SPECIAL PROVISIONS
FOR
UNIT AND LIMESTONE MASONRY

Johnson County
IM-080-6(488)242--13-52

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THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

150901.01 DESCRIPTION.

A. Section Includes: Abutment monuments composed of concrete masonry units (CMU's), face brick, stone trim units, mortar and grout, steel reinforcing bars, masonry joint reinforcement, ties and anchors, embedded flashing miscellaneous masonry accessories, and decorative stars.

B. Definitions.

1. CMU(s): Concrete masonry unit(s).

2. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

C. Submittals.

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

2. Test Data: Showing conformance for each type of product indicated.

3. Stone Trim Shop Drawings: Show sizes, profiles, and locations of each limestone coping, inset, and cap unit required.

4. Samples: For each type and color of the following:
- **a.** Face brick, in the form of straps of five or more bricks.
- **b.** Stone trim.
- **c.** Colored mortar.
- **d.** Weep holes/vents.

5. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

a. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91 for air content.
b. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.

D. Quality Assurance.

1. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

2. 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.

3. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602.

4. Mockup: Construct a mockup according to the Monument Mockup Notes in the plans. Do not proceed with construction until the mockup has been approved by the Engineer.

E. Delivery, Storage, And Handling.

1. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

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

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

4. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

5. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

F. Project Conditions.

1. Protection of Masonry: During construction, cover tops monuments with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress. Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.

2. Do not apply concentrated loads for at least three days after building masonry walls or columns.

3. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
a. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
b. Protect sills, ledges, and projections from mortar droppings.

c. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
d. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

4. 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 unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

5. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40°F and higher and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

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

150901.02 MATERIALS.

A. Masonry Units, General.

Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed work.

B. Concrete Masonry Units.

1. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated. Provide special shapes for corners, headers, bonding, and other special conditions.

2. CMUs: ASTM C90.
a. Density Classification: Normal weight unless otherwise indicated.
b. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

C. Brick.

1. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
a. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
b. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
c. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
d. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

2. Face Brick: ASTM C216, Grade SW, Type FBX.
a. Products: Subject to compliance with requirements:
b. Initial Rate of Absorption: Less than 30 grams per 30 square inches per minute when tested per ASTM C67.
c. Efflorescence: Provide brick that has been tested according to ASTM C67 and is rated "not effloresced."
d. Nominal size of 2 1/3 inches by 4 inches by 8 inches.

3. Face Brick Manufacturer and products subject to the following:
   a. Endicott Clay Products Company: Blend Consisting of 50% Autumn Sands Thin Brick, and 50% Burgundy Sands Thin Brick
   b. Summitville Tiles, Inc.: B211 Cambridge Blend
   c. Glen-Gery Corporation: Sunset Flashed Wirecut (FW15)
   d. Other manufacturers submitted the Engineer for review and approval.
   e. Selected product must be the same color and manufacturer as the thin brick for the intermediate monuments.

D. Stone Trim Units.

1. Limestone: ASTM C568, Classification II Medium Density.
   a. Bedding Planes: Stone produced from the quarry shall be of such size that when delivered to the fabricator, it may be fabricated in such a way that when set it will lay on its "natural bed" with its grain running horizontally as it does in the quarry.
   b. Provide stone units accurately shaped, with exposed faces dressed true, and with beds and joints at right angles to faces.
   c. For limestone, comply with recommendations in ILI's "Indiana Limestone Handbook."
   d. Matching Units: Furnish limestone units of matching color, grade, finish, size and profile.

2. Limestone: Provide one of the following:
   a. Anamosa Stone; belt-sawn finish, veine cut as quarried by Weber Stone Company, Inc. 12791 Stone City Road, Anamosa, IA 52205, 319-462-3581.
   b. Northern Buff; belt-sawn finish, veine cut as quarried by Vetter Stone Company, Mankato, MN 56001, 507 345-4568.
   c. Amber Select; belt-sawn finish, veine cut as quarried by Kasota Stone, Inc 820 North Willow Street, Mankato MN 56001, 507.508.0684.
   d. Or approved equal.

E. Mortar and Grout Materials.

1. Portland Cement: ASTM C150, 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.

2. Hydrated Lime: ASTM C207, Type S.

3. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979. Use only pigments with a record of satisfactory performance in masonry mortar.

4. Aggregate for Mortar: ASTM C144.
   a. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
   b. For joints less than 1/4 inch thick, use aggregate graded with 100% passing the No. 16 sieve.

5. Aggregate for Grout: ASTM C404.

6. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Euclid Chemical Company (The); an RPM company.
   b. GCP Applied Technologies Inc.
   c. Master Builders Solutions.

7. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs and BCMUs containing integral water repellent by same manufacturer. Products: Subject to compliance with requirements, provide one of the following:
   a. ACM Chemistries; RainBloc for Mortar.
   b. Master Builders Solutions; MasterPel 240MA.
   c. GCP Applied Technologies Inc.; Dry-Block Mortar Admixture.

8. Water: Potable.

F. Reinforcement.

1. Uncoated Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60.

2. Masonry Joint Reinforcement, General: ASTM A951/A951M.
   a. Interior Walls: Hot-dip galvanized, carbon steel.
   b. Exterior Walls: Hot-dip galvanized, carbon steel.
   c. Wire Size for Side Rods: 0.148 inch diameter.
   d. Wire Size for Cross Rods: 0.148 inch diameter.
   e. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches on center.
   f. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

3. Masonry Joint Reinforcement for Single-Wythe Masonry: Ladder type with single pair of side rods.

4. Masonry Joint Reinforcement for Composite Cavity Wall Masonry: Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum adjustment of 1 1/4 inches. Size ties to extend at least halfway through facing wythe but with at least 5/8 inch cover on outside face.

G. Ties and Anchors.

1. Adjustable Masonry-Veneer Anchors, General:
   a. Ties and anchors shall extend at least 1 1/2 inches into veneer but with at least a 5/8 inch cover on outside face.
   b. Provide anchors that allow vertical adjustment but resist a 100 pound load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.

2. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A1064/A1064M; with ASTM A153/A153M, Class B-2 coating.

3. Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 0.188 inch diameter, hot-dip galvanized steel wire. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer.

4. Dowel Anchors: Fabricate dowels from stainless steel.

H. Embedded Flashing Materials.

1. Flexible Flashing: Use one of the following, unless otherwise indicated:
   a. Copper-Laminated Flashing: 5 ounces per square foot copper sheet bonded between two layers of asphalt-free glass-fiber cloth. Products: Subject to compliance with requirements, provide one of the following:
      1) Advanced Building Products Inc.; Copper Sealtite 2000.

2) Hohmann & Barnard, Inc.; H & B Copper-Tuff Flashing.
3) Sandell Manufacturing Co., Inc.; Copper Fabric NA Flashing.
4) York Manufacturing, Inc.; Multi-Flash 500.

b. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.

2. Metal Accessories: Provide metal accessories as follows:
a. Stainless Steel: ASTM A 240/A 240M, Type 304.
b. Metal Termination Bars: Predrilled stainless-steel, approximately 1 by 1/8 inch thick; stainless steel anchors.

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

I. Miscellaneous Masonry Accessories.

1. Weep/Vent Products: Use the following unless otherwise indicated: Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch less than depth of outer wythe; in color selected from manufacturer's standard. Products: Subject to compliance with requirements, provide one of the following:
a. CavClear/Archovations, Inc.; CavClear Weep Vents.
b. Mortar Net USA, Ltd.; Mortar Net Weep Vents.
c. Advanced Building Products, Inc.; Mortar Maze Weep Vents.
d. Or Approved Equal.

2. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
a. Products: Subject to compliance with requirements, provide the following:
1) Mortar Net USA, Ltd.; Mortar Net.
2) Advanced Building Products, Inc.; Mortar Break DT
3) MASONPRO, Inc.; ProNet DT
b. Provide the following configuration: Strips, full-depth of cavity and 10 inches high, with dovetail shaped notches 7 inches deep that prevent clogging with mortar droppings.

3. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and hold reinforcing bars in center of cells. Units are formed from 0.148 inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated. Products: Subject to compliance with requirements, provide one of the following:
a. Dayton Superior Corporation, Dur-O-Wal Division; D/A810, D/A812 or D/A817.
b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

J. Masonry Cleaners.
Proprietary Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry and adjacent material surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

K. Mortar and Grout Mixes.

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

a. Do not use calcium chloride in mortar or grout.
b. Limit cementitious materials in mortar for exterior and reinforced masonry to Portland cement and lime.
c. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

2. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to project site.

3. Mortar for Unit Masonry: Comply with ASTM C270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.
a. For masonry below grade or in contact with earth, use Type M.
b. For reinforced masonry, use Type S.
c. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.

4. Pigmented Mortar: Select and proportion pigments with other ingredients to produce color required.
a. Color(s): As selected by Architect from manufacturer's full color line. A different color may be selected for each type of masonry unit.
b. Application: Use pigmented mortar for exposed mortar joints with the following units:
1) Face brick.
2) Stone trim units.

5. Grout for Unit Masonry: Comply with ASTM C476.
a. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
b. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C143/C143M.

L. Decorative Star.

1. Custom, ornamental, cast-metal star bolt to match the star located on the entry sign walls at the 1st Avenue and 9th Street intersection in Coralville, Iowa.

2. Decorative Star Castings and Forgings:
a. Max Cast, Kalona, Iowa (319) 656-5365.
b. Vinnetti's Gallery and Foundry, Nashville, TN (800) 882-5901
c. BronzeAge Art Casting, Sioux Falls, SD (605) 977-7644
d. Or approved equal.

3. Materials: Provide alloy and temper recommended by aluminum producer and finisher with strength and durability properties not less than that of alloy and temper conforming to ASTM B 26/B 26M, alloy A356.0-T6.

4. Form ornamental metal true to line and level with true curves and accurate angles and surfaces. Finish exposed surfaces to smooth, sharp, well-defined lines and arris. Pattern for cast metal star ornamentation will be provided to Contractor.

5. Mill joints to a tight, hairline fit. Cope or miter corner joints. Fabricate connections that will be exposed to weather in a manner to exclude water.

6. Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Protect mechanical finishes by applying a strippable, temporary protective covering before shipping.
   a. Cast Aluminum Finish:
   b. High-Performance Coating: Aliphatic acrylic polyurethane; two coats, semi-gloss finish. Color: AMS-STD-595, Color 17038 (Black)

7. Anchors: Expansion type; fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by ASTM E 488.

150901.03 CONSTRUCTION.

A. Examination.

1. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
   a. For the record, prepare written report, endorsed by installer, listing conditions detrimental to performance of work.
   b. Verify that foundations are within tolerances specified.
   c. Verify that reinforcing dowels are properly placed.

2. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

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

B. Installation, General.

1. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown.

2. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

4. Wetting of High-Suction Brick: If required by manufacturer, wet brick before laying if initial rate of absorption exceeds 30 grams per 30 square inches per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

C. Tolerances.

1. **Dimensions and Locations of Elements.**
   a. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
   b. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
   c. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

2. **Lines and Levels.**

a. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
b. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
c. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
d. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
e. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
f. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet or 1/2 inch maximum.
g. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

3. Joints.
a. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
b. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
c. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
d. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.
e. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

D. Laying Masonry Walls.

1. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

2. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

3. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4 inch horizontal face dimensions at corners or jambs.

4. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

5. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

6. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

E. Mortar Bedding and Jointing.

1. Lay hollow CMUs as follows:
   a. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
   b. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
   c. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
   d. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

2. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

3. Set stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
   a. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
   b. Wet joint surfaces thoroughly before applying mortar.
   c. Rake out joints for pointing with mortar or installation of sealant and backing material to a depth of not less than 3/4 inch. Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.
   d. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch. Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.

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

5. Cut joints flush for masonry walls to receive waterproofing membranes, air/vapor barriers, plaster, ceramic wall tile, or other direct-applied finishes (other than paint), unless otherwise indicated.

F. Composite Masonry.

1. Bond wythes of composite masonry together using one of the following methods: Masonry Joint Reinforcement: Installed in horizontal mortar joints.
   a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
   b. Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement.

2. Corners: Provide interlocking masonry unit bond in each wythe and course at corners unless otherwise indicated. Provide continuity with masonry joint reinforcement at corners by using prefabricated L-shaped units as well as masonry bonding.

3. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond walls together as follows:
   a. Provide continuity with masonry joint reinforcement by using prefabricated T-shaped units.
   b. Provide rigid metal anchors not more than 24 inches on center. If used with hollow masonry units, embed ends in mortar-filled cores.

G. Cavity Walls.

1. Bond wythes of cavity walls together using one of the following methods:
   a. Masonry Joint Reinforcement: Installed in horizontal mortar joints.

1) Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
2) Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement.
3) Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type reinforcement to allow for differential movement regardless of whether bed joints align.

b. Masonry Veneer Anchors: Comply with requirements for anchoring masonry veneers.

2. Air Space: Provide not less than 1 inch of air space between back of masonry veneer and exterior face of rigid insulation. Where non-insulated cavity is indicated on plans, provide not less than 2 inches of air space between back of masonry veneer and exterior face of backup wall.

3. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

H. Masonry Joint Reinforcement.

1. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
a. Space reinforcement not more than 16 inches on center.
b. Space reinforcement not more than 8 inches on center in foundation walls and parapet walls.
c. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.

2. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

3. Provide continuity at wall intersections by using prefabricated T-shaped units.

4. Provide continuity at corners by using prefabricated L-shaped units.

I. Anchoring Masonry Veneers.

1. Anchor masonry veneers at masonry cavity walls with masonry-veneer anchors to comply with the following:
a. Use adjustable (two-piece) type reinforcement installed in horizontal mortar joints.
b. Embed tie sections in masonry veneer joints.

2. Masonry Veneer Tie Spacing.
a. Provide ties installed in horizontal joints, at not less than one metal tie for 1.77 square feet of wall area, spaced not to exceed 16 inches on center horizontally and 16 inches on center vertically.
b. Stagger ties in alternate courses.
c. Install additional anchors within 12 inches of openings and at intervals, not exceeding 16 inches, around perimeter
d. At intersecting and abutting walls, provide ties at no more than 16 inches on center vertically.

J. Flashing, Weep Holes, Cavity Drainage, and Vents.

1. General: Install embedded flashing and weep holes in masonry at shelf angles, ledges, other obstructions to downward flow of water in wall, and where indicated. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.

Allow Engineer to conduct visual inspection of embedded flashings prior to concealing from view with subsequent construction.

2. Install flashing as follows unless otherwise indicated:
   a. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on bed of sealant as recommended by flashing manufacturer and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
   b. Coordinate sequence and installation of air barrier system with flashing.
   c. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches, and through inner wythe to within 1/2 inch of the interior face of wall in exposed masonry.
   d. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
   e. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

3. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
   a. Use specified weep/vent products to form weep holes.
   b. Space weep holes 24 inches on center unless otherwise indicated.

4. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

K. Decorative Star Installation.

Install decorative star where shown on the plans using expansion anchor drilled through center of star. Paint exposed hardware to match star.

L. Repairing, Pointing, and Cleaning.

1. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

2. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

3. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

4. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
   a. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
   b. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
   c. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
   d. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

e. Clean masonry with a proprietary cleaner applied according to manufacturer's written instructions.
f. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.
g. Clean limestone units to comply with recommendations in ILI's "Indiana Limestone Handbook."

150901.04 METHOD OF MEASUREMENT.
The Engineer will count each Abutment Monument installed.

150901.05 BASIS OF PAYMENT.
Contractor shall be paid the contract unit price for each Abutment Monument measured. Payment includes all labor, materials, equipment, and supervision required to install the Abutment Monuments, including concrete block, mortar, grout, reinforcing, face brick, stone trim, flashing, weeps, ties, anchors, and decorative stars. The Abutment Monument mockup shall be incidental to this bid item.