SECTION 042613 – MASONRY VENEER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Refer to **Specification 042000 – UNIT MASONRY**

1.2 SUMMARY

A. Section Includes:
1. Clay face brick.
2. Mortar.
3. Ties and anchors.
4. Embedded flashing.
5. Miscellaneous masonry accessories.

B. Products Installed but not Furnished under This Section:
1. Steel lintels in masonry veneer.
2. Steel shelf angles for supporting masonry veneer.

C. Related Requirements:
1. Section 076200 "Sheet Metal Flashing and Trim" for sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

1.4 DEFINITIONS

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

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at **Project site**.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

C. Shop Drawings: For the following:

1. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

D. Samples for Initial Selection:

1. Clay face brick, in the form of straps of five or more bricks.
2. Colored mortar.
3. Weep holes/vents.

E. Samples for Verification: For each type and color of the following:

1. Clay face brick, in the form of straps of five or more bricks.
2. Colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.
3. Weep holes and vents.
4. Accessories embedded in masonry.

1.7 INFORMATIONAL SUBMITTALS

A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.

1. Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

B. Material Certificates: For each type and size of the following:

1. Masonry units.
   a. Include data on material properties material test reports substantiating compliance with requirements.
   b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
   c. For exposed brick, include test report for efflorescence according to ASTM C 67.
2. Mortar admixtures.
3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
4. Anchors, ties, and metal accessories.

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

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.

D. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.8 QUALITY ASSURANCE

A. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 014000 "Quality Requirements" for mockups.

1. Build sample panels for typical exterior wall in sizes approximately 48 inches (1200 mm) long by 48 inches (1200 mm) high by full thickness.
2. Build sample panels facing south.
3. Where masonry is to match existing, build panels adjacent and parallel to existing surface.
4. Clean one-half of exposed faces of panels with masonry cleaner indicated.
5. Protect approved sample panels from the elements with weather-resistant membrane.
6. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.

    a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless such deviations are specifically approved by Architect in writing.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockup of typical wall area as shown on **Drawing A520**.
2. Build mockups for typical exterior wall in sizes approximately 48 inches (1200 mm) long by 48 inches (1200 mm) high by full thickness, including face and backup wythes and accessories.
    a. Include a sealant-filled joint at least 16 inches (400 mm) long in mockup.
    b. Include lower corner of window opening at upper corner of exterior wall mockup. Make opening approximately 12 inches (300 mm) wide by 16 inches (400 mm) high.
    c. Include through-wall flashing installed for a 24-inch (600-mm) length in corner of exterior wall mockup approximately 16 inches (400 mm) down from top of mockup, with a 18-inch (450-mm) length of flashing left exposed to view (omit masonry above half of flashing).
    d. Include metal studs, sheathing, water-resistive barrier sheathing joint-and-penetration treatment air barrier, veneer anchors, flashing, cavity drainage material, and weep holes in exterior masonry-veneer wall mockup.
4. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.
5. Protect accepted mockups from the elements with weather-resistant membrane.
6. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.

    a. Approval of mockups is also for other material and construction qualities specifically approved by Architect 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.

1.9 DELIVERY, STORAGE, AND HANDLING

A. 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.

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

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

D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

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

1.10 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of veneer, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches (600 mm) down face of veneer, and hold cover securely in place.

B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry. Immediately remove grout, mortar, and soil that come in contact with masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over 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 the end of each day to prevent rain from splashing mortar and dirt onto completed 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 unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. 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.

B. 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.

2.2 BRICK

B. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:

1. 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.
2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

C. Clay Face Brick: Facing brick complying with ASTM C 216, type FBS, Grade SW and as follows:

1. Unit Compressive Strength: Specify units with minimum average net-area compressive strength of 3000 psi.
2. 24-Hour Cold Water Absorption: Does not exceed 8.0%.
3. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
4. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers, or Architect approved equal prior to Bid, offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Product Representative
   North Georgia Brick
   Jamie Hustey
   404-989-1489
   jhustey@ngabrick.com
   b. Product
   As indicated on Architectural Drawing A520
   Exterior Keynote Schedule

5. Size (Actual Dimensions): **To match existing brick in size and texture.**

2.6 MORTAR MATERIALS

B. **Provide the following:**
1. **Masonry Cement meeting ASTM C 91**
   a. **For pigmented mortars, only allow premixed, colored masonry cements of formulation required to produce color desired. Pigments shall not exceed 5 percent of masonry cement by weight for mineral oxides nor 1 percent for carbon black.**
2. **Hydrated Lime: ASTM C 207, Type S.**
3. **Portland Cement-Lime Mix: Packaged blend of Portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207, Type S.**
4. **Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch (6.5 mm), use aggregate graded with 100 percent passing the No. 16 (1.18 mm) sieve.**
5. **Aggregate for Grout: ASTM C 404.**
6. **Ready-Mixed Mortar: Cementitious materials, water, and aggregate complying with requirements specified in this Article; combined with set-controlling admixtures to produce a ready-mixed mortar complying with ASTM C 1142.**
7. **Water: Potable.**
8. **Products: Colored Masonry Cement:**
   a. **At locations of specified face brick, use Type N mortar, color to be Argos Canyon Brown**

2.7 TIES AND ANCHORS

A. **Adjustable Masonry-Veneer Anchors:**
1. **General: Provide two-piece assemblies that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.**
2. **Screw-Attached, Masonry-Veneer Anchors at metal stud framing:**
   a. **Basis of Design is HB-213-HS by Hohmann & Barnard, Inc.**
   b. **Wire tie section shall extend at least halfway through veneer but with at least 5/8-inch cover on outside face.**
   c. **Wire (carbon steel): Prefabricated from cold-drawn steel wire conforming to ASTM A82/A82M**
   d. **Tensile Strength: 80,000 p.s.i., Yield Point: 70,000 p.s.i. minimum**
   e. **Hot-dip Galvanized after fabrication: ASTM A153/A153M-B (1.5 oz/ft2)**
   f. **Space 16" on center horizontal and 16" on center vertical.**
   g. **Refer to Section 072100. Provide wall ties that aide in securing rigid insulation.**

3. **Screw-Attached, Masonry-Veneer Anchors at concrete:**
   a. **Basis of Design is HB-200 by Hohmann & Barnard, Inc.**
   b. **Wire tie section shall extend at least halfway through veneer but with at least 5/8-inch cover on outside face.**
   c. **Wire (carbon steel): Prefabricated from cold-drawn steel wire conforming to**

ASTM A82/A82M

d. Tensile Strength: 80,000 p.s.i., Yield Point: 70,000 p.s.i. minimum
e. Hot-dip Galvanized after fabrication: ASTM A153/A153M-B (1.5 oz/ft2)
f. Space 16" on center horizontal and 16" on center vertical.

4. Masonry-Veneer Anchors at CMU:
a. Basis of Design is Lox-All Truss Reinforcement #170 Truss Eye-Wire by Hohmann & Barnard, Inc.
b. Wire tie section shall extend at least halfway through veneer but with at least 5/8-inch cover on outside face.
c. Conforms to ASTM A951/A951M-06, ACI/ASCE 530 and ASTM A82/A82M
d. Tensile Strength: 80,000 p.s.i., Yield Point: 70,000 p.s.i. minimum e. Hot-dip Galvanized after fabrication: ASTM A153/A153M-B2 (1.5 oz/ft2)
e. Space 16" on center horizontal and 16" on center vertical.

2.8 EMBEDDED FLASHING MATERIALS

A. Flexible Flashing:

1. Use the following unless otherwise indicated:

a. Basis-of-Design Product: Subject to compliance with requirements, provide Mortar Net Solutions; TotalFlash unitized flashing and cavity drainage system or comparable product by one of the following:

1) Advanced Building Products Inc.
2) Architect approved prior to Bid

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

1) Basis-of-Design Product: Mortar Net Solutions; CompleteFlash.

c. Sealants:

1) Basis-of-Design Product: Mortar Net Solutions; BTL-1, Butyl.

2. 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 0.040 inch (1.02 mm).

a. Basis-of-Design Product: Subject to compliance with requirements, provide Mortar Net Solutions; TotalFlash unitized flashing and cavity drainage system or comparable product by one of the following:

1) Advanced Building Products Inc.
2) Carlisle Coatings & Waterproofing Inc.
3) Fiberweb, Clark Hammerbeam Corp.
4) Grace Construction Products; W.R. Grace & Co. -- Conn.
5) Heckmann Building Products, Inc.

6) Polyguard Products, Inc.
7) W. R. Meadows, Inc.
8) Williams Products, Inc.

b. Accessories: Provide preformed corners and end dams produced by flashing manufacturer.

1) Basis-of-Design Product: Mortar Net Solutions; CompleteFlash.

c. Sealants:

1) Basis-of-Design Product: Mortar Net Solutions; MPE-1, Modified Polyether BTL-1, Butyl.

3. Elastomeric Thermoplastic Flashing: Composite flashing product consisting of a UV stable thermoplastic vinyl of an overall thickness of not less than 0.040 inch (1.02 mm).

a. Basis-of-Design Product: Subject to compliance with requirements, provide Mortar Net Solutions; TotalFlash unitized flashing and cavity drainage system or comparable product by one of the following:

1) Advanced Building Products Inc.
2) Hyload, Inc.
3) Or Architect approved prior to Bid

b. Self-Adhesive Sheet: Flexible 40 mil (1 mm) self-adhering sheet membrane, consisting of a self-adhered rubberized asphalt, a removable treated release film, and a high density 8 mil (0.2 mm) polymer film as the top surface.

c. Self-Adhesive Sheet with Drip Edge: Flexible 40 mil (1 mm) self-adhering sheet membrane, consisting of a self-adhered rubberized asphalt with drip edge. Where flashing extends to face of masonry, rubberized-asphalt coating is held back approximately 3/4 inches (19 mm) from edge.

d. Accessories: Provide preformed corners and end dams produced by flashing manufacturer.

1) Basis-of-Design Product: Mortar Net Solutions; CompleteFlash.

e. Sealants:

1) Basis-of-Design Product: Mortar Net Solutions; MPE-1, Modified Polyether BTL-1, Butyl.

4. EPDM Flashing: Sheet flashing product made from ethylene-propylene-diene terpolymer, complying with ASTM D 4637/D 4637M, 0.045 inch (1.14 mm) thick.

a. Basis-of-Design Product: Subject to compliance with requirements, provide Mortar Net Solutions; TotalFlash unitized flashing and cavity drainage system or comparable product by one of the following:

1) Carlisle Coatings & Waterproofing Inc.
2) Firestone Specialty Products.
3) Heckmann Building Products, Inc.
4) Architect approved prior to Bid

b. Accessories: Provide preformed corners and end dams produced by flashing manufacturer.

1) Basis-of-Design Product: Mortar Net Solutions; CompleteFlash.

c. Sealants:

1) Basis-of-Design Product: Mortar Net Solutions; MPE-1, Modified Polyether] BTL-1, Butyl.

B. Application: Unless otherwise indicated, use the following:

1. Where flashing is indicated to receive counterflashing, use metal flashing.
2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
3. Where flashing is partly exposed and is indicated to terminate at the wall face, use a flexible flashing with a metal drip edge or elastomeric thermoplastic flashing with a drip edge.

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

D. Termination Bars for Flexible Flashing: [Aluminum] [Stainless steel] steel bars [0.075 inch by 1 inch (1.9 mm by 25 mm)] [1/8 inch by 1 inch (3 mm by 25 mm)].

E. Termination Bars for Flexible Flashing: Stainless steel sheet 0.019 inch by 1-1/2 inches (0.48 mm by 38 mm) with a 3/8 inch (9.5 mm) sealant flange at top.

F. Termination Bars for Flexible Flashing: Aluminum sheet 0.064 inch by 1-1/2 inches (01.6 mm by 38 mm) with a 3/8 inch (9.5 mm) sealant flange at top.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene urethane or PVC.

B. Weep/Vent Products: Use:

1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch (3 mm) less than depth of outer wythe, in color selected from manufacturer's standard.

a. Basis-of-Design Product: Subject to compliance, provide Mortar Net Solutions; CellVent or Architect approved prior to Bid:

Cell Vents: Ultra Violet Resistant Polypropylene cell vent tested in conformance with ASTM D2240, D790B, D638 and D1238B.

i. Basis of Design is Quadro-Vent by Hohmann & Barnard, Inc.
ii. #3601 Cell Vent by Wire-bond.
iii. Mortar Net Weeps not allowed.
iv. Plastic tube weeps not allowed.
v. Cotton weeps not allowed.
vi. Color to be selected from standard color samples to match mortar.
vii. Space vents 24" on center horizontally placed in brick masonry joint. Vent to occur full height of joint. Cut vent as required to match brick height.

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

1. **Basis-of-Design Product: Subject to compliance with requirements, provide Mortar Net Solutions; MortarNet with the following:**

a. Provide trapezoidal shaped Mortar Net with insect barrier to suspend mortar droppings at unequal heights allowing moisture to drain from the cavity and maintain airflow within the cavity wall.

b. Shall have 90% open-weave mesh construction, shall not oxidize, rot,

2.10 MASONRY CLEANERS

A. 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 surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. **To satisfy the following:**
a. Brick cleaning in accordance with BIA Technotes #20.
b. Cleaning solutions to be approved by the manufacturer to not damage the surface of the units.
c. Pressure washing is not allowed due to the potential damage to units and mortar joints.
d. The use of muriatic or hydrochloric acid is not allowed.

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 in mortar or grout.**

B. **Mortar for Unit Masonry: Comply is to comply with BIA M1, for types of mortar indicated below:**

1. **For masonry below grade, in contact with earth, use Type S mortar.**
2. **For reinforced masonry, use Type S mortar.**
3. **For exterior, above-grade, load-bearing and non-load bearing walls; for interior load-bearing walls; for interior non-load bearing partitions, and for other applications, use Type N mortar.**
4. **Pigmented Mortar: Select and proportion pigments with other ingredients to produce color required.**
5. **Grout for Unit Masonry: Comply with ASTM C 476.**
   a. **Use coarse grout in grout spaces 2 inches or more in least horizontal dimension.**
6. **Mortar joints shall be concave, unless otherwise directed by the County.**

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

   1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

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

3.2 INSTALLATION, GENERAL

A. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

B. 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.

C. 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.

D. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

E. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested according to ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
2. 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 (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
4. 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 (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm).Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch (1.5 mm) from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

A. 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.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in **running bond** ; do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

C. Stopping and Resuming Work: Stop work by stepping 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.

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

3.5 MORTAR BEDDING AND JOINTING

A. 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.

B. Lay hollow brick and CMUs with face shells fully bedded in mortar and with head joints of depth equal to bed joints. At starting course, fully bed entire units, including area under cells.

1. At anchors and ties, fully bed units and fill cells with mortar as needed to fully embed anchors and ties in mortar.

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

1. For glazed masonry units, use a nonmetallic jointer 3/4 inch (19 mm) or more in width.

3.6 ANCHORED MASONRY VENEERS

A. Anchor masonry veneers to wall framing and concrete and masonry backup with seismic masonry-veneer anchors to comply with the following requirements:

1. Fasten screw-attached and seismic anchors through sheathing to wall framing and to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
2. Embed tie sections connector sections and continuous wire in masonry joints.
3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
4. Space anchors as indicated, but not more than 18 inches (458 mm) o.c. vertically and 24 inches (610 mm) o.c. horizontally, with not less than one anchor for each 2 sq. ft. (0.2 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 8 inches (203 mm), around perimeter.

B. Provide not less than 2 inches (50 mm) of airspace between back of masonry veneer and face of sheathing insulation.

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

3.7 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete to comply with the following:

1. Provide an open space not less than 2 inches (50 mm) wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches (610 mm) o.c. vertically and 36 inches (915 mm) o.c. horizontally.

3.8 EXPANSION JOINTS

A. General: Install expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span expansion joints without provision to allow for in-plane wall or partition movement.

B. Form expansion joints as follows:

1. Build in compressible joint fillers where indicated.
2. Form open joint full depth of brick wythe and of width indicated, but not less than 1/2 inch (13 mm) for installation of sealant and backer rod specified in Section 079200 "Joint Sealants."

C. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 "Joint Sealants," but not less than 3/8 inch (10 mm).

1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.9 LINTELS

A. Install **galvanized steel lintels** above all exterior exposed openings. **Paint all lintel surfaces prior to installation with special paint that adheres to galvanized steel on all surfaces.**

B. Provide minimum bearing of 8 inches (200 mm) at each jamb unless otherwise indicated.

3.10 FLASHING, WEEP HOLES, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, 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.

B. Install flashing as follows unless otherwise indicated:

1. 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 sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. Extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches (200 mm); with upper edge tucked under water-resistive barrier air barrier, lapping at least 4 inches (100 mm). Fasten upper edge of flexible flashing to sheathing through termination bar.
3. At lintels and shelf angles, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
5. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

D. Install weep holes in veneers in head joints of first course of masonry immediately above embedded flashing.

1. Use specified weep/vent products to form weep holes.
2. Use wicking material to form weep holes above flashing under brick sills. Turn wicking down at lip of sill to be as inconspicuous as possible.
3. Space weep holes 24 inches (600 mm) o.c. unless otherwise indicated.

E. Place cavity drainage material in airspace behind veneers to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

3.11 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

B. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.

C. Testing Prior to Construction: One set of tests.

D. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C 67 for compressive strength.

E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.

F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.

3.12 REPAIRING, POINTING, AND CLEANING

A. 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.

B. 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.

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

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. 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.
3. Protect adjacent stone and non masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
7. Clean stone trim to comply with stone supplier's written instructions.
8. Clean limestone units to comply with recommendations in ILI's "Indiana Limestone Handbook."

3.13 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.

1. Crush masonry waste to less than 4 inches (100 mm) in each 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 (450 mm) of finished grade.

C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042113