SECTION 04853

MORTAR-PLACED STONE ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Section includes solid masonry construction of base supported natural full stone veneer, set in cement mortar, with a structural back-up of masonry or metal lath on a structural backing.

B. Section includes special decorative cut stone shapes for trim.

C. Section includes installation of built-in accessories.

1.2 RELATED SECTIONS

A. Section 03300 - Cast-In-Place Concrete: Concrete Foundations.

B. Section 03300 - Cast-In-Place Concrete: Concrete supporting wall.

C. Section 04810 - Unit Masonry Assemblies: Masonry supporting wall.

D. Section 05500 - Metal Fabrications: Lintels, shelf angles, structural supports, anchors and other built-in components for building into stone veneer masonry by this section.

E. Section 05400 - Cold-Formed Metal Framing: Formed steel framed supporting wall.

F. Section 06112 - Framing and Sheathing: Wood frame supporting wall.

G. Section 07620 - Sheet Metal Flashing and Trim.

H. Section 07900 - Joint Sealers: Sealant for perimeter and control joints.

I. Section 09220 - Cement Plaster: Metal lath and scratch coat back-up over supporting walls.

1.3 REFERENCES

A. ASTM A 153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

B. ASTM A 580 - Standard Specification for Stainless Steel Wire.

C. ASTM A 666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip,

Plate, and Flat Bar.

D. ASTM C 91 - Standard Specification for Masonry Cement.

E. ASTM C 97 - Standard Specification for Absorption and Bulk Specific Gravity of Dimension Stone.

F. ASTM C 99 - Standard Specification for Modulus of Rupture of Dimension Stone.

G. ASTM C 144 - Aggregate for Masonry Mortar.

H. ASTM C 150 - Standard Specification for Portland Cement.

I. ASTM C 170 - Standard Specification for Compressive Strength of Dimension Stone.

J. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes.

K. ASTM C 270 - Mortar for Unit Masonry.

L. ASTM C 615 - Standard Specifications for Granite Dimension Stone.

M. ASTM C 616 - Standard Specification for Quartz-Based Dimension Stone.

N. ASTM C 780 - Preconstruction Evaluation of Mortar for Plain & Reinforced Masonry.

O. ACI 530/ASCE 5/TMS 402 - Building Code Requirements for Masonry Structures.

P. ACI 530.1/ASCE 6/TMS 602 - Specifications for Masonry Structures.

Q. National Concrete Masonry Association TEK 8-2A for masonry cleaning.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

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 methods.

C. Design Data: Submit design mix when Property specification of ASTM C270 is to be used, with required environmental conditions, and admixture limitations.

D. Selection Samples: For each stone product specified, submit two samples, minimum size 48 inches (1216 mm) square, representing actual product, color, and texture.

E. Samples: Submit samples of mortar representing actual mortar color and color range.

F. Quarrier's Certificate: Certify stone properties and mortar mix will conform to specified requirements.

G. Construct sample panel at location indicated or directed, and as follows:
   1. Recommended Size: 8 feet by 8 feet (2.4 m by 2.4 m) or a size that satisfies the architect. This size should be no less than 4 feet by 4 feet (1.2 m by 1.2 M).
   2. Include all stone unit types and sizes to be used including a typical corner

condition, special shapes and mortar joint treatment. Clean the sample panel using the same materials and tools as planned for the final stone masonry construction.

3. Obtain architect's acceptance of sample panel before beginning construction activities of this section.
4. Do not remove sample panel until construction activities of this section have been accepted by the Architect.

1.5 QUALIFICATIONS

A. Stone Quarrier: Company specializing in manufacturing products specified in this section with minimum five years documented experience.

B. Stone Masonry Company: Company specializing in performing Work of this section with minimum five years documented experience.

1.6 QUALITY ASSURANCE

A. Design Requirements: Perform Work in accordance with ACI 530/ASCE 5/TMS 402 Building Code Requirements for Masonry Structures, ACI 530.1/ASCE 6/TMS 602 Specifications for Masonry Structures and the applicable Building Code.

B. Design foundations, supporting walls, anchorage, spans, fastening, and joints under direct supervision of Professional Engineer experienced in design of this Work and licensed at Project location.

C. Preconstruction Meetings: Conduct preconstruction meetings including the Architect, Contractor, stone masonry subcontractor, and the flashing subcontractor to verify project requirements, substrate conditions, manufacturer's installation instructions and other requirements. Comply with Division 1 requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products on pallets, under cover and in manufacturer's unopened packaging until ready for installation.

B. Store stone materials on pallets on a dry level surface. Pallets shall not be stacked and shall be covered with tarps.

C. Store mortar under cover and in an area where temperature is maintained between 4 degrees C (40 degrees F) to 43 degrees C (110 degrees F).

1.8 PROJECT CONDITIONS

A. Hot and Cold Weather Requirements: In accordance with ACI 530.1/ASCE 6/TMS 602 Specifications for Masonry Structures.

B. Ambient temperature shall be 40 degrees F (4.4 degrees C) or above during erection of stone masonry. When ambient temperature falls below 50 degrees F, mortar mixing water shall be heated.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Stone Quarrier: Dunnville Cutstone Co., Inc., E4862 170th Ave, Menomonie, Wisconsin 54751, Phone: 715-664-8386, Fax: 702-543-5997, Internet: www.dunnvillecutstone.com.

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 VENEER STONE

A. General: Full Natural stone veneers vary in depth 3 to 5 inches (76 to 127 mm) some up to 7 inches (178 mm), heights of 3 to 8 inches (76 to 203 mm), or higher where indicated and is furnished in random lengths from 6 inches to 30 inches (152 mm to 762 mm).

B. Quartzitic Sandstone Blends: Quartzitic sandstone blends full veneers vary in depth 3 to 5 inches (76 to 127 mm) or up to 7 inches (178 mm) as noted below. The lengths vary from 6 to 30 inches (152 to 762 mm). Quartzitic sandstone has the following properties.
   1. Properties:
      a. Material Type: Quartzitic Sandstone.
      b. Material Class: Metamorphic.
      c. Dry Density: 115 pcf.
      d. Bulk Specific Gravity: 1.87 Average
      e. Absorption: 11.0% Average
      f. Modulus of Rupture:
      g. Compressive Strength: 2,890 psi.
      h. Freeze-Thaw Weight Loss: <0.5 percent
      i. Abrasion Resistance:
      j. Mohs Hardness:
   2. Dunnville Sandstone: Shades of buff and tan, may contain little to strong tan, grey or iron veining.
      a. Dunnville Sandstone Rubble Veneer: Shades of buff, tan, grey or dark iron veining.
         1) 100 percent Split-Face or Natural Bed
         2) Depth: 3 to 5 inches (76 to 127 mm).
         3) Heights: 1 to 3 inches (25 to 76 mm).
         4) Lengths: 8 to 20 inches (208 to 508 mm).
         5) Covers 40-45 Sq. Ft. per ton.
      b. Dunnville Sandstone Random Ashler Veneer: Shades of buff and tan, may contain little to strong tan, grey or iron veining.
         1) 100 percent Split-Face.
         2) Depth: 3 to 5 inches (76 to 127 mm).
         3) Heights: 3 to 8 inches (76 to 208 mm).
         4) Lengths: 6 to 30 inches (152 to 762 mm).
         5) Covers 40-45 Sq. Ft. per ton.
      c. Dunnville Sandstone Jumpers: Shades of buff, tan, iron and gray, may contain little to strong tan or iron veining.
         1) 100 percent natural bed face
         2) Depth: 3 to 5 inches (76 to 127 mm).
         3) Heights: 8 to 14 inches (208 to 356 mm).
         4) Lengths: 6 to 30 inches (152 to 762 mm).
         5) Covers 40-45 Sq. Ft. per ton.
      d. Dunnville Sandstone Sawn Bed, Split Face Veneer: Shades of buff and tan, may contain little to strong tan, grey or iron veining.
         1) 100 percent Split-Face.
         2) Depth: 3 to 5 inches (76 to 127 mm).
         3) Heights: 8 to 12 inches (208 to 356 mm).
         4) Lengths: 6 to 30 inches (152 to 762 mm).

5) Covers 40-45 Sq. Ft. per ton.

e. Dunnville Sandstone Sawn Bed, Rock Face Veneer: Shades of buff and tan, may contain little to strong tan, grey or iron veining.
   1) 100 percent Rock-Face.
   2) Depth: 3 to 5 inches (76 to 127 mm).
   3) Heights: 3 to 8 inches (76 to 208 mm).
   4) Lengths: 18 to 30 inches (457 to 762 mm) plus.
   5) Covers 40-45 Sq. Ft. per ton.

2.3 SPECIAL SHAPES

A. Provide special shapes as indicated on the Drawings and as follows:
   1. Quoins.
   2. Keystones.
   3. Edgestones.
   4. Cornerstones.
   5. Sills.
   6. Ledges.
   7. Medallions
   8. Other _____.

B. Stone shall be furnished in sizes indicated plus or minus 1/2 inch (12.5 mm). Material shall conform to C 616 for Quartzite Sandstone with the following properties:
   1. Maximum absorption rate of 11.0 percent average when tested in accordance with ASTM C 97.
   2. Average dry density of 115 lb per CF when tested in accordance with ASTM C 97.
   3. Average compressive strength of 2,890 psi when tested in accordance with ASTM C 170.

C. Color shall be:
   1. Match the veneer stone.
   2. _____.

2.4 ACCESSORIES

A. Joint Reinforcement: As specified in Section _____.

B. Wall Ties: Formed steel wire, 22 gauge (0.73 mm) diameter, hot-dip galvanized to A 153, B2 finish:
   1. Eye and pintle type.
   2. Wall strap for bolted attachment to studs.
   3. Wire loop for embedment in back-up masonry.
   4. With provision for vertical adjustment after attachment.

C. Wall Ties: Formed steel wire, 22 gauge (0.73 mm) diameter, stainless steel conforming to ASTM A 580:
   1. Eye and pintle type.
   2. Wall strap for bolted attachment to studs.
   3. Wire loop for embedment in back-up masonry.
   4. With provision for vertical adjustment after attachment.

D. Other Anchors in Direct Contact with Stone: ASTM A 666, Type 304, stainless steel of sizes and configurations required for support of stone and applicable superimposed loads.

E. Weephole Vent Devices: One piece aluminum Weephole Ventilator as manufactured by Hohmann & Barnard Inc.

F. Setting Buttons and Shims: Lead or Plastic.

2.5 MORTAR

A. Masonry Cement: Complying with ASTM C91:
   1. Type N.
   2. Color, gray.
   3. Color, white or colored is optional.
   4. Color _____.

B. Portland Cement: Complying with ASTM C150:
   1. Type I.
   2. Type __.
   3. Color, gray.
   4. Color, white or colored is optional.
   5. Color _____.

C. Mortar Aggregate: Complying with ASTM C144, standard masonry type.

D. Hydrated Lime: Complying with ASTM C207:
   1. Type S.
   2. Type SA.

E. Water: Clean and potable.

2.6 MIXES

A. Mortar Mixes:
   1. Mortar for Structural Masonry: Complying with ASTM C270, using Proportion Specification.
      a. Type N.

B. Mortar Mixing:
   1. Mix mortar ingredients in accordance with ASTM C270. Mix only in quantities needed for immediate use.
   2. Do not use anti-freeze compounds to lower freezing point of mortar.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until backing structure is plumb, bearing surfaces are level and substrates are clean and properly prepared.

B. Verify that built-in items are in proper location, and ready for roughing into stone masonry.

C. Notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Stone must be water saturated, surface-dry when placed. Water down the stone 24 hours prior to placement until saturated. Reapply water to keep stone saturated as required by weather conditions.

B. Coordinate placement of reinforcement, anchors and accessories, flashings and other moisture control products supplied by other sections.

C. Clean all built-in items of loose rust, ice, mud, or other foreign matter before incorporating into the wall. All ferrous metal built into the wall shall be primed or galvanized.

D. If required, provide temporary bracing during installation of masonry work. Maintain bracing in place until building structure provides permanent support.

3.3 INSTALLATION

A. Install veneer stone and mortar in accordance with ACI 530.1/ASCE 6/TMS 602 Specifications for Masonry Structures.

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

C. Pattern Bond:
1. Lay stone with the bedface, splitface or weather edge exposed. Take care to avoid a concentration of any one color to any one wall surface.
2. Maintain an approximate 1/2 inch (12.5 mm) joint, as stone allows.
3. If a drystack installation is desired, stone is to be laid tight to one another, as the stone will naturally allow.
4. Do not use stacked vertical joints.
5. Lay out work in advance and distribute color range of stone uniformly over total work area.

D. Anchoring: Tie stone to backing as required by the applicable Building Code. As a minimum tie stone to backing with metal ties as follows:
1. Provide minimum one tie per 2 square feet of wall surface area.
2. Maximum spacing between adjacent ties shall be 16 inches vertically and 32 inches o.c. horizontally.
3. Ties shall be imbedded in horizontal joints to a 2 inch minimum depth.
4. Provide additional ties at openings within 12 inches of opening.

E. Joining Work: Where fresh masonry joints partially set masonry.
1. Remove loose stone and mortar.
2. Clean and lightly wet surface of set masonry.
3. To avoid a horizontal run of masonry rack back 1/2 (12.5 mm) the length of stone in each course.
4. Toothing is not permitted.

F. Joints:
1. Lay stone with an approximate 1/2 inch (12.5 mm) mortar joint, as stone allows.
2. Tool joints when "thumb-print" hard with a round jointer slightly larger than the width of the joint.
3. Trowel-point or concave tool exterior joints below grade.
4. Flush cut joints to be finished with a soft brush only.
5. Retempering or mortar is not permitted.
6. Use non-corrosive stone shims as required to maintain uniform joint thickness.

G. Flashing:
1. Clean surface of masonry smooth and remove any projections, which could damage flashings.

2. Place flashing on a bed of mortar.
3. Cover flashing with mortar.
4. Provide weep vents at head joints placed every 16 inches (406 mm) along the first course immediately above flashing or as recommended by weep vent manufacturer.
5. Use a non-corrosive, fluid conducting polymer mesh such as "Mortar Net", "Control Cavity", "CavClear" or equal to keep the air space behind the installed veneer stone, clear of mortar and mortar droppings.

H. Control and Expansion Joints: Keep joints open and free of debris. Coordinate control joint in accordance with Section 07900 for sealant performance.

I. Sealant Recesses: Provide open joint 3/4 inch (19 mm) deep and 1/4 inch (6 mm) wide, where masonry meets doors, windows and other exterior openings. Coordinate sealant joints in accordance with Section 07900 for sealant performance.

J. Cutting And Fitting: Cut and fit for chases, pipes, conduit, sleeves, grounds, and other penetrations and adjacent materials

3.4 FIELD QUALITY CONTROL

A. Test mortar and grout in accordance with Section 01110.

B. Testing of Mortar Mix: In accordance with ASTM C780, Annex A4, for mortar aggregate ratio and ASTM C 780, Annex A5, for mortar water content.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Cover the top of unfinished stone masonry work to protect it from the weather.

C. Touch-up, repair or replace damaged products before Substantial Completion.

3.6 CLEANING

A. Promptly remove excess wet mortar from the face of the stone as work progresses. Clean stone masonry with a stiff nylon brush and clean water only. See Dunnville Cutstone Co., Inc recommendations for cleaning of stonework if it is necessary to clean with chemicals. These recommendations are located at www.dunnvillecutstone.com.

END OF SECTION