to the exterior, use the following unless otherwise indicated:

1. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated

polyethylene film to produce an overall thickness of not less than **0.030 inch**.

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

- 1) Dur-O-Wal, a Dayton Superior Company; Dur-O-Barrier-44.
- 2) Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Perm-A-Barrier Wall Flashing.
- 3) Heckmann Building Products Inc.; No. 82 Rubberized-Asphalt Thru-Wall Flashing.
- 4) Hohmann & Barnard, Inc.; Textroflash.

B. Adhesives, Primers, and Seam Tapes for Flexible Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

## 2.6 MISCELLANEOUS MASONRY ACCESSORIES

A. Weep Hole/Vent Products: Use the following unless otherwise indicated:

1. Wicking Material: Absorbent rope, made from cotton or UV-resistant synthetic fiber, **1/4 to 3/8 inch** in diameter, in length required to produce **2-inch** exposure on exterior and **18 inches** in cavity behind stone masonry. Use only for weep holes.
2. Round Plastic Tubing: Medium-density polyethylene, **3/8-inch** OD by thickness of stone masonry.

B. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Provide one of the following configurations:

a. Strips, full-depth of cavity and **10 inches** wide, with dovetail shaped notches **7 inches** deep that prevent mesh from being clogged with mortar droppings.

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

a. Mortar Net USA, Ltd.; Mortar Net.

## 2.7 CAVITY-WALL INSULATION

A. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, closed-cell product extruded with an integral skin.

B. Adhesive: Type recommended by insulation board manufacturer for application indicated.

## 2.8 MASONRY CLEANERS

- A. Job-Mixed Detergent Solution: 1/2-cup dry-measure tetrasodium polyphosphate and 1/2-cup dry-measure laundry detergent dissolved in 1 gal. of water.

## 2.9 MORTAR SEALANT

- A. Sealant for exposed mortar joints:
  - 1. Sikaflex-15 LM as available from Sika Corporation. Phone: 800-933-7452 or approved equal.

## 2.10 ANTI-GRAFFITI SEALANT

- A. Sealant for the exposed finish of all exposed sandstone surfaces:
  - 1. Sure Klean Weather Seal "Blok-Guard & Graffiti Control" water and oil repellent as manufactured by: ProSoCo Inc., Kansas City, KS. : a clear solvent-based silicone elastomer formulated to weatherproof concrete block and other porous masonry surfaces from repeated graffiti attacks without altering the natural appearance.
  - 2. Sealer shall not produce any visible color change to sandstone following application.

## 2.11 MORTAR MIXES

- A. General: 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.
  - 2. Limit cementitious materials in mortar to portland cement, mortar cement, and lime.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Stone Masonry: Comply with ASTM C 270, Proportion Specification.
  - 1. Mortar for Setting Stone: Type S.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
  - 1. Pigments shall not exceed 10 percent of portland cement by weight.
  - 2. Pigments shall not exceed 5 percent of mortar cement by weight.
  - 3. Mix to match Architect's sample.
- ?. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.

## 2.12 FABRICATION

- A. Fabricate stone in sizes and shapes necessary to comply with requirements indicated, including details on Drawings. Coping stones shall be 3 feet long, minimum.
- B. Shape stone for type of masonry (pattern) as follows:
  - 1. Split-bed, coursed broken-range ashlar with varying course heights of roughly 9", 15" and 24" and random lengths of 12" to 48" or more as indicated in Drawings. The stone veneer shall have a thickness between 4" and 6", with chopped roughly squared edges. No more than 25% of the stones used should be 9" tall with at least 30% of the stones used 24" tall. The larger dimension of the stone shall always be horizontal; no "jumpers" will be allowed.
- C. Finish exposed faces and edges of stone to comply with requirements indicated for finish and to match approved samples and mockups.
  - 1. Finish: Split face.
  - 2. Finish for Top Surface of Sills: Sand-rubbed.
  - 3. Finish for face of Sills: Split Face
  - 4. Finish for Caps, Copings and Lintels: Sand-rubbed.
    - a. Finish exposed ends of copings same as front and back faces.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine surfaces indicated to receive stone masonry, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine substrate to verify that dovetail slots, inserts, reinforcement, veneer anchors, flashing, and other items installed in substrates and required for or extending into stone masonry are correctly installed.
- C. Examine wall framing, sheathing, and weather-resistant sheathing paper to verify that stud locations are suitable for spacing of veneer anchors and that installation will result in a weatherproof covering.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Accurately mark stud centerlines on face of weather-resistant sheathing paper before beginning stone installation.
- B. Coat concrete and unit masonry backup with asphalt dampproofing.

- C. Clean dirty or stained stone surfaces by removing soil, stains, and foreign materials before setting. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.

### 3.3 SETTING OF STONE MASONRY, GENERAL

- A. Perform necessary field cutting and trimming as stone is set.
  - 1. Use power saws to cut stone that is fabricated with saw-cut surfaces. Cut lines straight and true, with edges eased slightly to prevent snipping.
- B. Sort stone before it is placed in wall to remove stone that does not comply with requirements relating to aesthetic effects, physical properties, or fabrication, or that is otherwise unsuitable for intended use.
- C. Arrange and trim stones for accurate fit in coursed-range ashlar pattern with uniform course heights, random lengths, and uniform joint widths.
- D. Maintain uniform joint widths except for variations due to different stone sizes and where minor variations are required to maintain bond alignment if any. Lay walls with joints not less than **1/4 inch** at narrowest points or more than **1/2 inch** at widest points.
- E. Provide sealant joints of widths and at locations indicated.
  - 1. Keep sealant joints free of mortar and other rigid materials.
  - 2. Sealing joints is specified in Section 079200 "Joint Sealants."
- F. Install embedded flashing and weep holes at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
  - 1. At stud-framed walls, extend flashing through stone masonry, up the face of sheathing at least **8 inches**, and behind weather-resistant sheathing paper.
  - 2. At concrete backing, extend flashing through stone masonry, turned up a minimum of **8 inches**.
  - 3. At lintels and shelf angles, extend flashing full length of angles but not less than **6 inches** into masonry at each end.
  - 4. At ends of head and sill flashing turn up not less than **2 inches** to form end dams.
  - 5. Cut flexible flashing flush with face of wall after masonry wall construction is completed.
- G. Place weep holes and vents in joints where moisture may accumulate, including at base of cavity walls, above shelf angles, and at flashing.
  - 1. Use wicking material or round plastic tubing to form weep holes.
  - 2. Use wicking material to form weep holes above flashing in stone sills. Turn wicking down at lip of sill to be as inconspicuous as possible.
  - 3. Space weep holes formed from plastic tubing or wicking material **16 inches** o.c.
  - 4. Trim wicking material used in weep holes flush with outside face of wall after mortar has set.
  - 5. Place cavity drainage material in cavities to comply with configuration requirements for

cavity drainage material in "Miscellaneous Masonry Accessories" Article.

- H. Install vents in vertical head joints at the top of each continuous cavity at spacing indicated. Use round plastic tubing to form vents.

### 3.4 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed **1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch in 40 feet** or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed **1/4 inch in 20 feet or 1/2 inch in 40 feet** or more.
- B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed **1/4 inch in 20 feet or 1/2 inch in 40 feet** or more.
- C. Variation of Linear Building Line: For position shown in plan, do not exceed **1/2 inch in 20 feet or 3/4 inch in 40 feet** or more.
- D. Measure variation from level, plumb, and position shown in plan as variation of the average plane of the face of each stone from level, plumb, or dimensioned plane.
- E. Variation in Mortar-Joint Thickness: Do not vary from joint size range indicated.
- F. Variation in Plane between Adjacent Stones: Do not exceed one-half of tolerance specified for thickness of stone.

### 3.5 INSTALLATION OF ANCHORED STONE MASONRY

- A. Anchor stone masonry to concrete with corrugated-metal veneer anchors unless otherwise indicated. Secure anchors by inserting dovetailed ends into dovetail slots in concrete.
- B. Anchor stone masonry to stud framing with adjustable, screw-attached veneer anchors unless otherwise indicated. Fasten anchors through sheathing to framing with two screws.
- C. Embed veneer anchors in mortar joints of stone masonry at least halfway, but not less than **1-1/2 inches**, through stone masonry and with at least **5/8-inch** cover on outside face.
- D. Space anchors not more than **18 inches** o.c. vertically and **32 inches** o.c. horizontally, with not less than 1 anchor per **2.67 sq. ft.** of wall area. Install additional anchors within **12 inches** of openings, sealant joints, and perimeter at intervals not exceeding **12 inches**.
- E. Set stone in full bed of mortar with full head joints unless otherwise indicated. Build anchors into mortar joints as stone is set.
- F. Provide **1-inch** cavity between stone masonry and backup construction unless otherwise indicated. Keep cavity free of mortar droppings and debris.
- G. Tool joints, when mortar is thumbprint hard, with a smooth jointing tool to produce a concave

joint profile.

### 3.6 POINTING

- A. Prepare stone-joint surfaces for pointing with mortar by removing dust and mortar particles. Where setting mortar was removed to depths greater than surrounding areas, apply pointing mortar in layers not more than **3/8 inch** deep until a uniform depth is formed.
- B. Point stone joints by placing and compacting pointing mortar in layers not more than **3/8 inch** deep. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.
- C. Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce the following joint profile:
  - 1. Joint Profile: Smooth, flat face recessed **1/4 inch** below edges of stone (raked joint).

### 3.7 ADJUSTING AND CLEANING

- A. Remove and replace stone masonry of the following description:
  - 1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Architect.
  - 2. Defective joints.
  - 3. Stone masonry not matching approved samples and mockups.
  - 4. Stone masonry not complying with other requirements indicated.
- B. Replace in a manner that results in stone masonry matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean stone masonry as work progresses. Remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean stone masonry as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on mockup; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before cleaning stone masonry.
  - 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
  - 4. Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.
  - 5. Clean stone masonry by bucket and brush hand-cleaning method described in BIA Technical Note No. 20 Revised II, using job-mixed detergent solution.

### 3.8 ANTI-GRAFFITI SEALANT

- A. Following a 7 day curing period, power wash all installed stone veneer to remove all dirt, dust, and stains.
- B. Apply penetrating surface sealer to all exposed stone veneer. Closely following manufacturer's recommendations. Do not over apply. Thoroughly soak stone but do not allow sealer to pond, run, streak, or drip. Protect all adjacent lawns and planting areas by covering with polyethylene film. The finish on all sealed surfaces will be even and uniform. Following manufacturer's recommended drying period, all stained or streaked areas will be stripped, replaced, and sealed at no additional cost.

### 3.9 EXCESS MATERIALS AND WASTE

- A. Excess Stone: Stack excess stone where directed by Owner for Owner's use.
- B. Disposal as Fill Material: Dispose of clean masonry waste, including mortar and excess or soil-contaminated sand, by crushing and mixing with fill material as fill is placed.
  - 1. Crush masonry waste to less than 4 inches in greatest dimension.
  - 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Section 312000 "Earth Moving."
  - 3. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other waste, and legally dispose of off Owner's property.

END OF SECTION 044300

## SECTION 047200 - CAST STONE MASONRY

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Cast stone spillway stones.

B. Related Sections:

1. Section 044300 "Stone Masonry" for installing cast stone units.

#### 1.2 ACTION SUBMITTALS

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

1. For cast stone units, include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. LEED Submittals:

1. Product Certificates for Credit MR 5: For products and materials required to comply with requirements for regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered LEED regional.

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

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

D. Samples for Verification:

1. For color and texture of cast stone required, **10 inches** square in size.

E. Full-Size Samples: For color texture and shape of cast spillway stone unit.

1. Make available for Architect's review at Project site or at manufacturing plant, if acceptable to Architect.
2. Make Samples from materials to be used for units used on Project immediately before beginning production of units for Project.
3. Approved Samples may be installed in the Work.