SECTION 049000

MASONRY RESTORATION AND CLEANING

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the masonry restoration and cleaning as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Cleaning existing face brick walls.

2. Repointing existing face brick walls.

3. Repair of existing damaged face brick.

4. Replacing existing damaged face brick.

5. Remove, clean and salvage existing brick for reuse.

6. Inspection and sounding of entire exterior face brick walls at G-Wing to determine if any existing brick is unsound.

1.3 RELATED SECTIONS

A. Unit Masonry - Section 042000.

B. Joint Sealers - Section 079200.

1.4 QUALITY ASSURANCE

A. Field-Constructed Mock-Ups: Prior to start of general masonry restoration, prepare the following sample panels on the building where directed by Architect. Obtain Architect's acceptance of visual qualities before proceeding with the work. Retain acceptable panels in undisturbed condition, suitably marked, during construction as a standard for judging completed work.

1. Cleaning: Demonstrate materials and methods to be used for cleaning each type of exposed surface and condition on sample panels of approximately 25 sq. ft. in area.

a. Test adjacent non-masonry materials for possible reaction with cleaning materials.
b. Allow waiting period not less than seven (7) calendar days after completion of sample cleaning to permit study of sample panels for negative reactions.

2. Repointing: Refer to elevation drawings for location of in-place visual mock-up. Within the mock-up area, prepare two (2) adjacent but separate sample areas of approximately 3'-0" high by 6'-0" wide for each type of repointing required, one for demonstrating methods and quality of workmanship expected in removal of mortar from joints and the other for demonstrating quality of materials and workmanship expected in pointing mortar joints. Coordinate sample area size with the area indicated on the drawings. In the newly pointed masonry, provide custom color mortar for review and final selection of mortar color.

3. Patching: Prepare sample area approximately 3'-0" high by 6'-0" wide for demonstrating techniques and quality of masonry repair work.

1.5 SUBMITTALS

A. Product Data: Submit manufacturers' technical data for each product indicated including recommendations for their application and use and VOC compliance. Include test reports and certifications substantiating that products comply with requirements.

B. Restoration Program: Submit written program for each phase of restoration process, including protection of surrounding materials on building and site during operations. Describe in detail materials, methods and equipment to be used for each phase of restoration work.

C. Mortar Color Samples for Initial Selection: Prior to start of the in-place visual mock-up, submit mortar samples for initial selection demonstrating match to the Architect's control sample. Final selection will be made upon review of the in-place visual mock-up on the building.

1.6 DELIVERY, STORAGE AND HANDLING

A. Carefully pack, handle, and ship masonry units and accessories strapped together in suitable packs or pallets or in heavy cartons. Unload and handle to prevent chipping and breakage.

B. Deliver other materials to site in manufacturer's original and unopened containers and packaging, bearing labels as to type and names of products and manufacturers.

C. Protect masonry restoration materials during storage and construction from wetting by rain, snow or ground water, and from staining or intermixture with earth or other types of materials.

D. Protect grout, mortar and other materials from deterioration by moisture and temperature. Store in a dry location or in waterproof containers. Keep containers tightly closed and away from open flames. Protect liquid components from freezing. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage.

1.7 PROJECT CONDITIONS

A. Clean masonry surfaces only when air temperatures are 40 deg. F. and above and will remain so until masonry has dried out, but for not less than seven (7) days after completion of cleaning.

B. Do not repoint mortar joints or repair masonry unless air temperatures are between 40 deg. F. and 80 deg. F. and will remain so for at least forty-eight (48) hours after completion of work.

C. Prevent grout or mortar used in repointing and repair work from staining face of surrounding masonry and other surfaces. Immediately remove grout and mortar in contact with exposed masonry and other surfaces.

D. Protect sills, ledges and projections from mortar droppings.

1.8 SEQUENCING/SCHEDULING

A. Perform masonry restoration work in the following sequence:

1. Repair existing masonry, including replacing existing masonry with new masonry materials.

2. Rake out existing mortar from joints indicated to be repointed.

3. Repoint existing mortar joints of masonry indicated to be restored.

4. Clean existing masonry surfaces.

PART 2 PRODUCTS

2.1 MASONRY MATERIALS

A. Provide salvaged (existing) face brick. Existing face brick to be reused shall be sound, whole, undamaged brick free from defects and of the same quality as the surrounding untouched brick.

B. For mortar materials, conform to the following requirements:

1. Portland Cement: ASTM C 150, Type 1, standard color, one source.

2. Hydrated Lime: ASTM C 207, Type S.

3. Sand: Clean, washed, buff colored sand, graded per ASTM C 144.

4. Water: Clean, fresh and suitable for drinking.

C. Mortar Mix: Refer to Section 042000.

2.2 CLEANING MATERIALS AND EQUIPMENT, GENERAL

A. Water for Cleaning: Clean, potable, free of oils, acids, alkalis, salts, and organic matter.

B. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film forming, strippable masking material for protecting glass, metal and polished stone surfaces from damaging effect of acidic and alkaline masonry cleaners.

1. Products: Subject to compliance with requirements provide one of the following or an approved equal:

a. "Diedrich Acid Guard," Diedrich Technologies.
b. "Sure Klean Acid Stop," ProSoCo, Inc.
c. "Price Mask," Price Research, Ltd.

C. Spray Equipment: Provide equipment for controlled spray application of water and chemical cleaners, at rates required by the manufacturer, measured at spray tip, and for volume.

1. For spray application of chemical cleaners provide low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray-tip.

2. For spray application of water provide fan-shaped spray-tip which disperses water at angle of not less than 15 degrees.

2.3 CLEANING MATERIALS FOR MASONRY

A. Alkaline Prewash Cleaner: Manufacturer's standard alkaline cleaner for prewash applications only which are followed by acidic cleaner of type indicated for afterwash.

1. Product: Subject to compliance with requirements, provide "Sure Klean 766 Prewash," ProSoCo, Inc., or equivalent product of Diedrich Technologies, Price Research, Ltd., or an approved equal.

B. Acidic Cleaner: Manufacturer's standard strength acidic masonry restoration cleaner composed of hydrofluoric acid blended with other acids including trace of phosphoric acid and combined with special wetting systems and inhibitors.

1. Products: Subject to compliance with requirements, provide one of the following or an approved equal:

a. "Diedrich 101 Masonry Restorer," Diedrich Technologies.
b. "Sure Klean Restoration Cleaner," ProSoCo, Inc.
c. "Price Restoration Cleaner," Price Research, Ltd.

2.4 EFFLORESCENCE CLEANER

A. Acidic Cleaner: "Sure Klean Custom Masonry Cleaner" as manufactured by ProSoCo.

2.5 MORTAR MIXES

A. Measuring and Mixing: Measure cementitious and aggregate material in a dry condition by volume or equivalent weight. Do not measure by shovel, use known measure. Mix materials in a clean mechanical batch mixer.

1. Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix which will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 1-to-2 hours. Add remaining water in small portions until mortar of desired consistency is reached. Use mortar within thirty (30) minutes of final mixing; do not retemper or use partially hardened material.

B. Colored Mortar: Produce mortar of color required by use of selected coloring agent. Provide custom color mortar blend as required to match Architect's control sample.

C. Do not use admixtures of any kind in mortar, other than colorant.

D. Mortar Proportions

1. Pointing Mortar for Brick: One part white Portland cement, 2 parts lime and 6 parts colored mortar aggregate. Add colored mortar pigment to product mortar colors required to match.

2. Rebuilding Mortar: Comply with ASTM C 270, Proportion Specification, Type N, with cementitious material content limited to Portland cement-lime and coloring agent.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where masonry restoration and cleaning are to be performed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Architect.

3.2 PROTECTION

A. General: Comply with recommendations of manufacturers of chemical cleaners for protecting building surfaces against damage from exposure to their products.

B. Protect persons, motor vehicles, surrounding surfaces of building whose masonry surfaces are being restored, building site, and surrounding buildings from injury resulting from masonry restoration work.

1. Prevent chemical cleaning solutions from coming into contact with pedestrians, motor vehicles, landscaping, buildings and other surfaces which could be injured by such contact.

2. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.

3. Dispose of run-off from cleaning operations by legal means and in manner which prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

4. Erect temporary protection covers over pedestrian walkways and at points of entrance and exit for persons and vehicles which must remain in operation during course of masonry restoration work.

C. Protect glass, unpainted metal trim and polished stone from contact with acidic chemical cleaners by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape. Apply masking agent to comply with manufacturer's recommendations. Do not apply liquid masking agent to painted or porous surfaces.

3.3 CLEANING EXISTING MASONRY, GENERAL

A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other.

B. Use only those cleaning methods indicated for each masonry material and location.

C. Perform each cleaning method indicated in a manner which results in uniform coverage of all surfaces, including corners, moldings, interstices and which produces an even effect without streaking or damage to masonry surfaces.

D. Rinse off chemical residue and soil by working upwards from bottom to top of each treated area at each stage or scaffold setting.

E. Water Application Methods: Prior to chemical cleaning, apply water application to mock-ups by spray at various pressures to determine if masonry surfaces can be cleaned adequately and to the Architect's satisfaction in this manner. If water applications prove ineffective, proceed with chemical cleaners.

F. Chemical Cleaner Application Methods: Apply chemical cleaners to masonry surfaces to comply with chemical manufacturer's recommendations. Do not allow chemicals to remain on surface for periods longer than that indicated or recommended by manufacturer.

1. For hard to remove dirt or grime, apply pre-wash cleaner prior to application of chemical cleaner; follow manufacturer's instructions.

3.4 BRICK REMOVAL AND REBUILDING

A. Brick Removal

1. Carefully remove by hand any brick which are damaged, spalled or deteriorated. Cut out full units from joint to joint and in manner to permit replacement with full size units.

2. Support and protect masonry indicated to remain which surrounds removal area.

3. Salvage as many whole, undamaged bricks as possible.

4. Remove mortar, loose particles and soil from salvaged brick by cleaning with brushes and water. Store brick for reuse.

5. Clean remaining brick at edges of removal areas by removing mortar, dust, and loose debris in preparation for rebuilding.

B. Brick Rebuilding

1. Install salvaged brick to replace removed brick. Fit replacement units into bonding and coursing pattern of existing brick. If cutting is required use motor driven saw designed to cut masonry with clean, sharp unchipped edges.

2. Lay replacement brick with completely filled bed, head and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet clay brick which have ASTM C 67 initial rates of absorption (suction) of more than 30 grams per 30 sq. in. per minute. Use wetting methods which ensure that units are nearly saturated but surface dry when laid. Maintain joint width for replacement units to match existing.

3. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.

3.5 REPOINTING EXISTING MASONRY

A. Joint Raking

1. Rake out mortar from joints to depths equal to 2-1/2 times their widths but not less than 1/2" nor less than that required to expose sound, unweathered mortar.

2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum or flush joints to remove dirt and loose debris.

3. Do not spall edges of masonry units or widen joints. Replace any masonry units which become damaged.

a. Cut out old mortar by hand with chisel and mallet.
b. Power operated rotary hand saws and grinders will be permitted but only on specific written approval of Architect based on submission by Contractor of a satisfactory quality control program and demonstrated ability of operators to use tools without damage to masonry. Quality control program shall include provisions for supervising performance and preventing damage due to worker fatigue.

B. Joint Pointing

1. Rinse masonry joint surfaces with water to remove any dust and mortar particles. Time application of rinsing so that, at time of pointing, excess water has evaporated or run off, and joint surfaces are damp but free of standing water.

2. Apply first layer of pointing mortar to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8" until a uniform depth is formed. Compact each layer thoroughly and allow to become thumbprint-hard before applying next layer.

3. After joints have been filled to a uniform depth, place remaining pointing mortar in three (3) layers with each of first and second layers filling approximately 2/5 of joint depth and third layer the remaining 1/5. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing bricks have rounded edges recess final layer slightly from face. Take care not to spread mortar over edges onto exposed masonry surfaces, or to featheredge mortar.

4. When mortar is thumbprint hard, tool joints to match original appearance of joints, unless otherwise indicated. Remove excess mortar from edge of joint by brushing.

5. Cure mortar by maintaining in a damp condition for not less than seventy-two (72) hours.

6. Where repointing work precedes cleaning of existing masonry allow mortar to harden not less than thirty (30) days before beginning cleaning work.

END OF SECTION