SECTION 04200

UNIT MASONRY

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included:

Unit masonry required for this Work is indicated on the Drawings and may include, but is not necessarily limited to, concrete block bearing walls, partition walls, brick, veneer, and related work.

1.02 QUALITY ASSURANCE

A. In addition to complying with all pertinent codes, standards and regulations, the Contractor shall comply with all standards referenced in these Specifications and applicable portions of the following standards.

1. Concrete block:
   a. "Standard Specifications for Hollow Load Bearing Concrete Masonry Units", ASTM C-90.
   b. "Standard Specification for Solid Load Bearing Concrete Masonry Units", ASTM C-145.
   c. “Standard Specification for Dry-Cast Nonloadbearing Concrete Masonry Units”, ASTM C-129.
   d. “Standard Specification for Concrete Facing Brick and Other Concrete Masonry Facing Units”, ASTM-1634.
   e. "Standard Methods of Sampling and Testing Concrete Masonry Units", ASTM C-140.
   f. "Standard Specification for Concrete Aggregates", ASTM C-33.
   g. "Tests for Drying Shrinkage of Concrete Masonry Units", ASTM C-426.

2. Architectural Block:
   a. Greensburg Block, Greensburg, PA. Split-face (Gray), Nitterhouse- Split-Face Block - Style "J-13" (light gray) or Duchini Block Split-face (Gray) or pre-approved equal. The charcoal border shall be painted in the field by the General Contractor as directed by the Engineer.
   b. Mortar for Architectural Block shall be supplied by the block manufacturer and match the split-face block perfectly.

3. Mortar and grout:
   a. "Standard Specification for Mortar and Grout for Reinforced Masonry", ASTM C-476.
   b. "Standard Specification for Aggregate for Masonry Mortar", ASTM C-144.
   c. "Standard Specification for Aggregate for Masonry Grout", ASTM C-404.
   d. "Standard Specification for Mortar for Unit Masonry", ASTM C-270.
   e. "Standard Specification for Portland Cement", ASTM C-150.
   f. "Standard Specification for Masonry Cement", ASTM C-91.
   g. "Standard Specification for Quicklime for Structural Purposes", ASTM C-5.
   h. "Standard Specification for Hydrate Lime for Masonry Purposes", ASTM

C-207.

i. "Standard Specification for Air-Entraining Admixtures for Concrete", ASTM C-260.

j. "Standard Specification for Portland Cements-Lime Mortar for Brick Masonry", Brick Institute of America, (BIA) Designation MI-72.

4. All of the foregoing refers to the latest edition of the referenced standards.

5. Included in the list of applicable standards will be all other standards as may be referenced in the full texts of those principal standards enumerated above, whether or not they appear in the foregoing list, and all other standards as may be referenced in this Section.

B. Notification:

At least 48 hours prior to installation of masonry Work, the Contractor shall notify the Engineer of the time and date the masonry work will begin. The Engineer shall be present at the start of the masonry work to verify the acceptability of the masonry work relative to the qualities of appearance, materials and construction.

1.03 SUBMITTALS

A. Samples:

Before any unit masonry materials are delivered to the job site, the Contractor will submit mortar mix design proportions together with sufficient evidence that the proposed mortar mix will meet the requirements of these Specifications and two (2) samples of each of the proposed masonry units to the Engineer for his approval in accordance with Section 01300 of these Specifications.

B. Certification:

Prior to delivery of unit masonry to the job site, the Contractor will deliver to the Engineer a letter from the Manufacturer(s) of the unit masonry certifying that all such unit masonry delivered to the job site is in strict conformance with the provisions of this Section of these Specifications.

1.04 PRODUCT HANDLING

A. Protection:

1. The Contractor will use all means necessary to protect unit masonry materials before, during and after installation and to protect the installed Work and materials of all other trades.

2. Unit masonry will not be dumped but will be handled individually or in suitable groups and properly stacked above ground on a level platform which permits air circulation under the stack. Unit masonry stacks will be covered and protected from weather, moisture and neglect.

B. Replacements:

In the event of damage, the Contractor will immediately make all repairs and replacements

necessary to the approval of the Engineer and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 CONCRETE BLOCK

A. Concrete block shall conform to ASTM C-90 or C-145, as applicable, Grade N-1 or better, Type I, normal block widths of 6 inches, nominal face dimensions of 8 by 16 inches as shown on the Drawings, load bearing block, free from chips and spalls with exposed surfaces uniform in color and fine to medium in texture. The Contractor shall provide complete with masonry opening and corner units as required.

B. All concrete blocks shall be plant cured under cover for at least 30 days prior to delivery.

C. Aggregates for concrete block shall conform to ASTM C-33 and shall consist of gravel, crushed gravel or crushed stone. The use of air-cooled blast furnace slag as an aggregate shall not be acceptable.

D. Shrinkage of concrete blocks shall not exceed 0.03 percent for normal length units when tested in accordance with ASTM C-426.

E. At the time of delivery to the job site, concrete blocks shall have been cured for at least 30 days and shall have a value, in weight of contained water, of not more than 40% of the fully saturated content for the unit tested. All units shall be shipped from the factory and stored at the job site with all necessary protection to prevent increase of water content from rain and other sources.

2.02 MORTAR AND GROUT

A. Materials used in the preparation of mortar and grout shall conform to the following:

1. Cementitious materials:

   a. Portland Cement - ASTM C-150, Type I.
   b. Masonry Cement - ASTM C-91, Type II.
   c. Quickline - ASTM C-5.
   d. Hydrated Lime - ASTM C-207, Type S.

2. Air-Entraining Admixtures: ASTM C-260.

3. Aggregates: ASTM C-144 (Mortar) or ASTM C-404 (Grout).

4. Water: Clean and potable.

5. Admixtures: Integral waterproofing compounds, accelerators or other admixtures not specifically mentioned shall not be used without prior written approval by the Engineer.

6. Mortar Colors: Mortar color shall generally be natural except for colored mortar required for the Architectural (Nitterhouse) split-face block.

7. Antifreeze Compounds: No antifreeze liquid, salts or other substances shall be used in the mortar or grout to lower the freezing point.

B. Mortar mixes shall conform in all respects to ASTM C-270 or BIA-MI-72, Type M or S, or ASTM C-476, Type PL or PM. Materials used in mortar mixes shall conform to the standards referenced in Item A above.

C. Grout mixes shall conform in all respects to ASTM C-476, fine grout or coarse grout as appropriate for the intended application. Materials used in grout mixes shall conform to the standards referenced in Item A above.

D. Laboratory tests shall be performed for mortar and grout mixes and materials used in these mixes in accordance with the standards referenced in this Section. Test results shall be submitted to the Engineer for approval prior to incorporation of these items into the Work.

2.03 WALL REINFORCING

A. Horizontal joint reinforcing and ties for masonry: The Contractor shall provide welded wire units prefabricated in straight lengths of not less than 10 feet with matching corner ("L") and intersecting ("T") units, fabricated from cold-drawn steel wire complying with ASTM A-82, with deformed continuous side rods and plan cross rods into units with widths of approximately 2 inches less than nominal width of walls and partitions as required to position side rods for full embedment in mortar with mortar coverage of not less than 5/8 inch on joint faces exposed to exterior and not less than 1/2 inch elsewhere. Truss type of joint reinforcing with diagonal cross rods spaced not more than 16 inches on centers (vertically every other course of block) shall be provided unless otherwise indicated.

Number of side rods: single pair for single wythe masonry and one side rod for each brick wythe.

B. Wire sizes: Reinforcement for exterior walls shall be fabricated with 3/16-inch diameter side rods and 9-gage cross rods, unless noted otherwise . Reinforcement for interior walls shall be fabricated with 9-gage side and cross rods, unless noted otherwise.

C. Wire finish: Manufacturer's hot dipped galvanized finish to comply with ASTM A-153, Class B-2 coating, for exterior walls and Manufacturer's standard galvanized finish elsewhere shall be provided.

2.04 ANCHOR AND TIES

A. Miscellaneous anchoring hardware:

1. Anchoring Hardware shall be provided as shown on the Drawings or as required to produce a strong rigid masonry wall with all required intersections and/or fastened items properly secured.

2. Metal strap anchors, buck and frame anchors and other anchoring devices shall be provided as necessary for the proper installation of the work.

3. Anchoring hardware shall be as manufactured by Heckman Building Products, Inc., Hohmann and Barnard, Inc., or approved equal.

2.05 OTHER MATERIALS

All other materials not specifically described but required for a complete and proper installation of unit masonry shall be as selected by the Contractor subject to the approval of the Engineer.

PART 3 - EXECUTION

3.01 MIXING MORTAR AND GROUT

A. Materials for mortar and grout mixes shall be measured by either volume or weight, such that the specified proportions of the mortar and grout can be controlled and accurately maintained. Measurement of sand by shovel shall not be permitted.

B. All cementitious materials and aggregate shall be mixed for at least three (3) minutes and not more than five (5) minutes in a mechanical batch mixer, with the minimum amount of water to produce a workable consistency.

C. Mortars that have stiffened because of evaporation of water from the mortar shall be retempered by adding water as frequently as needed to restore the required consistency. Mortars shall be used and placed in final position within 2-1/2 hours after initial mixing. Grout mixes shall not be retempered.

3.02 INSTALLATION OF UNIT MASONRY

A. No unit masonry is to be laid in temperatures of less than 40ºF unless suitable means for heating materials and for protecting the work against cold and frost are provided and are approved by the Engineer. Provisions shall be made to protect unit masonry against freezing for at least forty-eight (48) hours after being laid.

B. Exposed surfaces of masonry walls shall be kept clean of mortar droppings during construction. When Work is not in progress, tops of walls are to be kept covered with non-staining covers, weighted down. On resumption of Work top surfaces shall be cleaned of all loose mortar and foreign matter and wetted down, if required.

C. Loose steel or reinforced concrete block lintels as shown on the Drawings or as required herein shall be installed. Frame anchors shall be bedded in mortar joints and filled solidly against doorframes with mortar. Joints shall be struck with a concave tool. Unit masonry shall fit tightly against and around pipe sleeves, conduit and against ceiling structures.

D. Joints in exterior brick walls shall be a nominal 3/8-inch thick. In exposed wall, brick or masonry joints shall be cut flush, then tooled with 5/8-inch diameter approved round tool, compacting mortar tightly against units on both sides of joint. Tool head joints first.

E. Unit masonry shall be laid plumb with level courses and accurate joints and to dimensions as shown on the Drawings. Bonds shall be running bonds unless otherwise noted. Special units shall be used where required for corners, returns, openings and offsets. Joints shall be tooled with metal tool to a concave surface to achieve a wall design of brick in a running bond except concrete block joints which shall be painted shall be cut flush and not tooled. Care shall be taken at all openings to assure that all exposed returns of masonry units are of same texture as the corresponding wall. Particular care shall also be exercised at these points to obtain uniform and level joints.

F. Wall reinforcement in all unit masonry walls, whether solid brick, concrete block, cavity walls or composite walls shall be installed. Reinforcement shall be placed in the first and second bed joints; 8 inches apart immediately above lintels and below sills at openings, and in bed joints at 24 inch vertical intervals elsewhere. Reinforcement in the second bed joint above or below openings shall extend 2 feet beyond jambs, and all other reinforcement continuous and splices with a minimum of 8-inch laps for side rods, or in accordance with the National Concrete Masonry Association Standards shall be made. Reinforcement with minimum 5/8-inch mortar cover on face sides shall be installed. All intersecting walls and corners shall be tied with reinforcement and additional reinforcement as shown on the Drawings or as required herein shall be provided.

G. Rope wick or plastic weepholes, at 24 inch spacing in vertical joints of the first course, shall be provided over all counter flashing and through wall flashing on all exterior walls.

H. Uncompleted walls shall be braced during construction to prevent injury to personnel or damage to adjacent structures. Damaged Work shall be replaced, restored, or repaired as required by the Engineer.

I. Dirt, mortar stains and other markings shall be removed upon completion of masonry Work. No wire brushing shall be permitted. A dilute solution of muriatic acid and water shall be allowed for brick or block walls, provided it is promptly and thoroughly removed with water.

J. Built-in Work:

1. Work with other trades shall be coordinated to properly install all connecting work.

2. All panel boxes, anchors, grounds, plugs, spandrel waterproofing, flashings, expansion and control joints, electrical devices, and all other incidental Work shall be built-in.

3. Required bedding, grouting for metal doors, windows, frames or lintels shall be provided. Fill in solid behind metal door frames at head and jambs.

4. Caulking spaces 1/4 inch wide by 3/4 inch deep around wall openings shall be provided.

5. Hollow masonry units directly under wall-supported beams, lintels, steel joists and girders shall be filled with concrete and reinforced as shown on the Drawings. Hollow masonry units receiving anchor bolts shall be filled completely with concrete.

6. Chases and recesses shall be built into walls at the time walls are constructed, so that the structural stability and weather resistance of the wall is maintained. Masonry shall be supported directly over chases wider than 12 inches on lintels. At least 8 inches of masonry between chases, jambs, or openings shall be provided.

K. Upon completion of the Work of this Section, the Contractor shall make a thorough inspection of all installed unit masonry and verify that all units and all joints have been installed in accordance with the provisions of this Section, making all necessary adjustments.

L. Upon completion of all Work of this Section, the Contractor shall promptly remove from the job site all mortar droppings, broken units, debris arising from the Work of this Section, and all tools and equipment of this Section, leaving all areas in a neat and orderly condition to the approval of the Engineer.

PART 4 – BASIS OF PAYMENT

4.01 Unit Masonry – Incidental. No additional compensation will be provided for Unit Masonry. The cost associated with Unit Masonry shall be included in the Lump Sum price bid for the items specified in the Bid Schedule.

END OF SECTION