SECTION 04 20 00
UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish and install:

1. Concrete masonry unit construction for infill of existing tilt-up panels where indicated on the Drawings.
2. Reinforcing, ties, anchors, and other metal accessories, for anchoring unit masonry together and to other materials.

B. Place, install and build-in, as work progresses, the following products and materials furnished under the indicated Sections:

1. Anchor bolts, wood blocking, and anchorage items furnished or set by other trades as specified in individual Sections.
2. Access door frames furnished by Section 08 31 00 - ACCESS DOORS AND PANELS or by section requiring the same.

1.2 RELATED REQUIREMENTS

A. Section 01 45 00 - QUALITY CONTROL: Perform testing of masonry, mortar and grout specified herein.

B. Section 01 45 29 - TESTING LABORATORY SERVICES: Perform testing of masonry, mortar and grout specified herein.

C. Section 07 84 00 - FIRESTOPPING.

D. Section 07 92 00 - JOINT SEALANTS: Sealant, caulking materials, and compressible joint bead back-up, in conjunction with masonry work.

1.3 REFERENCES

A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. The standards referenced herein are included to establish recognized minimum quality only. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern. Equivalent quality and testing standards will be acceptable, subject to their timely submission, review and acceptance by the Architect.

1. Masonry Standards Joint Committee (MSJC) [The Masonry Society (TMS)/American Concrete Institute (ACI)/American Society of Civil Engineers (ASCE)]: TMS 602/ACI 530.1/ASCE 6 - “Specifications for Masonry Structures”
2. ASTM A 82 - Steel Web, Plain, for Concrete Reinforcement.
3. ASTM A 123 - Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products.
4. ASTM A 153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
5. ASTM A 497 - Welded Wire Fabric; Deformed, for Concrete Reinforcement.
6. ASTM A 615 - Deformed and Plain Billet-Steel Bar for Concrete Reinforcement.

7. ASTM A 641 - Zinc-Coated (Galvanized) Carbon Steel Wire.
8. ASTM B 117 - Salt Spray (Fog) Testing.
9. ASTM B 633 - Electrodeposited Coatings of Zinc on Iron and Steel.
10. ASTM C 5 - Quicklime for Structural Purposes.
11. ASTM C 90 - Load-Bearing Concrete Masonry Units.
12. ASTM C129 - Non-Load Bearing Concrete Masonry Units.
13. ASTM C 140 - Method of Sampling and Testing Concrete Masonry Units.
14. ASTM C 144 - Aggregate for Masonry Mortar.
15. ASTM C 150 - Portland Cement.
16. ASTM C 207 - Hydrated Lime for Masonry Purposes.
17. ASTM C 270 - Mortar for Unit Masonry.
18. ASTM C 387 - Packaged, Dry, Combined Materials, for Mortar and Concrete.
19. ASTM C 404 - Aggregates for Masonry Grout.
20. ASTM C 476 - Grout for Masonry
21. ASTM C 514 - Water Penetration and Leakage Test to Assess Performance of Integral Water Repellent Admixtures.
22. ASTM C 595 - Blended Hydraulic Cement.
23. ASTM C 778 – Specification for Standard Sand.
24. ASTM C 780 - Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
25. ASTM C 1019 - Method of Sampling and Testing Grout.
26. ASTM C 1072 - Method for Measurement of Masonry Flexural Bond Strength.
27. ASTM C 1093 - Standard Practice for Accreditation of Testing Agencies for Masonry.
28. ASTM C 1329 – Standard Specification for Mortar Cement.
29. ASTM C 1357 – Test Methods for Evaluating Masonry Bond Strength.
30. ASTM D 1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
31. ASTM D 2000 - Classification System for Rubber Products.
32. ASTM D 2287 - Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds.
33. ASTM E 119 - Fire Tests of Building Construction and Materials.
34. ASTM E 447 - Compressive Strength of Masonry Prisms.
35. ASTM E 488 - Strength of Anchors in Concrete and Masonry Elements.
36. ASTM E 518 - Test Method for Flexural Bond Strength of Masonry.
37. American National Standards Institute Building Code requirements.
38. MCAA – Hot and Cold Weather Masonry Construction.

B. The following reference materials are hereby made a part of this Section by reference thereto:

1. UL Fire Resistance Directory.
2. IMI: Masonry Construction Guide Manual.
3. PCA, “Concrete Masonry Handbook”.
4. NCMA applicable TEK Bulletins.
5. NCMA TEK Bulletin Nº. 45 - Removal of Stains from Concrete Masonry Walls.

1.4 SUBMITTALS

A. Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Literature: Manufacturer's product data sheets, performance data, physical properties for each item furnished hereunder.
2. Material certificates: Provide for the following, signed by manufacturer and Contractor certifying that each material complies with requirements.
   a. Each material and grade indicated for reinforcing bars.
3. Material test reports from a qualified independent laboratory employed and paid by Contractor indicating and interpreting test results relative to compliance of the following proposed masonry materials with requirements indicated:
   a. Mortar complying with the property requirements of, and tested in accordance with ASTM C 270.
   b. Grout mixes: Include description of type and proportions of grout ingredients.
   c. Masonry units; report for tests performed within the previous six months.

1.5 QUALIFICATIONS

A. Installer: Company specializing in performing the masonry work of this Section with minimum of 10 years documented experience. Work shall be done by skilled workmen, fully instructed as to the requirements of these Specifications and adequately supervised during the work.

1.6 QUALITY ASSURANCE

A. Single-source responsibility for concrete masonry units: Obtain concrete masonry units for the project from a single manufacturer.

B. Single-source responsibility for mortar materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.

1.7 REGULATORY REQUIREMENTS

A. Fire performance characteristics: Where indicated, provide materials and construction identical to those of assemblies whose fire resistance has been determined per ASTM E 119 by a testing and inspecting organization, by equivalent concrete masonry thickness, or by another means, as acceptable to authorities having jurisdiction.

1.8 DELIVERY, STORAGE, AND HANDLING

A. General: Do not deliver cement, lime, and similar perishable materials to the site until suitable storage is available. Store such materials in weatherproof structures, and ensure that materials are in perfectly fresh condition when brought for use. Protect masonry units and manufactured products of all types from wetting by rain or snow, and keep covered when not in use.

B. Masonry Face Units: Handle all masonry units carefully in transit and on the site, so as to keep units whole, with edges sharp, and faces clean and undamaged. Deliver all masonry units on pallets; or handle units individually, and properly stack same.

C. Aggregates: Deliver, store and handle aggregate materials so as to prevent contamination with earth or other foreign materials.

1. Store cement, lime and similar products under cover and from direct contact with earth or floor slabs.

D. Manufactured items: Deliver manufactured products in original containers plainly marked with product identification and manufacturer's name.

1. Store metal accessories and the like under cover and from direct contact with ground, and in manner to prevent rust.

E. Damaged material: Remove any damaged or contaminated materials from job site immediately, including materials in broken packages, packages containing water marks, or which show other evidence of damage, unless Architect specifically authorizes correction thereof and usage on project.

1.9 ENVIRONMENTAL CONDITIONS

A. Hot and cold weather requirements shall be in accordance with the recommendations of the Masonry Industry Council as contained in the document "*HOT AND COLD WEATHER MASONRY CONSTRUCTION*" published by the MCAA (Masonry Contractor's Association of America). Enforcement for these requirements shall take place under the following conditions which modify those in the referenced document.

1. The recommended hot weather requirements for 100 degrees Fahrenheit (37.8 degrees Celsius) shall be enforced for this project when ambient temperatures are above 90 degrees Fahrenheit (32.2 degrees Celsius) under all wind conditions including zero velocity.
2. Cold weather requirements shall be enforced when ambient temperatures fall below 40 degrees Fahrenheit (4.4 degrees Celsius).

1.10 COORDINATION

A. Coordinate work with that of other trades which require placement and building-in of, as work progresses, anchor bolts, wood blocking, and anchorage items.

B. Examine all Drawings as to requirements for the accommodation of work of other trades. Provide all required recesses, chases, slots, and cutouts. Place anchors, bolts, sleeves and other items occurring in the masonry work. Take every precaution to minimize future cutting and patching. Closely coordinate the location and placement of such items.

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. Load bearing hollow and solid, normal weight concrete masonry units: Conform to ASTM C90, Type 1, Class 1, normal weight.

1. Plain-faced units of nominal thickness indicated on the Drawings, nominal 8 by 16 inch face dimension with light gray color and uniform medium-fine texture, sound, true to plane and line, and free from chips, cracks, and other defects.
   a. Types required, wythe (depth) and fire resistant construction rating as indicated on Drawings.
2. Aggregate: sand and gravel: conform to ASTM C 33.
3. Minimum allowable compressive strength for an individual unit of not less than 1700 psi (net area); and not less than 1,900 psi. (net area) for average of 3 units; when tested in accordance with ASTM C 140.

4. Oven dry density: 125 pounds per cubic foot.
5. Moisture content for average of 3 units, when delivered, not exceeding 35 percent of the total absorption, when tested in accordance with ASTM C 140.

B. Concrete masonry grout blocks: Open end high strength concrete masonry units and slot type strength concrete masonry units for use at reinforced concrete masonry construction where indicated on the Drawings. Conform to all requirements specified above for standard concrete masonry units, and the following additional requirements:

1. Plain-faced units of nominal thickness indicated on the Drawings, nominal 8 by 16 inch face dimension with light gray color and uniform medium-fine texture, sound, true to plane and line, and free from chips, cracks, and other defects.

2.2 MORTAR

A. Prepackaged mortar (ready mix) complying with ASTM C 1142, or site-mixed portland cement mortar complying with ASTM C 270 may be used.

1. Admixtures are not permitted except where expressly specified herein or as otherwise approved by Architect for specific field conditions.
2. Color and texture: As selected by the Architect to match approved samples

B. Mortar materials for site mixed mortar:

1. Portland cement for masonry conforming to ASTM C 150, Type I, non-staining, without air entrainment. Use Type III as necessary for laying masonry in cold weather.
   a. For concrete masonry, use white color portland cement
2. Aggregates for grout: Conforming to ASTM C 144 for fine aggregate and ASTM C 404, Size 8 or 89.
3. Aggregate for concrete masonry mortar: Clean, washed uniformly well graded sand conforming to ASTM C 144, with the following gradation, and having a fineness modulus between 2.15 and 2.35:

Sieve Size	Percentage Passing
#4	100%
#8	95 to 100%
#16	70 to 100%
#30	40 to 75%
#50	10 to 35%
#100	2 to 15%
#200	0 to 5%

4. Mortar pigments: Commercial alkali-resistant, non-fading mortar pigments, oxides of iron where feasible, synthetic type, equal to products of
   a. Davis Colors, Beltsville MD.
   b. Solomon Grind-Chem Service, Inc., Springfield IL.
   c. Landers Segal Color, Inc., Passaic New Jersey.
5. Lime: Approved brand of plastic hydrated lime, conforming to ASTM C 207, Type “S”.
6. Water: Clean and fresh without contaminants.

C. Prepackaged mortar (ready mix)

1. General: complying with ASTM C 1142, factory blended consisting of:
    a. Portland cement: Comply with ASTM C 150, Type I.
    b. Hydrated lime: Type S, complying with ASTM C 207.
    c. Aggregate: Provide clean, sharp, well graded aggregate free from injurious amounts of dust, lumps, shale, alkali, surface coatings, and organic matter, and complying with ASTM C144.
    d. Admixtures: Prepackaged mortar mixes contain manufacturer's own proprietary admixtures; additional field admixtures are strictly prohibited.
    e. Water: Provide water free from deleterious amounts of acids, alkalis, and organic materials. Water shall be potable.
    f. Pigments: Chemically inert synthetic iron oxide pigments, lightfast, weather resistant, complying with ASTM C-979.
        1) Mortar Color: As selected by Architect from manufacturer's full range of standard colors.

D. Mortar types: ASTM C 270 Type M or S using the property specification.

2.3 GROUT MIXES

A. Prepackaged grout (ready mix) complying with ASTM C 1107, or site-mixed Portland cement grout complying with ASTM C 476 may be used.

B. Grout: Ready mixed, non-metallic high-strength controlled expansion grout of flowable consistency, conforming to ASTM C 1107 with minimum compressive strength of 8,000 pounds per square inch (55.2 MPa) at 28 days.
    1. Products which may be considered as equal include the following:
        a. Five Star Products, Inc., Fairfield CT, product "Five Star Grout."
        b. L&M Construction Chemicals, Omaha NE, Product: "Crystex."
        c. BASF Construction Chemicals, Cleveland, OH, product "Masterflow 713".
        d. Sika Corporation, Lyndhurst, NJ, product "SikaGrout 212".
        e. ChemMasters, Madison, OH, product "Conset".

C. Grout for engineered masonry (core fill): Course grout having a compressive strength of 2,000 to 2,250 pounds per square inch (13.8 to 15.5 MPa) at 28 days; slump 8 to 10 inches.

D. Grout for bond beams and lintels: Fine grout having a compressive strength of 2,500 to 3,000 pounds per square inch (17.2 to 20.6 MPa) at 28 days; slump 8 to 10 inches.

2.4 REINFORCEMENT AND ANCHORAGE MATERIALS

A. Reinforcing steel, additional to rods which are embedded in concrete: Solid steel reinforcing bars, conforming to ASTM A 615, Grade 60, of sizes indicated on the Drawings.
    1. Recycled content of Steel: Use maximum available percentage of recycled steel. Reinforcing steel incorporated into the work shall contain not less than 60 percent of recycled scrap steel.

2.5 ACCESSORIES

A. Cleaning solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.6 MIXING MORTARS AND GROUT

A. General: Mix mortar and grout in accordance with the requirements of ASTM C270, and ASTM C476 as applicable.
   1. Control batching procedure to ensure proper proportions by measuring materials by volume. Amount of mixing water and mortar consistency shall be controlled by mason.
   2. Control batch sizes to allow for use within manufacturer's recommended pot life.
   3. Retempering will be permitted only within the first two hours of initial mix or shorter times as directed by manufacturers.
   4. Discard all mortar and grout which exceeds the time limits allowed by the manufacturer. Discard mortar that has partially set.

B. Maintain sand uniformly damp immediately before mixing process.

C. Add mortar color and admixtures in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.

D. Do not use anti-freeze compounds to lower the freezing point of mortar or grout.

E. Pouring grout shall be fluid consistency (as fluid as possible for pouring without separation of constituent parts).

2.7 SOURCE QUALITY CONTROL

A. Preconstruction testing: Except for testing by the Contractor, required as part of this Section, or Section 01 45 29 – TESTING LABORATORY SERVICES, the Owner will employ and pay a qualified independent testing laboratory to perform the following preconstruction testing indicated as well as other inspecting and testing services required by referenced unit masonry standard or indicated herein for source quality control:
   1. Concrete Masonry Unit Tests: For each different concrete masonry unit indicated, units will be tested for strength, absorption, and moisture content per ASTM C 140.
   2. Mortar composition and properties will be field evaluated per ASTM C 780 for compressive strength, consistency, mortar aggregate ratio, water content, air content, and splitting tensil strength.
   3. Grout compressive strength will be tested per ASTM C 1019 for compressive strength and slump.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive the work of this Section.

B. Verify built-in and other items provided by separate Sections of the work are properly sized and located.

C. Verify foundation walls supporting masonry is constructed within tolerances required by code

D. Beginning of installation means acceptance of site conditions.

3.2 PREPARATION

A. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

B. Protect surfaces of windows, door frames, louvers and vents as well as similar finish products with painted and integral finishes from mortar droppings and stains.

3.3 INSTALLATION - GENERAL

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

B. Establish lines, levels and coursing indicated. Protect from displacement.

C. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

3.4 COURSING, BONDS AND JOINTS

A. Coursing, joints and bond pattern: Running bond except as otherwise indicated on the Drawings.

B. Joints:

1. Concealed from view masonry, including masonry which will be concealed by flashings and similar materials: Fill joints with mortar and strike joints flush. Concave tool exterior joints below grade.

3.5 LAYING MASONRY - GENERAL

A. Build the masonry walls and partitions in the various combinations and thickness as indicated on the Drawings.

B. Erect all masonry work in compliance with the line and level tolerances specified herein. Hold uniform joint sizes. Correct, or replace, as directed by the Architect, non-conforming masonry work at no additional cost to the Contract.

C. Lay out coursing before setting to minimize cutting closures or jumping bond, Avoid the use of less-than-half-size units.

D. Laying masonry units:

1. Lay solid masonry units in full bed of mortar, with full head joints; uniformly joint with other work.
2. Lay hollow masonry units with face shell bedding on head and bed joints.
3. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
4. Interlock intersections and external corners.
5. Cut all exposed masonry with a motor-driven carborundum blade saw to ensure straight and clean, unchipped edges.
    a. Lay no unit having chipped edges or face defects where such unit would be exposed to view. Remove any such unit, if installed, and replace with

an undamaged unit, and bear all costs therefore.

6. Do not spread any more mortar than can be covered before surface of mortar has begun to dry.
7. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove entirely, clean off mortar, and reset with fresh mortar.
8. Except for cleaning down and repointing, finish all masonry as the walls and partitions are carried up.

E. Build-in reinforcement and anchorage items as the work progresses, grouting for secure anchorage.

F. Provide complete protection against breakage and weather damage to all masonry work, including substantial wood boxing around door jambs, over the tops of walls and wherever necessary to protect work at all stages of completion. Protect masonry when not roofed over, at all times when masons are not working on the walls. Apply tarpaulins or waterproof paper, properly weighted, or nailed, to assure their remaining in place to protect masonry from all possible hazards.

G. Point and fill all holes and cracks in new mortar joints with additional fresh mortar; do not merely spread adjacent mortar over defect or use dead mortar droppings. Do all pointing while mortar is still soft and plastic. If hardened, chisel defect out and refill solidly with fresh additional mortar, and tool or rake joints as specified herein.

H. Protect all masonry from rain prior to, and during the installation thereof. If the temperature is in excess of 80 degrees Fahrenheit at time of installation, lightly moisten contact surfaces of masonry units by brushing with water.

I. Cold/Hot Weather Procedures: No masonry work shall be laid in temperatures below 40 degrees Fahrenheit without the submittal to and review by the Architect of cold weather procedures.

1. In ambient temperatures below 40 degrees Fahrenheit make provisions to adequately protect the masonry materials and the finished work from frost by heating of masonry materials, enclosing the work or heating the enclosed spaces.
2. No frozen work shall be built upon nor shall anti-freeze admixtures be permitted in the mortar mix.
3. Any completed work found to be affected by frost shall be taken down and rebuilt at no additional expense to the Owner.

3.6 ENGINEERED MASONRY

A. Lay masonry units with core cells vertically aligned and clear of mortar and unobstructed.

B. Place mortar in masonry unit bed joints back 1/4 inch from edge of unit grout spaces, bevel back and upward. Permit mortar to cure 7 calendar days before placing grout.

C. Refer to the Drawings for locations where vertical steel reinforcing rods will be required in masonry walls. Reinforce masonry unit cores with reinforcement bars and grout.

D. Retain vertical reinforcement in position at top and bottom of cells and at intervals not exceeding 192 bar diameters. Splice reinforcement as indicated on the Drawings.

E. Wet masonry unit surfaces in contact with grout just prior to grout placement.

F. Grout spaces less than 2 inches in width with fine grout using low lift grouting techniques. Grout spaces 2 inches or greater in width with course grout using high or low grouting techniques.

G. When grouting is stopped for more than one hour, terminate grout 1-1/2 inch below top of upper masonry unit to form a positive key for subsequent grout placement.

H. Low lift grouting: Place first lift of grout to a height of three concrete masonry unit courses, and rod for grout consolidation. Place subsequent lifts in 8 inch increments and rod for grout consolidation.

3.7 BUILDING-IN WORK

A. As work progresses install built-in metal frames, fabricated metal frames, window frames, wood nailing strips, anchor bolts, plates and other items to be built-in the work.

B. Install built-in items plumb and level; take care not to distort alignment of such items.

C. Bed anchors of metal frames in adjacent mortar joints. Fill frame voids solid with grout except where joints are indicated to receive caulking and sealant. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

1. Rake joints to receive sealant to a uniform depth of 3/4 inch for installation of caulking and sealant.

D. Do not build-in organic materials subject to deterioration.

3.8 REINFORCEMENT AND ANCHORAGE

A. Lap reinforcement as indicated on the Drawings.

B. Anchor ends of walls to structure as indicated on the Drawings.

C. Embed anchors in concrete as indicated on the Drawings.

D. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.

3.9 FIELD QUALITY CONTROL

A. Field inspection will be performed under the provisions of Division 1 – GENERAL REQUIREMENTS (Section 01 45 00 - QUALITY CONTROL, or Section 01 45 29 – TESTING
LABORATORY SERVICES, as applicable).

B. Testing frequency: Tests and evaluations listed in this article shall be performed during construction for each 5000 square feet of wall area or portion thereof.

C. Evaluation of Quality Control tests: In absence of other indications of noncompliance with requirements, masonry will be considered satisfactory if results from source quality control tests comply with minimum requirements indicated.

3.10 PROTECTION OF WORK

A. Protection of Masonry: During erection, cover tops of walls, 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 down both sides and hold cover securely in place.

B. Stain prevention: Provide protection and prevent grout, mortar, and soil from staining the face of exposed masonry and building finishes. Protect base of walls from rain-splashed mud and mortar splatter.

1. Remove immediately all grout, mortar, and, soil that come in contact with such masonry.

3.11 TOLERANCES

A. Maximum variation from true surface level for exposed to view walls and partitions:

1. Unit-to-unit tolerance: 1/16 inch.
2. Surface, overall tolerance: 1/4 inch in 10 feet in any direction and 1/2 inch in 20 feet or more.
    a. Where both faces of single wythe wall or partition will be exposed to view, request and obtain decision from the Architect as to which face will be required to conform to the specified surface level tolerance.

B. Maximum variation from plumb: For lines and surfaces of walls do not exceed 1/4 inch in 10 feet, 3/8 inch in any story up to 20 feet maximum. At expansion joints and other conspicuous lines, do not exceed 1/4 inch in 20 feet.

C. Maximum variation from level: For lines of sills, tops of walls and other conspicuous lines, do not exceed 1/8 inch in 3 feet, or 1/4 inch in 10 feet and 1/2 inch in 30 feet.

D. Maximum variation of linear building line: For position shown in plan relating to columns, walls, and partitions, do not exceed 1/2 inch in 20 feet or 3/4 inch in 40 feet.

E. Maximum variation in specified height: 1/2 inch per story.

F. Maximum variation of joint thickness: 1/8 inch in 3 feet.

G. Maximum horizontally projected unsupported masonry unit: 1-1/8 inches

3.12 CLEANING

A. Comply with requirements of Section 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL for handling and disposition of all construction waste.

B. Progress Cleaning:

1. General: Maintain site free of waste materials, debris, and rubbish resulting from the work of this Section.
    a. Remove from work areas surplus and waste materials resulting from the work of this Section. Remove on a continual on-going basis through-out the term of construction.
2. During the progress of the work, keep the exposed surfaces of masonry clean at all times, and protected against damage. As each segment of the masonry is erected, dry-brush the surfaces free from mortar spots and droppings.

C. Prior to performing the final cleaning work, examine all face joints in exposed masonry to locate cracks, holes or other defects in the mortar; and point up all such defects and fill with mortar as specified herein. Where necessary, in the opinion of the Architect, cut out defective joints in masonry and replace with new materials, exercising extreme care to match original work.

D. At a time approved by the Architect, perform final cleaning operations on all masonry as specified herein.

1. Perform the final cleaning work only when the ambient temperature is above 40 degrees Fahrenheit, and rising.
2. Do not use wire brushes or other abrasive tools in the cleaning operations.
3. Perform final cleaning operations from the top down. If masonry cleaning work is performed after windows, doors, frames, and other work has been installed, provide complete protection for said items; be fully responsible for any damage due to the cleaning operations.
4. Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.
5. Perform final cleaning of masonry units by scrubbing with stiff bristle fiber brushes and clear water, changing the water frequently.

E. Provide suitable protective coverings for all other surfaces and materials during the final cleaning procedures, and bear full responsibility for correcting any damage caused by these operations, to the satisfaction of the Architect.

END OF SECTION