

SECTION 04500

BUILDING RESTORATION AND CLEANING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section describes the requirements for building restoration and cleaning work, including the following:
1. Cleaning exterior stone, terra cotta, glazed brick, masonry surfaces, including metal windows, bronze doors, metal spandrel panels, and standing seam copper roof.
 2. Re-pointing and/or repair of deteriorated or missing mortar joints.
 3. Repair of glazed brick walls at Light Courts.
 4. Repair, cleaning, and restoration of all steel windows, metal spandrels and metal spandrel panels.
 5. Removal of lead paint from all steel windows and exterior metal doors and frames.
 6. Removal of graffiti from all surfaces.
 7. Anchoring of stone and terra cotta veneer panels.
 8. Anchoring of unreinforced masonry URM.
 9. Anchoring of existing exterior cladding.
 10. Restoration of steel windows including new glazing and new windows as indicated.

1.02 SUBMITTALS

- A. Product Data: Manufacturer's technical data for each product specified, including recommendations for application and use. Include test reports and certifications substantiating product compliance with Specifications.
- B. Cleaning and Restoration Program: Written program for each phase of cleaning and restoration including protection of surrounding materials and site during work.
1. Describe materials, methods and equipment to be used for each phase of work.
 2. If alternative methods and materials are proposed for phases, furnish written description, including documentation of successful use on other comparable Projects.
- C. Schedule of existing windows documenting the existing condition and proposed extent of repairs for each window unit. Include listing of hardware on each window unit.
- D. Samples: Furnish the following for verification purposes prior to mock-up erection:
1. Mortar for pointing and rebuilding and repair, 6-inch long, 1/2-inch wide strip of mortar set in aluminum or plastic channel. Include sample for each type and color proposed. Samples shall be produced using all ingredients in proportions to be used in the mortar.

1.03 QUALITY ASSURANCE

- A. Cleaning and restoration materials and methods shall be confirmed with Architect and Architect's historic consultant prior to beginning work.
- B. Restoration Specialist: Firm having minimum 5-years experience in comparable historic restoration Projects, employing personnel skilled in the restoration and operations specified.
- C. Re-pointing mason shall have a minimum of 5-years experience with re-pointing historic masonry buildings.
- D. Field Constructed Mock-Up: Prior to start of work, prepare the following panels on building where directed by the Architect. Obtain Architect's approval of visual qualities before proceeding with the work.
 - 1. Cleaning: Demonstrate materials and methods to be used for cleaning each type of building surface on a 10-sq. ft. area.
 - 2. Re-pointing: Use same techniques to be used on the Project. Several locations may be required to include all types of stone, terra cotta and masonry, joint styles, mortar colors, and other issues to be encountered on the Project. Mock-up panels shall be used to determine the acceptability of power tools for removing existing mortar.
 - 3. Graffiti-removal: Prepare sample areas to determine composition of graffiti and effective methods for removal. Comply with specified requirements.
 - 4. Provide mock-up of windows to be restored. Minimum of 10 windows.
 - 5. Provide sample of new windows.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's original and unopened containers and packaging, bearing labels indicating type and names of products and manufacturers.
- B. Protect materials during storage and construction from wetting by rain or ground water, and from staining or intermixture with earth and other types of materials.
- C. Protect grout, mortar and other materials from deterioration by moisture and temperature.
 - 1. Store in a dry location or in waterproof containers.
 - 2. Keep containers tightly closed and away from open flames.
 - 3. Comply with manufacturer's recommendations for storage temperature requirements.

1.05 PROJECT CONDITIONS

- A. Protect persons, motor vehicles, surrounding surfaces, building site, and surrounding buildings from damage resulting from the work.
- B. Clean building surfaces when air temperature is at least 40-deg. F. during and for 7-days after completion of cleaning.
- C. Re-point mortar joints or repair masonry when air temperature is between 40- and 80-deg. F. Re-pointing shall be done in the shade, away from strong sunlight in order to slow the drying process.

- D. Prevent grout and mortar from staining face of surrounding surfaces. Remove grout and mortar immediately from exposed masonry and other surfaces.
- E. Protect sills, ledges and projections from mortar droppings.

PART 2 - PRODUCTS

2.01 MORTAR MATERIALS

- A. Re-pointing Mortar: Comply with ASTM C270, proportion(s) as determined from analysis of historic mortar.
 - 1. Sand: Free of impurities such as salts or clay, with a rounded particle shape. Gradation shall comply with ASTM C144. Some variation may be acceptable to match the original size and gradation. Sand color and texture shall match the original as closely as possible to provide the proper color match without other additives. Obtain sand from several sources and combine or screen if required to match the range of colors and grain sizes in the historic mortar.
 - 2. Lime: ASTM C207, Type S or Type SA.
 - 3. Lime Putty: ASTM C5.
 - 4. Portland Cement: ASTM C150. Provide white, non-staining portland cement if required for color match of historic mortar. Cement shall not have more than 0.60-percent alkali to help avoid efflorescence.
 - 5. Masonry Cement: Not permitted.
 - 6. Water: Potable; clean and free from acids, alkalis, or other dissolved organic materials.
 - 7. Do not use antifreeze compounds or bonding agents.
 - 8. New mortar shall match the un-weathered historic mortar. Make mortar samples and allow to cure at a temperature of approximately 70-degrees F. for one week and compare to historic mortar.
- B. Other Mortar:
 - 1. Portland Cement: ASTM C150, Type I.
 - a. Where required for mortar color, provide non-staining white cement complying with staining requirements of ASTM C91 for not more than 0.03-percent water soluble alkali.
 - 2. Hydrated Lime: ASTM C207, Type S.
 - 3. Aggregate for Mortar: ASTM C144.
 - a. Colored Mortar Aggregate: Natural or manufactured sand selected to produce mortar color indicated.
 - b. Match size, texture and gradation of existing mortar as closely as possible.
 - 4. Colored Mortar Pigment: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes.
 - 5. Water: Clean, free of oils, acids, alkalis and organic matter.

C. Aggregate for Grout: ASTM C404.

2.02 CLEANING MATERIALS AND EQUIPMENT

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

B. Brushes: Fiber bristles.

C. Chemical Cleaning Materials:

1. Stone and Terra Cotta: Prosoco "Sure Klean Restoration Cleaner 20030" or approved equal.

2. Graffiti Cleaning: Prosoco "Heavy Duty Paint Stripper 20048 " or approved equal.

3. Remove existing lead paint from all steel window frames and metal spandrel panels with chemical paint stripper. Comply with all local and federal standards for removal of lead based paint. Paint stripper: Cathedral Stone Company: Paint Stripper 5-301.

4. Clean standing seam copper roof and gutters with micro abrasive cleaning system (JOS system or equal) with dolomite medium.

5. Clean bronze door frames with exterior alkaline based cleaning agent and paraffin sealer coat.

D. Painted Metal Rust Converter: Products containing tannic acid, a small quantity of orthophosphoric acid, and wetting agent with an organic solvent.

E. Stucco Cleaner: Prosoco "EIFS Clean' N Prep" or approved equal.

F. Concrete Cleaner: Prosoco "Sure Klean Light-Duty Concrete Cleaner" or approved equal. Do not use a rust remover product without testing to verify that product will not pull pigment out of the historic concrete leaving a "bleached" spot.

G. Cast Stone Rust Remover: Prosoco "Rust and Scale Remover" or approved equal. Test in a discreet area to assure that the cast stone is not permanently lightened. Rust conversion formulas shall contain tannic acid, a small quantity of orthophosphoric acid, and wetting agent with an organic solvent.

H. Spray Equipment: Equipment for controlled spray application of water at specified pressures, measured at spray tip.

1. Water: Fan-shaped spray tip which disperses water at an angle of not less than 15-degrees.

2. Heated Water: Equipment capable of maintaining temperature between 140- and 180-deg. F. at flow rates specified.

3. Steam: Steam generator capable of delivering live steam at nozzle head.

2.03 MORTAR MIXES

A. General:

1. Measurement and Mixing: Measure in a dry condition by volume or equivalent weight. Mix materials in a clean mechanical batch mixer.

2. Pointing Mortar:
 - a. Mix materials together before adding water.
 - b. Mix again adding only enough water to produce a damp, unworkable mix which will retain its form when pressed into a ball.
 - c. Maintain mortar in dampened condition for 1- to 2-hours.
 - d. Add remaining water in small portions until mortar of desired consistency is reached.
 - e. Use mortar within 30-minutes of final mixing; do not re-temper or use partially hardened material.
3. Colored Mortar: Produce color required by use of selected ingredients. Do not adjust proportions without Architect's approval. Do not exceed pigment-to-cement ratio of 1 to 10, by weight.
4. Do not use admixtures.

2.04 EXISTING EXTERIOR CLADDING ANCHORS

A. Steel Frame Stud to Terra Cotta (Interior Application):

1. Approved Manufacturer: Helifix North America "DryFix"; Blok-Lok Limited, Spira-Lok, Helical Wall Tie System; or approved equal.
2. Exterior terra cotta units shall be stabilized to steel stud backup by means of mechanical connection to the steel stud backup using a 10 mm stainless steel remedial wall tie.
3. A 10 mm entry holes shall be drilled through the concrete using an S.D.S. drill. An additional 6.5 mm entry hole shall be drilled into the terra cotta exterior units to a depth to be determined using an electric hammer drill. The drilling shall be carried out parallel to and in line with the solid side section of the steel stud.
4. The 10 mm tie shall be driven into position at a depth of approximately 2-inches by means of a setting tool mounted on an electric hammer drill (S.D.S. type).
5. The 10 mm tie shall then be angle bent downward 90-degrees at the side of the steel stud prior to being secured by means of an angle offset steel bracket to be screwed to the side of the steel stud.
6. Site testing will verify drill entry hole size and adjustments may be required.

B. Granite to Concrete:

1. Approved Manufacturer: Helifix North America 10 mm Helifix 304 stainless steel remedial wall tie; Blok-Lok Limited, Spira-Lok, Helical Wall Tie System; or approved equal.
2. An 8 mm entry hole shall be drilled through the exterior limestone by means of an electric hammer drill (3 jaw chuck).
3. A further 8 mm entry hole shall then be drilled into the concrete backup by means of an S.D.S. rotary hammer drill.
4. The tie shall then be driven into position into the concrete backup at an embedment of approximately 2-inches and recessed by means of a setting tool mounted on an S.D.S. rotary hammer drill.

5. A support tool may be required when installing longer lengths of the tie into dense masonry backup.
 6. Patch penetrations to match existing as approved by the Architect.
 7. Site testing will verify drill entry hole size and adjustments may be required.
- C. Terra Cotta to Concrete (Asymmetric):
1. Approved Manufacturer: Helifix North America 10mm/8mm asymmetric 304 stainless steel remedial wall ties; Blok-Lok Limited, Spira-Lok, Helical Wall Tie System; or approved equal.
 2. An 6.5 mm entry hole shall be drilled through the terra cotta by means of an electric hammer drill (3 jaw chuck type).
 3. A further 6.5 mm entry hole shall then be drilled through the terra cotta and into the concrete block backup to a minimum of 3-inches by means of an S.D.S. rotary hammer drill.
 4. The tie shall then be driven into position into the concrete backup at an embedment of approximately 2-inches and recessed by means of a setting tool mounted on an S.D.S. rotary hammer drill.
 5. Patch penetrations to match existing as approved by the Architect.
 6. Site testing will verify drill entry hole size and adjustments may be required.
- D. Multi Wythe Brick to Concrete:
1. Approved Manufacturer: Helifix North America, Inc. 100 mm 304 stainless steel remedial wall ties; Blok-Lok Limited, Spira-Lok, Helical Wall Tie System; or approved equal.
 2. An 8 mm entry hole shall be drilled through the multi wythe brick veneer by means of an electric hammer drill (3 jaw chuck type).
 3. A further 8 mm entry hole shall then be drilled through the concrete backup to maximum of 3-inches into the backup concrete substrate. This drill procedure shall be carried out by means of an S.D.S. rotary hammer drill.
 4. The tie shall then be driven into position into the concrete backup at an embedment of approximately 2-inches and recessed by means of a setting tool mounted on an S.D.S. rotary hammer drill.
 5. A support device shall be fitted to the D.F.U. to aid in the tie setting procedure.
 6. Patch penetrations to match existing as approved by the Architect.
- E. Concrete to Granite (Interior Application):
1. Approved Manufacturer: Helifix North America, Inc. 10 mm Helifix stainless steel remedial wall ties; Blok-Lok Limited, Spira-Lok, Helical Wall Tie System; or approved equal.
 2. An 8 mm entry hole shall be drilled through the concrete interior and continuously drilled across the cavity into the exterior units to a depth to be determined.
 - a. Site testing will verify drill entry hole sizes and adjustments may be required.
 - b. Drill procedure shall be carried out by means of an S.D.S. rotary hammer.

3. The concrete interior wall will be routed out with a 10 mm (3/8-inch) drill so as to leave approximately 2-inches of concrete substrates that have been predrilled with an 8 mm entry hole.
4. A support tool may be required when installing longer lengths of tie into dense masonry surfaces.
5. Patch penetrations to match existing as approved by the Architect.

F. Concrete to Terra Cotta (Interior Application):

1. Approved Manufacturer: Helifix North America, Inc. 10 mm Helifix stainless steel remedial wall ties; Blok-Lok Limited, Spira-Lok, Helical Wall Tie System; or approved equal.
2. An 8 mm entry hole shall be drilled through the concrete interior and continuously drilled across the cavity into the terra cotta exterior units to a depth to be determined.
 - a. Site testing will verify drill entry hole sizes and any necessary adjustments shall be made.
 - b. The drill procedure shall be carried out with concrete by means of an S.D.S. rotary hammer and in the terra cotta with a 3 jaw chuck electric hammer drill.
3. The concrete interior wall will then be routed out with a 10 mm (3/8-inch) drill so as to leave approximately 2-inches of concrete substrates (that have been predrilled with an 8 mm entry hole).
4. A support tool may be required when installing longer lengths of the tie into dense masonry units.
5. Patch penetrations to match existing as approved by the Architect.

G. Concrete to Multi Wythe Brick:

1. Approved Manufacturer: Helifix North America, Inc. 10 mm Helifix stainless steel remedial wall ties; Blok-Lok Limited, Spira-Lok, Helical Wall Tie System; or approved equal.
2. An 8 mm entry hole shall be drilled through the concrete interior and continuously drilled across the cavity into the multi wythe masonry to a depth to be determined.
 - a. Site testing will verify drill entry hole sizes and any necessary adjustments shall be made.
 - b. The drill procedure shall be carried out with concrete by means of an S.D.S. rotary hammer and in the masonry with a 3 jaw chuck electric hammer drill.
3. The concrete interior wall with then be routed out with a 10 mm (3/8-inch) drill so as to leave approximately 2-inches of concrete substrates (that has been predrilled with an 8 mm entry hole).
4. A support tool may be required when installing longer lengths of the tie into dense masonry units.
5. Patch penetrations to match existing as approved by the Architect.

PART 3 - EXECUTION

3.01 CLEANING EXISTING EXTERIOR BUILDING SURFACES

- A. Determine the general nature and source of dirt in order to remove it in the most effective and least harmful manner.

- B. Cleaning methods include water, chemical and mechanical (abrasive). In order to determine the cleaning method(s) to be used, the following conditions shall be considered:
 - 1. Environmental Concerns: The potential effect of each proposed cleaning method shall be evaluated. The proposed cleaning method and materials may cause damage to landscaping, animal life, and property.
 - 2. Personal Safety.
- C. Test Cleaning Methods: Several cleaning methods shall be tested prior to selection to determine the one most effective.
- D. Level of Desired Cleanliness: Determine the desired appearance prior to selection of the cleaning method to be used.
- E. Perform cleaning tests on an area of sufficient size to give a true indication of effectiveness. The test area shall include each material required to be cleaned. More than one cleaning method may be required to achieve required results.
- F. Water Cleaning: Cleaning methods include low pressure wash over an extended period, moderate to high pressure wash and steam. Bristle brushes may be used to supplement the water wash. Joints, including mortar and sealant, shall be sound in order to minimize water penetration. Water methods shall not be used during periods of cold weather and no water cleaning shall be done for several days prior to the first average frost date.
- G. Chemical Cleaning: Before use, verify that surfaces are not subject to direct attack by cleaning chemicals and that a change in the surface color and appearance doesn't occur from the chemical cleaners.
- H. Mechanical Cleaning: Methods include grinders and sanding discs to abrade the dirt from the surface. Mechanical cleaning methods may only be used on ferrous metal surfaces.
- I. Application of any liquid formulations under pressure shall be limited to maximum pressure of 200-psf as measured at the nozzle; a spacer rod shall be attached to the nozzle assure a minimum space of 12-inches between the nozzle and surface. Nozzle shall be maintained perpendicular to the surface during application.

3.02 REPOINTING MORTAR JOINTS

- A. Provide a unit price per lineal foot for re-pointing each type of masonry, stone, terra cotta, and glazed brick.
- B. Re-pointing is the process of removing only deteriorated mortar from the joints and replacing it with new mortar.
- C. Preliminary research is required to ensure that re-pointing work is both physically and visually appropriate to the building. Analysis of un-weathered portions of the historic mortar to which the new mortar will be matched can suggest appropriate mixes for the re-pointing mortar so that it will not damage the building because it is excessively strong or vapor impermeable.
- D. A mortar analysis by a qualified laboratory may be used to provide information on the original mortar ingredients. Analysis includes original water content, rate of curing, weather conditions during original construction, method of mixing and placing, cleanliness and condition of the sand, and identification of sand by gradation and color.
 - 1. Mortar samples shall be chosen carefully and picked from a variety of locations on the building to find un-weathered mortar.
- E. New mortar shall conform to the following:
 - 1. Shall match the historic mortar in color, texture, and tooling.

2. Sand shall match the sand in the historic mortar.
 3. Shall have greater vapor permeability and be softer (measured in compressive strength) than the masonry units.
 4. Shall be as vapor permeable and as soft or softer (measured in compressive strength) than the historic mortar.
- F. Extent: Re-point only those areas where mortar is severely disintegrated.
- G. Joint Preparation:
1. Old mortar shall be removed to a minimum depth of 2- to 2-1/2-times the width of the joint to ensure adequate bond and to prevent mortar pop outs. Remove loose or disintegrated mortar beyond this minimum depth.
 2. Remove mortar cleanly from the masonry units, leaving square corners at the back of the cut. Before filling, the joints shall be rinsed with a jet of water to remove loose particles and dust. At the time of filling, joints shall be damp but with no standing water.
- H. Joint Filling:
1. Where existing mortar has been removed to a depth greater than 1-inch, the areas shall be filled first, compacting the new mortar in several layers approximately ¼-inch thick, packing it well into the back corners. As soon as the mortar has reached thumb-print hardness, another ¼-inch layer may be applied. Allow each layer time to harden before the next layer is applied.
 2. When the final is thumb print hard, the joint shall be tooled to match the historic joint. Observe the horizontal and vertical joints in the historic mortar to determine the order in which they were tooled and whether they were the same style.
 3. After tooling, remove excess mortar from the edge of the joint by brushing with a natural bristle or nylon brush. Do not use metal bristle brushes.
- I. Curing: Periodically wet re-pointed areas after the mortar joints are thumb print hard and have been finish tooled. Continue curing as required by local conditions. Cover walls with burlap for the first 3-days after re-pointing. Plastic may be used but shall not be allowed to come in contact with the wall.
- J. Cleaning: Remove small amount of mortar from the edge of the joint following tooling using a stiff natural bristle or nylon brush after the mortar has dried but before it is initially set. If mortar has hardened, remove with a wooden paddle. If required, very low pressure (100-psi) water washing supplemented by stiff natural bristle or nylon brushes may be used. Do not clean until mortar has fully hardened.

3.03 REPAIR OF HISTORIC STEEL WINDOWS AND METAL SPANDREL PANELS

- A. Physical Evaluation: Carefully examine the physical condition of existing steel windows and metal spandrel panels on a unit by unit basis. Prepare a graphic, photographic or window schedule to record existing conditions and document the scope of any necessary repairs. Document presence and degree of corrosion, condition of paint, deterioration of the metal sections including bowing, misalignment of the sash, or bent sections, condition of the glass and glazing compound, presence and condition of hardware, screws, bolts, and hinges, and condition of the surrounds, including need for sealants or resetting improperly sloped sills. Submit for approval prior to beginning repair of steel windows. Repair and component replacement (e.g., replacement of a single deteriorated muntin) is required; whole sash replacement is not acceptable. Missing or dysfunctional window hardware shall be replicated to match other existing units, whether components or units of hardware.

- B. Corrosion: Corrosion may be light, medium or heavy; depending on how much the rust has penetrated the metal sections. If the rusting is merely a surface accumulation or flaking, the corrosion is light. If the rusting has penetrated the metal as indicated by a bubbling texture but has not caused structural damage, the corrosion is medium. If the rust has penetrated deep into the metal, the corrosion is heavy. A sharp probe or tool can be used to determine the extent of metal corrosion. If the probe can penetrate the surface of the metal and brittle strands can be dug out, then a high degree of corrosive deterioration is present.
- C. Routine Maintenance:
1. Remove surface dirt and grease in order to ascertain the degree of deterioration. Minor cleaning may be accomplished using a brush or vacuum followed by wiping with a cloth dampened with mineral spirits or denatured alcohol.
 2. If windows and/or metal spandrel panels are determined to be in a sound condition, take the following steps:
 - a. Remove light rust, and lead paint. Rust removal methods include manual and mechanical abrasion or the application of chemicals. Rust can be removed using a wire brush, aluminum oxide sandpaper, or a variety of power tools adapted for abrasive cleaning such as an electric drill with a wire brush or a rotary sander attachment. Protect adjacent sills and window jambs. Remove rust using a commercially prepared anti-corrosive acid compound. Protect adjacent masonry surrounds from contact with acid cleaners. Remove all lead paint with a chemical paint remover or with a pneumatic needle scaler or gun. Comply with all local and Federal standards for the removal of lead based paint. Paint Stripper: Cathedral Stone Company; Paint Stripper 5-301.
 - b. Wipe bare metal with a cleaning solvent such as denatured alcohol and immediately dry in preparation for priming. Prime exposed metal with a rust-inhibiting primer immediately after cleaning.
 - c. Replace cracked or broken glass and glazing compound. When bedding glass, use glazing compound formulated for metal windows.
 - d. Replace missing screws or fasteners.
 - e. Clean and lubricate hinges. Clean with cleaning solvent and fine bronze wool. Lubricate with a non-greasy lubricant formulated for metals and with an anti-corrosive agent.
 - f. Repaint metal sections as specified below.
 - g. Seal masonry surrounds with elastomeric sealant. Comply with requirements of Section 07920.
- D. In-place Repair:
1. Comply with specified requirements for routine maintenance above.
 2. Medium to heavy corrosion that has not done structural damage can be removed by using the chemical cleaning process or by sandblasting using low pressure and a grit size in the range of #10 to #45. Provide metal or plywood shields to protect masonry surrounds and glass.
 3. Bare metal shall be primed as soon as possible after exposure to the air.
 4. Bent or bowed metal sections may be realigned without removing the window.

5. Once metal sections have been cleaned of corrosion and straightened, small holes and uneven areas resulting from rusting shall be filled with a patching material and sanded smooth to eliminate pockets where water can accumulate. Bondo or similar epoxy-based fillers are acceptable for ferrous metal.
6. Replace cracked glass, deteriorated glazing compound, missing screws, and broken fasteners. When bedding glass, use glazing compound formulated for metal windows.
7. Clean and lubricate hinges. Clean with cleaning solvent and fine bronze wool. Lubricate with a non-greasy lubricant formulated for metals and with an anti-corrosive agent.
8. Repaint metal sections as specified below.
9. Seal masonry surrounds with elastomeric sealant. Comply with requirements of Section 07920.

E. Repainting:

1. Strip steel windows and metal spandrel panels of all paint build-up, clean and repaint.
2. Materials:
 - a. Primer: Alkyd gloss.
 - b. Finish Coats: Alkyd gloss. Base coat distinct from both primer and finish coat. Finish coat color to match original.
 - c. Degreaser/Solvent: Fisher Scientific Company or approved equal, consisting of a mixture of 75-percent toluene, 24-percent acetone and 1-percent butyl acetate.
 - d. Metal Filler: Devcon "Plastic Steel" or approved equal two-part epoxy, putty-grade.
 - e. Other Materials: Provide wire brushes, brushes, sandpaper and other materials required.
3. Protection: Protect adjacent masonry and glass from damage by providing temporary covers.
4. Surface Preparation:
 - a. Remove paint, rust and scale by scraping or sanding. Use caution to prevent pitting or abrasion of metal surfaces.
 - b. Remove caulking between metal and masonry by hand.
 - c. Using a wire brush, remove dirt, grease and corrosion from the metal surfaces. Air-blast residual grit from the surface.
 - d. Repair or replace deteriorated pieces of metal to match existing. Repair or replace damaged or missing hardware to match existing.
 - e. Clean bare metal with a degreaser.
 - f. Fill small holes and other imperfections with metal filler and allow to cure. Sand flush with the metal surface.
5. Apply primer to metal surfaces.
6. Seal joints with backer rod and joint sealant as specified.

7. Brush apply 2 coats of paint at a rate recommended by the manufacturer. Cover surfaces to provide a uniform color and clean, sharp appearance with no overlaps. Comply with additional requirements specified in Section 09900.

3.04 REMOVAL OF GRAFFITI FROM HISTORIC MASONRY

- A. Successful graffiti removal from historic masonry depends on achieving a balance between breaking the bond between the graffiti and the masonry surface without damaging the masonry. This requires knowledge of the materials used to make the graffiti and the masonry on which the graffiti was applied.
- B. For purposes of this Section, masonry encompasses all types of natural stones; manufactured clay materials, including brick and terra cotta; and cementitious materials, such as cast stone, concrete and mortar.
 1. For purposes of cleaning, masonry types are categorized according to whether they are acid-sensitive, non-acid sensitive, or alkali-sensitive.
 - a. Acid-Sensitive stones may be damaged or destroyed by contact with acids. Acid-sensitive materials include limestone, marble, travertine, calcareous sandstones and shales, polished stones, and glazed architectural terra cotta and glazed brick.
 - b. Non-acid sensitive masonry materials include slate, granite, unglazed architectural terra cotta and unglazed brick.
 - c. Alkali-sensitive stones contain silicates or ferrous, soluble iron compounds that can react with alkalis or water to form staining. Alkali-sensitive stones include some granite, Indiana limestone, and many types of sandstone.
- C. Testing: Before selecting a removal method, all cleaning materials and techniques for removing graffiti from a historic masonry building shall be tested on mock-ups or areas of the building that are not highly visible, but which are representative of typical conditions. Visual observation shall be supplemented by the use of a magnifying glass and spot tests shall be carried out with various solvents to help identify the specific graffiti medium. More complex testing using laboratory equipment and more scientific analytical processes may be required in complex situations. Sample areas that represent the desired degree of cleanliness shall be approved in writing by the Architect. The materials and other data necessary to reproduce the desired cleaning results shall be recorded and the accepted sample area preserved for reference until the end of the Project.
- D. Graffiti Removal Materials and Methods:
 1. General: A variety of treatments are available from which to choose the most appropriate method of graffiti removal that will not damage the surface of historic masonry. Successful graffiti removal often requires a combination of cleaning materials and methods.
 2. Poulticing: A poultice consists of an absorbent material or powder-inert clays, diatomaceous earth or cellulose products such as fluff pulp cellulose or shredded paper-mixed with a cleaning solution to form a past or slurry. The poultice enables a cleaning solution to be kept in contact with the stained area as long as possible while allowing the cleaning solution to pull the staining material out of the substrate via the poultice without re-depositing it in, or re-staining, the masonry. A poultice is often covered with a plastic sheet to retard evaporation.
 3. Water and Detergent: Graffiti removal from historic masonry should always begin with the gentlest means possible. Fresh graffiti made with water-soluble markers may sometimes be removed with water, possibly aided by a neutral or non-ionic detergent. Ammonia can also be used in removing fresh graffiti. Any detergent shall be approached with caution and tested before using since many detergents are not neutral and contain substances that may leave undesirable residues on masonry materials. The water and detergent shall be mixed with an absorbent material and applied in the form of a poultice.

4. Organic Solvents and Paint Removers: Most graffiti can be removed without damaging the masonry with proprietary graffiti-removal products and commercial paint strippers containing organic solvents. These products should be tested and used in accordance with manufacturer's instructions. Solvents shall be used in a poultice form to prevent them from penetrating into the substrate and permanently discoloring or staining the masonry. Comply with Material Safety Data Sheets (MSDS).
5. Alkaline Compounds: Alkaline compounds may be used to remove some oils and greases, and waxes from non-alkali sensitive masonry. Alkaline compounds shall be used in conjunction with a poultice when removing graffiti. The use of alkaline compounds shall be followed by a weak acid wash and a water rinse to neutralize or remove the alkaline residues from the masonry. Do not use strong alkalines (pH 13-14) since they can cause efflorescence and staining on masonry surfaces if not properly neutralized.
6. Bleaches: Alkali-based bleaches such as calcium hypochlorite can be used in a poultice to bleach or decolorize certain dyes contained in some paints and inks that cannot readily be removed by other means.
7. Mechanical or Abrasive Methods: Mechanical treatments include dry or wet blasting using abrasive grits; high-pressure water washing; and mechanical sanding or grinding. Abrasive methods will cause damage to masonry and should not be considered as a method of removing graffiti from historic masonry. Under very controlled circumstances, a micro-abrasive technique may be appropriate for removing graffiti from delicate masonry surfaces if used at low pressures of 35- to 40-psi with fine abrasives. This treatment shall be done very slowly and carefully to avoid damaging the masonry, and shall be tested first and performed only by a professional conservator, subject to review and approval of proposed test methods and approval of a small test area, by the Architect before proceeding.

D. Graffiti-Removal Techniques and Guidelines:

1. Carry out graffiti removal in well-ventilated conditions. Workers shall wear protective clothing and personal protective equipment as recommended by graffiti removal material manufacturer.
2. Pre-wet the masonry when using an alkaline paint remover. Pre-wet the surrounding surfaces to dilute the effect on any cleaning agents that might be inadvertently splashed or spilled on the surface. Do not wet the area to be cleaned if the cleaning agent is solvent-based or incompatible with water.
3. Rinse the cleaning agent off the masonry surface starting at the bottom and moving up to prevent the cleaning agent from running down and staining a lower surface.
4. Mortar joints react differently from masonry units and may require a different cleaning material and/or method.
5. Graffiti removal may result in an obviously clean spot. Clean the entire masonry unit that is bounded by mortar joints but not the joints themselves unless necessary. The prominence of the clean spot may be minimized by fanning the cleaning out from the spot and feathering it by gradually reducing the strength or thoroughness of the cleaning.
6. If not possible to completely remove all traces of graffiti without removing some of the masonry surface, it may be preferable to leave the masonry alone. Some graffiti ghosts become less noticeable with time due to fading of the dyes used in paints and markers. It may be possible to conceal more obvious graffiti ghosts with carefully-matched paint.
7. After graffiti removal, the masonry surface shall be tested with pH strips to make sure all cleaning materials have been removed. Non-staining pH strips will indicate whether acids or alkalis remain on the masonry surface.
8. Although alkaline paint removers are sometimes ineffective on modern formulations of aerosol paints,

they may work well in removing multi-layered graffiti because they last longer.

9. What removes graffiti in one instance may not always work again even in what appears to be an identical situation.
10. More than one cleaning material and technique may be required to clean a heavily graffitied area if different materials were used to make the graffiti.
11. Effective graffiti removal often depends on trial-and-error testing as well as knowledge of masonry materials, graffiti materials and cleaning techniques.
12. No coatings shall be applied for the purpose of protecting against graffiti.

3.05 EXTERIOR STONE CLADDING

- A. Provide new anchoring system for all stone units as shown on drawings (Helifix anchor system or equal).
 - Condition One: Concrete to stone facing (interior application)
 - Condition Two: Stone facing to concrete (exterior application. Holes drilled into the stone to be filled with mortar.
- B. Clean the exterior stone (granite) with PROSOCO SureKlean Restoration Cleaner 20030.
- C. Remove existing graffiti with PROSOCO Heavy Duty Paint Stripper 20048
- D. Provide new exterior sealer graffiti coating on all stone facing PROSOCO Sacrificial Coating SC-1 57057. From grade to the 4th floor bull nose.
- E. Re-point masonry joints as required. Samples shall be taken of the existing mortar and analyzed by a testing laboratory to determine the composition make-up of the mortar. Mortar to match existing historic mortar in color and joint profile (assume 20 % of the joints to be re-pointed).

3.06 EXTERIOR TERRA COTTA CLADDING

- A. Provide new anchoring system for existing terra cotta cornice and wall facing as shown on drawings.
 - Condition One: Steel framework to terra cotta (interior application)
 - Condition Two: Concrete to terra cotta (interior application)
- B. Clean terra cotta with PROSOCO SureKlean Restoration Cleaner 20030.
- C. Repair existing terra cotta window sills at the light courts:
 - a. Remove existing loosing terra cotta bisque.
 - b. Rebuild existing terra cotta bisque to match original profile with Cathedral Stone Company: Jahn M100 Restoration Mortar.
 - c. Paint mortar repair area with Cathedral Stone Company: Jahn Terra Cotta Glaze Repair colored to match the existing terra cotta glaze.
- D. Re-point masonry joints as required. Samples shall be taken of the existing mortar and analyzed by a testing laboratory to determine the compositional make-up of the mortar. Replacement mortar to match existing historic mortar in color and joint profile.
- E. Provide stainless steel rod bracing @ terra cotta balustrade as indicated.

3.07 EXTERIOR STEEL FRAMED WINDOWS AT FLOORS 1-9:

- A. Remove all existing lead based paint finishes with chemical paint stripper. (Comply with all Local and Federal standards for the removal of lead based paint.) Cathedral Stone Company: Paint Stripper 5-301.
- B. Remove existing screw attached glazing stops and re-install where replacement glass is to be installed.
- C. Replace broken glass panes with new glass to match existing. Refer to window schedule for type of glass to be used for replacement glass.
- D. Install new silicone sealant at all glazing stops as shown on drawings.
- E. Screw existing operable sash shut and seal all joints at operable sash with silicone sealant.
- F. Paint all metal window framing and sash with primer and two finish coats of paint.

- G. Custom fabricated replacement mullions and sash:
Provide new custom fabricated mullions and sash units to match profiles of the originals (see plans for window profiles, profiles shown on the plans are an approximate representation of the existing mullion profiles, new custom shapes shall be made using extant sections of the original windows) where mullions or sash were removed to install mechanical equipment in the existing windows.
Existing light court windows that required replacement sash and glazing: Use parts from the existing windows where new mechanical louvers are being installed to replace missing window components.
- H. Provide new sealant at all perimeter joints between the window frame and masonry jambs.
- I. Provide new steel custom fabricated windows to match existing.

3.08 EXTERIOR STEEL FRAMED WINDOWS AT FLOORS 10-14 (JAIL CELL FLOORS):

- A. Removal all existing lead based paint finishes with chemical paint stripper. (Comply with all local and federal standards for the removal of lead based paint.) Cathedral Stone Company: Paint Stripper 5-301
- B. Remove existing screw attached glazing stops, remove all existing glazing putty and re-install existing stops.
- C. Remove original obscured vision glass and replace with 1/8 inch clear glass, except as noted at new bathroom locations.
- D. Install new silicone sealant at all glazing stops as shown on drawings.
- E. Screw existing operable sash shut and seal all joints at operable sash with silicone sealant.
- F. Provide new sealant at all perimeter joints between the window frame and masonry jambs.
- G. Metal trim piece at head, sill and jamb.
- H. Bond breaker at head, sill and jamb.
- I. Provide new steel custom fabricated windows to match existing.

3.09 EXTERIOR BRONZE ENTRY FRAMES:

- A. Replace any broken glass with new clear glass to match original.
- B. Clean bronze door frames with exterior alkaline based cleaning agent to remove existing oxidation.
Provide a paraffin sealer coat
- C. Provide accessible hardware for the doors.
- D. Provide new bronze doors to match existing at the south entrance that have been replaced with aluminum entrances.
- E. Provide an ADA compliant entrance door at the Spring Street entrance by removing the center post between 2 original doors and reinstalling them as a pair of doors with a power operated door opener. The power operator Record series 8100.
- F. Provide new custom cast historic ornamentation and door push pulls

3.10 UN-REINFORCED GLAZED BRICK MASONRY AT THE LIGHT COURTS:

- A. Re-point masonry joints as required. Samples shall be taken of the existing mortar and analyzed by a testing laboratory to determine the composition make-up of the mortar. Mortar to match existing color and joint profile. Assume that 25% of the brick is to be repointed.
- B. Replace damaged glazed brick with new brick to match existing. Brick to be 2 1/4" high by 8" long by 3 5/8" bed depth with a white glaze. Glen Grey Brick or equal.
- C. Repair damaged brick masonry at relieving angles at floor lines and at 6th, 7th & 8th floors. 10,000 s.f.
- D. URM wall strengthen:
 - Stairwell Walls: Provide fiber wrap backing at the existing wall with a fiber wrap insert anchor in the existing wall.
 - Tenant Area Walls: Strengthen existing URM walls with new steel stud framing on the inside of the existing masonry wall with anchors drilled in the existing wall at two foot on center attached to the stud wall framing. At the URM walls at the Light Court at floors 10 thru 14 and as otherwise indicated, provide shotcrete, strong backs and pin anchors. Refer to structural drawings for typical wall reinforcement.
- E. Clean glazed masonry with PROSOCO Sure Klean Restoration Cleaner 20030.

- F. Demolish existing URM parapets at roof and salvage glazed brick. Provide new parapets using salvaged brick as indicated.
- G. ProSoCo Sacrificial Coating SC-1-57057 Sealer at all exterior brick surfaces and terra cotta sills exposed to weather.

3.11 STANDING SEAM COPPER ROOF:

- 1. Inspect existing standing seam copper roof and roof gutters and make any repairs as required.
- 2. Clean the copper roof with a micro-abrasive cleaning system (JOS System or equal) with dolomite medium.

3.12 HISTORIC FLAG POLE :

- 1. Repair historic flagpole at the south elevation as required.

END OF SECTION