PART 1- GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Repair of wood window sash, frames, and sills, including repair of deteriorated wood elements, repair of cracks in wood, adhesive repairs at open joints, replacement of glazing stops with glazing putty, and dutchman repairs.

2. Surface preparation and applications of paint systems on wood windows.

1.2 DEFINITIONS

A. “Tier 1” Windows: High prominence, original window assemblies that are more than fifty years old. All steps should be taken to maintain these windows in good condition and to protect the material fabric from deterioration. Campus Architect to review and approve repair strategies for these windows prior to work being conducted.

B. “Tier 2” Windows: Windows that are in less prominent locations, are less than fifty years old, or do not have unique or character-defining features (“off the shelf” windows). While a program to maintain these windows is possible, replacement of these windows is allowed.

C. “Minor Repairs and Patching”: consist of consolidating and applying fillers to extant original material. Elements requiring minor repairs and patching have are intact, but exhibit minor deterioration, such as weathering, cracking or minor loss of material. Minor loss is defined as affecting less than \( \frac{1}{4} \)" depth of the surface of the element.

D. “Partial Replacement”: Are to be conducted on components that exhibit deterioration that exceeds \( \frac{1}{4} \)" in depth, but affect less than 20% of the surface area of the element. Original material will be partially replaced by Dutchman patches or epoxy fill.

E. “Gloss Level 2”: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

1.3 SUBMITTALS

A. General: Submit the following according to Sections 01 33 00 Submittal Procedures.

B. Product Data: Submit manufacturer's technical data for each product indicated, including the manufacturers’ recommendations for their application and use. Include test reports and certifications substantiating that products comply with specified requirements.

1. Product data for each type of wood rehabilitation work required includes:

   a. Product information for epoxy repair materials.

C. Samples for Verification: for each type of paint system and each color and gloss of topcoat.

   a. Provide “brushout” sample on rigid backing, min. 8 inches square
b. Label each coat of each sample

c. Label each sample for location and application area.

D. 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.

E. Field Mock-Ups and Sample Windows:

1. Complete wood repair at areas of deterioration for Architect’s review. Repairs on mock-up to include the following:
   a. Strip window of paint coatings as necessary for repairs of damaged wood.
   b. Installation of epoxy repair compound.
   c. Installation of Dutchman repair.
   d. Preparation of surface for repainting.
   e. Prime and finish painting.

2. Subsequent work in the sequence may not start until the Architect has reviewed and approved the previous treatment. Repeat treatments until approved by the Architect, before beginning the next treatment in the sequence.

3. The approved sample repair shall be used as a standard for all window repair work.

1.4 QUALITY ASSURANCE

A. Standards:

1. The "Quality Standards" of the Architectural Woodwork Institute (AWI) shall apply to all work of this section.

2. Any item not given a specific quality grade shall be AWI premium grade.

3. All work shall be subject to the Inspection Procedures of the AWI Quality Certification Program.

B. All work shall be performed by a firm having not less than five (5) years successful experience in comparable wood window repair and painting projects. All work shall be performed by persons whose qualifications have been submitted.

1. One skilled worker shall be present at all times during the execution of the work and shall personally direct the wood window repair work.

2. In acceptance or rejection of the wood window repair work, no allowance will be made for lack of skill or expertise on the part of the workers.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees F (7 degrees C).

   a. Maintain containers in clean condition, free of foreign materials and residue.

   b. Remove rags and waste from storage areas daily.
B. Wood window repair components: Keep all materials and fabricated items dry and protected from damage, soiling and deterioration.

C. Follow manufacturers’ directions for proper storage of all products.

1.6 PROJECT CONDITIONS

A. Field Measurements: The contractor is responsible for all field measuring of dimensions for any required replacement parts or repairs and to verify scope of work noted on the drawings prior to starting work of this section.

B. Provide temporary infill panels at openings where sash has been removed for repair work. Infill panels to be weather tight and secure. A minimum of one bay of sash must remain in place within any individual office or lab space at a time. This is to allow for natural light in the office/lab areas.

C. Do not apply primers or finish coats under direct sunlight or within an hour of direct sunlight.

D. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 degrees F (10 and 35 degrees C)

E. Do not apply paints in rain, fog or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F (3 degrees C) above the dew point; or to damp or wet surfaces.

F. Comply with manufacturer’s recommendations for applying paint. Should discrepancies between this specification and the manufacturer’s recommendations occur, consult with Architect.

PART 2- PRODUCTS

2.1 WOOD WINDOW REPAIR MATERIALS


1. Primer: Primaries Flexible Cell-Bonding Primer; two-component epoxy-based coupling agent specifically designed to enhance the bonding strength of the wood repair compound.

2. Wood Repair Compound: Flex-Tec HV Elastomeric Wood Repair Compound; two-part epoxy-based repair material specifically engineered to move with the natural expansion and contraction of wood.


C. Wood: Wood for splicing or dutchman repairs shall be of a species, cut, grade, etc. to match existing window being repaired.

D. Wood Preservative: Clear, biocide that complies with California VOC requirements. “Bora-Care” as manufactured by Nisus Corporation, 100 Nisus Drive, Rockford TN 37853, 1-800-264-0870

E. Wood Filler: For repair of checks, gouges and imperfections and to recreate original profiles where damaged: (No substitutions)

1. Decraflex Smooth Knife Grade Patch, ICI 40448.
F. Miscellaneous

1. Fasteners: Galvanized, type and size to fit application.

2. Glazing: New float glass to match thickness and dimensions of original.


5. Hardware: where required to operate window sash, to match existing.

2.2 PAINT, GENERAL

A. MPI Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

a. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

b. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

c. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

2.3 COATING AND PAINTING SYSTEMS

A. Paint System for Wood:

a. Finish Coats: Kelly Moore Acry-Shield 1245 paint – two coats at 1.75 mils minimum DFT per coat.

i. Colors: Carbon Black, to match the existing wood windows and subject to the approval of the Campus Architect

ii. Gloss: Gloss Level 2, Low Sheen

b. Primer: Kelly Moore 255 Acry-Shield Primer – one coat at 1.5 mils minimum DFT.

c. or substitute that complies with the General Requirements and is approved by the Campus Architect.

2.4 MISCELLANEOUS

A. Hardware: where required to operate window sash, to match existing.
B. Fasteners: Galvanized, type and size to fit application.
C. Glazing: New float glass to match thickness and dimensions of original.
D. Hardware: where required to operate window sash, to match existing.
E. Glazing compound: Dap 33 by Dap, Inc. 2400 Boston Street, Baltimore, ML 21224, www.dap.com, or equal.

PART 3- EXECUTION

3.1 EXAMINATION

A. Inspect all window sash, frames and sills designated for repairs. Confirm that the scope and scale of work is as understood and agreed upon by the Owners.
B. Examine substrates and conditions under which coatings will be applied for compliance with requirements on applying coatings. Surfaces to receive coatings must be thoroughly clean, dry, dull and free of oil, grease and other contaminants prior to application of coatings.
   a. Do not proceed with coating application until unsatisfactory conditions have been corrected.
   b. Start of application will be construed as the Applicator's acceptance of surfaces within that particular area.
C. Coordinating Work: Review sections in which other coatings are provided to ensure compatibility of the total systems for various substrates. On request, furnish information on the characteristics of specified finish materials to ensure compatible primers.
   1. Notify the Architect of problems anticipated using the coatings specified over substrates primed by others.

3.2 PREPARATION

A. Inspect all designated windows at site. Inspect both the weather and non-weather sides of each component.
B. Verify all areas of rotted or deteriorated wood in the following:
   1. Window trim, sashes, mullions, muntins, frames, heads, and sills.
   2. All surfaces where wood decay is present or that do not retain original profiles require epoxy repair treatment.
   3. Areas of major damage and deterioration require dutchman repairs
   4. Verify the following conditions:
      a. Missing or broken hardware.
b. Damaged or missing glazing.

c. Deteriorated glazing putty.

C. Removal of Finishes:

1. Prior to any repair work, all loose and deteriorated coatings shall be removed to bare wood. Gouging, scarring or other damage to wood shall not be permitted.

2. Coatings removal shall extend at least 2-inches beyond area to be repaired.

3. Removal of Glazing Compound from Wood Sash: Remove all existing glazing compound taking care not to damage glass.

D. Comply with manufacturer’s written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.

E. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

   a. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

   b. Prime coat exposed wood surfaces within twenty-four hours from sanding.

F. Remove hardware, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

   a. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

3.3 REQUIREMENTS FOR LEADED PAINT SURFACES

A. Lead-based paint may be present on exterior surfaces of the building. It is the Contractor’s responsibility to ensure these materials are handled in accordance with all applicable State and Federal regulations to accomplish the work.

B. Project shall be conducted in compliance with CAL-OSHA requirements provided in 8 CCR 1528, 5144, 5194 and 5155. These provisions include, but are not limited to, personal exposure air monitoring, protective clothing, training, containment, respiratory protection, worker change areas and medical examinations.

3.4 REPAIR PROCEDURES

A. General

1. Remove sash from frames to perform repair work. Label sash and sash elements with a unique number so that each sash can be reinstalled in its original location after rehabilitation work in complete.

2. Provide temporary protection at window opening where sash is removed. Do not nail protection to window frame or any other historic materials.

3. Perform all wood repairs to sash, frame and sill elements.
4. Replace existing glazing with new glazing if existing is cracked or broken.

5. Remove all flaking paint, prepare surfaces and paint.

6. Reinstall repaired sash in original location. Clean and lubricate all sash operating mechanisms. Reinstall fully operable sash so that they operate smoothly and properly.

7. Surface clean and lubricate all hardware. Where existing hardware is beyond repair, or is not original, replace with new hardware.

B. Repair of Open Joint.

1. Clean out joints. Fill joint with adhesive, allow to cure. Sand smooth to match level and/or profile of adjacent surface.

C. Minor Repairs and Patching:

1. Remove all paint and other coatings from area to be repaired.

2. Check area of removal to determine complete elimination of decayed material.

3. The remaining wood should be of even color, without red-brown and/or grey spots.

4. No soft wood, existing brittle compound, or other previous repairs should remain.

5. Sand the bare wood, thoroughly removing loose wood fibers, paint, saw dust and dirt.

6. Treat bare and sanded wood thoroughly with epoxy primer.

7. For larger or profiled repairs, acrylic strips matching the shape of the wood can be placed on the member to assist in modeling the compound.

8. Fill the repair area completely with epoxy repair compound, making surface even and smooth.

9. After curing, sand the repair even and smooth. Transitions and irregularities between wood and epoxy shall not be visible after sanding.

10. Remove sanding dust thoroughly.

D. Dutchman Repair

1. Spot remove paint from area of dutchman repair.

2. Use a saw to remove the decayed area and at least 1/2” of the adjoining sound wood.

3. Cut wood dutchman slightly smaller than area to be filled. The seam between the wood and the repair should be 1/32”, or less.

4. Sand the bare wood to thoroughly remove loose fibers and raised grain prior to installing dutchman.

5. Apply a thin layer of epoxy adhesive to the existing and the new wood. Install wood dutchman.
6. Fill the seam with epoxy consolidant between the new dutchman and the existing wood element.

7. Sand entire area smooth after proper curing. Prepare surface, prime and paint.

E. Repairing Large Voids

1. Install epoxy consolidant and wood fill to areas of sills where cracks or other openings are larger than 1/8”.

2. Spot remove paint from areas requiring repairs.

3. Remove dirt and debris from crack with a fiber bristle brush.

4. Install the consolidant following the manufacturers’ instructions. After the consolidant has cured, apply wood fill to fill crack completely. Force deep into the crack.

5. After proper cure, sand area flush with adjacent surface.

F. Removing Existing Glazing Stops

1. Remove all existing wood glazing stops and fasteners.

2. Remove any residual glazing putty.

3. Clean and prime wood muntin surfaces prior to reinstalling glazing.

G. Glazing

1. Remove existing glazing where required. Clean out and prime wood surfaces, including glazing rabbet.

2. Apply a thin setting bead of glazing compound to n surface, press in glazing.

3. Install glazing points, minimum of two points of each side of glass pane, approximately 2 inches away from the corners. Install other points as needed.

4. Roll out a rope of glazing compound, approximately 3/8" in diameter, press into glass around entire perimeter. Finish compound with a long, smooth stroke over surface. Scrape off excess compound. Dimension of glazing compound to be consistent throughout project. Allow compound to dry for a minimum of two days. Paint glazing compound concurrently with painting of sash. All surfaces of glazing compound to be thoroughly coated with paint.

H. Installing New Glazing Putty

1. Install glazing to primed wood surfaces.

2. Apply a thin setting bead of glazing compound to muntin surface, press in glazing.

3. Install glazing points, minimum of two points of each side of glass pane, approximately 2 inches away from the corners. Install other points as needed.

4. Roll out a rope of glazing compound, approximately 3/8" in diameter, press into glass around entire perimeter. Finish compound with a long, smooth stroke over surface. Scrape off excess compound. Dimension of glazing compound to be consistent throughout project. Allow
compound to dry for a minimum of two days. Paint glazing compound concurrently with painting of sash. All surfaces of glazing compound to be thoroughly coated with paint.

3.5 SURFACE PREPARATION AND PAINTING

A. Existing wood sash elements have a minimum amount of paint. Paint removal down to bare wood is not required. Remove all flaking or raised paint. Sand smooth.

B. Existing frame and sill elements have multiple layers of paint. Complete paint removal is not required. Remove all flaking or raised paint. Sand smooth.
   a. Where flaking of changes in paint layers occurs, feather the transition between layers to provide a smooth surface.

C. Prime all wood elements at completion of surface preparation.

D. Apply two coats of finish paint to all sash, sill and exterior frame elements. Apply one coat of paint to interior wood frame and sill elements.

E. Interior frame and sash elements may have different colors of paint, match existing colors.

3.6 APPLICATION

A. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to the material required to be coated or finished.
   a. Reccoat, prime and seal substrates where there is evidence of suction spots or unsealed areas in the first coat to ensure a finish coat with no burn-through or other defects caused by insufficient sealing.

B. Brush Application: Brush-out and work brush coats into surfaces in an even film. Eliminate cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Neatly draw glass lines and color breaks.

3.7 COMPLETED REPAIRS

A. Repaired sash, frames and sills shall be consistent in detail and visual appearance and be weathertight. Where windows operate, windows shall open and close smoothly, and latch securely.

3.8 CLEANING

A. Clean both sides of all glazing at completion of project.

B. Remove and legally dispose of all materials, tools, equipment and debris generated from work of this section.

END OF SECTION