D-1150

ROOF REPLACEMENT

LHS BUILDING

DIABLO VALLEY COLLEGE

PLEASANT HILL, CALIFORNIA

TECHNICAL SPECIFICATIONS

28 MAY 2024

SECTION 02 41 00

SELECTIVE DEMOLITION

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Demolition of and removal of roof systems.

B. Demolition of and removal of exterior finishes to perform the roof installation.

C. Protection of building interiors from dirt, dust and damage.

1.02 RELATED SECTIONS

A. Division 1 – General Requirements.

B. Appendix – Hazardous Material Abatement

1.03 SPECIAL JOB CONDITIONS

A. Roofing, exterior wall finish and sealant that is removed shall be made watertight and secure in the same day's operation.

B. Contractor will verify roof demolition scope with the Owner Representative and/or Architect/Engineer prior to the start of work.

C. The building will be occupied and in use during the work.

D. The Contractor will be responsible for the building watertightness after the existing roofs are removed.

1.04 SUBMITTALS

A. The Contractor shall submit a detailed demolition plan to the Construction Manager, outlining the means and methods to be utilized in the removal, transportation and disposal of the existing roof system and related debris. The removal plan shall also include the Contractor's proposed methods for interior and exterior protection and cleanup during removal and re-roofing operations. Identify the proposed location(s) of dumpsters.

1.05 EQUIPMENT

A. Conveyances: Buggies or wheelbarrows used on roofs shall be limited to 3/8 cubic yard capacity.

B. Chutes: Provide enclosed chutes for debris transfer from the roof vertically for a distance of 10 feet or more. Do not extend chutes in an unbroken line for more than 20 feet, without substantial breaks at intervals not greater than 20 feet. Debris shall not spill from the bottom of the chute directly onto the ground. Direct chutes into an approved construction debris container. Provide a hose with a nozzle connected to an adequate water supply, near chute outlet to wet debris as necessary for dust control.

C. Hoists/Cranes: Provide hoists or cranes to remove debris and transport materials to and from the roof. All materials shall be properly secured to prevent loose materials or debris from breaking loose from hoisting apparatus. Debris to be transported from the roof shall be placed directly in approved construction debris containers. Proper protection of wall areas for their entire height shall be provided in the form of heavy duty tarps secured or affixed to exterior walls directly adjacent to or under the area of hoisting.

D. The use of “bobcat” type removal equipment is prohibited.

E. Mechanical cutting equipment: Roof cutting equipment shall have an operable blade depth setting mechanism, in order to control the cutting depth of the blade and alleviate the potential of damage to the structural deck.

PART 2 – MATERIALS

NOT USED

PART 3 – EXECUTION

3.01 PREPARATION

A. Provide, erect, and maintain temporary barriers and security devices as required for performance of the Work.

B. Protect existing landscaping materials, appurtenances, structures, and finish materials that are not to be demolished.

C. Mark location of utilities.

D. Protect existing structures and paving from damage or displacement.

E. Where nature of demolition requires their use, erect and maintain trash and dust chutes for disposal of materials, rubbish and debris (See Paragraph 1.05).

3.02 DEMOLITION REQUIREMENTS

A. Conduct demolition to minimize interference with adjacent occupancies.

B. Conduct operations with minimum interference to public or private accesses. Maintain egress and access at all times.

3.03 DEMOLITION

A. Disconnect, cap, and identify designated utilities within demolition areas; protect those utilities to remain from damage.

B. Remove materials to be re-installed or retained. Store and protect in manner to prevent damage.

C. Remove demolished materials and debris from site.

D. Do not burn or bury materials on site.

E. Leave site in clean condition.

F. Remove temporary work.

3.04 STORAGE AND DISPOSAL

A. Items to be removed, stored, and protected for re-installation: As indicated on the Drawings and herein, including but not limited to the following:

1. Ducts, mechanical units, condensate lines, some HVAC units, or communications items that may require removal and reinstallation during reconstruction.

B. Items to be removed: As indicated on the Drawings and herein, including but not limited to the following:

1. For all roof areas roof systems, as indicated on the Drawings.

2. Parapet caps and reglets.

C. Debris disposal:

1. All debris shall be transported to dumpsters at ground level by enclosed chute. Uncontrolled dropping of debris to ground level will not be permitted. Control visible emissions at the dumpster location by wetting the debris with a fine spray of water at the dumpster level and by providing a tarp cover over the dumpster.

2. Dispose of all debris in accordance with all applicable local, State, Federal regulations for the proper transportation and disposal of roofing materials at an approved landfill.

3.05 CLEANING

A. Clean, restore and/or replace items stained, dirtied, discolored or otherwise damaged due to the Work, as required by the Owner.

B. Clean roof, building (interior and exterior), and surrounding areas so they are free of trash, debris and dirt caused by, or associated with the Work.

C. Clean out drain leaders and piping to the point where it exits the site. Water test all roof drains and downspouts prior to and after construction by running water from a hose into each gutter and downspout in the presence of the Owner and/or Owner Representative.

D. Sweep site and paved areas clean daily.

END OF SECTION

SECTION 07 54 05

THERMOPLASTIC MEMBRANE ROOFING SYSTEM

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. An adhered single-ply TPA/PVC fleece back roof system complying with California Title 24 (Cool Roofing) regulations as shown on the Drawings.

1.02 RELATED SECTIONS

A. Section 07 60 00 – Flashing and Sheet Metal

B. Section 07 90 00 – Sealants

1.03 PERFORMANCE REQUIREMENTS

A. Membrane and related items shall be classified by Underwriters Laboratories, Inc. as a Class A Sheathing Material for use in construction of Class A coverings and amendments. Wind: Factory (FM) 1-90.

B. Provide installed roof membrane and base flashings that remain watertight, do not permit the passage of water and resist the specified uplift pressure, thermally induced movement and exposure to weather without failure.

C. Material Compatibility: Provide roofing materials that are compatible with one another under the conditions of service and application required, as demonstrated by the roof manufacturer, based on testing and field experience.

1.04 PRE-CONSTRUCTION MEETING

A. A preconstruction meeting shall be held after the submittals were transmitted and prior to the start of Work (not less than one calendar week).

B. Required attendees are the Owner Representative, Architect, Engineer, Contractor, and Roof Manufacturer.

1.05 ROOFING CONTRACTOR'S QUALIFICATIONS

A. Contractor shall submit work 5-year history data showing successful warranted installation experience of the specified system, and of being authorized by the roofing system manufacturer to install the specified manufacturer's materials.

B. The Contractor shall use adequate amounts of such qualified workmen to install the specified roofing system.

C. The Contractor shall have an experienced, pre-qualified, superintendent having experience installing the roof system specified, familiar with the requirements of this project, on the job at all times when roof installation is in progress. Training for superintendent shall include certification of completion of manufacturer's in-house training course and on-site training.

1.06 FIELD INSPECTION

A. The Owner reserves the right to retain, at the Owner's expense, an independent inspection service to provide part-time or full-time inspection of the roofing system installation. The inspector shall have free access to the work area.

B. The Contractor shall arrange for the membrane manufacturer to provide inspection of the roofing system installation. Upon completion of the installation, an inspection shall be made by a Quality Assurance Specialist of the membrane manufacturer at no extra charge to the Owner or Contractor. The inspection is to confirm the roofing system is installed in accordance with the membrane manufacturer's published specifications and details and Contract Documents.

1.07 WARRANTIES

A. Contractor: The Contractor shall warrant the roof application with respect to workmanship and proper application for two (2) years from the date of acceptance by the membrane manufacturer. Should any leaks covered under the warranty occur during this period, corrective action shall be taken by the Contractor to repair the roof to the satisfaction of the Owner and the manufacturer. All corrective work shall be done at no cost to the Owner.

B. Manufacturer's standard warranty form, without monetary limitation, in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Special warranty includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, cover boards, substrate board, and other components of roofing system, whether manufactured by or approved by the manufacturer for 30 [thirty] years from date of Substantial Completion.

C. Maintenance Service Agreement: Manufacturer's standard form, in which manufacturer agrees to provide the following service for the roof system during the second, fifth, tenth, fifteen and twentieth of the warranty period specified above:

1. Inspection of the roof membrane and associated roofing system components listed above by a manufacturer's technical service representative.

2. Report of inspection documenting roofing conditions.

3. Routine preventive maintenance and repairs to damage to the roof system, excluding such damage to the roof system excluded from the warranty and service agreements as a result of neglect, negligence, vandalism or other excluded cause as descrived in manufacturer's published terms and conditions at the date of this contract.

4. General rooftop housekeeping and cleanup, subject to limits, but generally including removal of incidental debris.

5. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering Work of this Section, including all components of roofing system such as roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers and walkway products, for the following warranty period: years from date of Substantial Completion.

D. Warranty shall be issued by the original manufacturer of the roofing membrane. No private label membranes will be accepted.

1.08 SUBMITTALS

A. The Contractor shall submit the following:

1. Written confirmation from membrane manufacturer of approved applicator status and that the Contractor is qualified for the specified warranty.

2. Manufacturer literature and MSDS sheets for the items listed in Part 2.

3. Submit 6 in. long samples of the following items for approval prior to ordering:

a) Pre-manufactured pipe flashing
b) Termination bar
c) Sample of membrane
d) Mechanical fasteners and metal distribution plates
e) Lap splice sample (factory and field)
f) Roofing insulation

4. Shop drawings including outline of the roof and roof size, perimeter and penetration details, special details and section layout, location of factory dielectric and field welds, accessory and material list.

5. Pullout Tests: Perform pullout tests and submit engineering results of manufacturer's random location pull tests. Manufacturer shall obtain at least two (2) pull resistance tests from indicated locations of a sections of decking, where integrity is in question. Submit pull test results with drawing indicating the locations of the tests. Engineering results shall demonstrate the manufacturer's reasons for selection of anchorage, frequency and the seaming patterns.

6. Membrane Data: Prior to receipt of bids, Contractor shall submit all forms and other required data to roofing system manufacturer for pre-approvals. Advise building Owner or Owner Representative in writing of any recommendations made or revisions required by manufacturer to particular job conditions. In the absence of any comments, the Owner and/or his representative shall assume the manufacturer's most recently published specifications shall be followed.

7. Provide Operations/Maintenance manual and repair procedures to the Owner and/or Owner's representative.

8. Insulation: A tapered insulation layout drawing from the insulation manufacturer. The shop drawing should include an outline of the roof area and locations of drains and major roof penetrations. Provide a profile of tapered sections; indicate minimum and maximum thicknesses at perimeters, for the proposed insulation system.

9. Submit certification from each insulation manufacturer stating the roof membrane manufacturer for the specified warranty accepts the submitted products.

10. Warranties: Provide an unexecuted copy of the specified warranties.

1.09 PRODUCT DELIVERY, STORAGE AND HANDLING PROCEDURES

A. Deliver materials in original unopened packaging.

B. Containers labeled with manufacturer's name, brand name, and identification of various items.

C. Store materials in a dry area and protect from inclement weather. Damaged materials shall be replaced at contractor's expense.

D. Do not allow roofing membrane to come in contact or be exposed to any materials that would be detrimental to or cause degradation of the roofing membrane.

1.10 JOB CONDITIONS

A. Environmental Conditions

1. In making field heat welds, make sure all welding surfaces are clean and free of moisture or foreign items.

2. Weather Precautions: Proceed with roofing work when existing and forecasted weather conditions permit work performance in compliance with manufacturer's recommendations.

3. Roofing system shall not be applied when the surrounding air, surface temperature, relative humidity or wind velocity is not within the range acceptable under the manufacturer's recommendations.

B. Protection

1. Prior to starting work, protect all work in an approved manner including all paving and faces of building walls. Provide special protection of the face of the building wall adjacent to hoist.

2. Complete the whole roofing section or any portion of the roof in a single day to avoid exposure to rain, dew, or moisture of any kind. If rain threatens during the day or in an emergency, protect the unfinished exposed roofing components and provide temporary water cut-offs around exposed edges and incomplete flashing areas.

3. All hoisting equipment shall bear on solid pad blocking. If on the roof surface, pad shall be large enough to evenly distribute the load to avoid crushing insulation and roof system. Pad shall consist of two separate layers of material to eliminate vibration and movement to directly affect the roofing membrane. Pad shall be of sufficient size to accommodate work tools and weights used around hoisting operations.

4. Repairs: Clean or repair surfaces damaged or soiled by operations under this contract to the satisfaction of the Owner or Owner's representative without additional cost to the Owner. These would include, but not be limited to, windows, doors, floors, walls, stairs, elevators, steps, walks, curbs, lawn areas, or other roofs.

PART 2 – MATERIALS

2.01 ROOF MEMBRANE

A. A special formulated, permanent, thermoplastic alloy, bonded to a high tenacity, low shrinkage weft inserted polyester fabric with resistance to ultraviolet rays, microorganisms and impervious to most caustic chemicals.

B. The new roofing shall be a prefabricated fully adhered installation of single-ply reinforced co-polymer alloy (CPA) membrane. Product: 60 mil thick fleece-back membrane. Color: White. SRI: 110.

The basis of design is Tremply TPA FB by Tremco or approved equal.

C. Adhesive: TPA LV Single-Ply Bonding Adhesive by Tremco or approved equal.

D. Fleece Membrane Adhesive: FB WB Single-Ply Bonding Adhesive by Tremco or approved equal.

E. Liquid Flashing:

i. Base Coat: Alpha Guard BIO Base Coat by Tremco or approved equal.
ii. Top Coat: Alpha Guard BIO Top Coat by Tremco or approved equal.

2.02 MATERIALS

A. Membrane-Related Materials

1. All membrane components, including pipe and curb flashings, shall be factory prefabricated from the same fabric reinforced material used for the deck membrane.

2. Termination Sealant: Compatible with materials to which membrane is to be bonded, conforming to Federal Specifications TT-598 and TT-S-00230C as furnished by the membrane manufacturer.

3. Distribution Plates: Factory Mutual approved stress distribution plates formed from a minimum 24 gauge, G-90 C.Q. steel with a galvalume coating for cover board, insulation and membrane attachment.

4. Water Cut-Off Mastic: Compatible with materials with which it is used and furnished by the membrane manufacturer.

5. Fasteners: Compatible with roof deck as furnished by the membrane manufacturer. Fasteners shall be furnished by the membrane manufacturer and be #14 or approved equal and must pass 30 cycles in the Kesternich Cabinet, DIN #50018-2 Liter. The FM approved fastener is inserted through the hole in the distribution plate and properly secured to the roof deck.

6. Terminations/Edge Details: Shall be manufactured from rigid exterior vinyl with slotted holes for securement and furnished by membrane manufacturer. All other terminations/edge details must be approved and warranted by the membrane manufacturer.

7. Termination Bars: By Tremco.

2.03 COVERBOARD & INSULATION

A. Cover Board: Board shall be a minimum of 1/4 inch thick by 4 feet by 8 feet. Dens-Deck Prime roof board by Georgia Pacific or approved equal – at roof decks. 1/2 inch thick 4 feet by 8 feet Dens-Deck roof board – at walls.

B. Tapered Insulation (Crickets): A rigid isocyanurate board with factory-applied fiberglass bituminous felts on both sides. Conforming to HH-I-530A (Type II, unfaced) and C1289-02, Type II, Class 1, Grade 2 with an average density of 2.0 lbs. per cubic foot. Manufacturer: Tremco flat and tapered panels or approved equal. The board size: 4 foot by 8 foot, ¼ in. per foot slope for tapered insulation.

2.04 MISCELLANEOUS

A. Roofing Nails: Stainless Steel “Stronghold” type: (for use on parapet walls, wood nailers).

B. Pipe Clamps: Stainless steel draw band clamps.

C. Fasteners and Accessories

1. Fasteners for securement of each layer of gypsum fire barrier board under pvc roof system through the isocyanurate insulation (where applicable) and into the wood deck shall be fluorocarbon-coated, No. 14 self-drilling, self-tapping screws, long enough to penetrate the receiving substrate 1-¼ inches minimum and 1-½ inches maximum. Fasteners shall be in conformance with FM 4470 specifications.

2. Provide screws with stress distribution plates by Duro-Last, minimum 0.024 inch thick, 3 inch square plate.

D. Nailers & Blocking

1. Blocking/Lumber: Grade #2 Douglas Fir with 19% moisture content max conforming to standard 15 grading and dressing rules of the West Coast Lumber Inspection Bureau, or other species of wood of equal strength. All lumber shall be grade marked at the mill and pressure treated by a method approved by the roofing membrane manufacturer: “Wolmanized” or “Osmose K-33” is acceptable.

2. Nailer Fasteners: Nailers shall be securely anchored to the deck to resist the minimum force required in the recent edition of Loss Prevention Data Sheet I-49, “Perimeter Flashing,” Factory Mutual Systems, for FM 1-75, fasteners spacing must be 4 inches o.c. maximaum. 16 d common nails must be minimum size fasteners.

3. PVC(Vinyl)-Clad Metal Flashing: GSM flashing coated on one side by membrane manufacturer with weldable, PVC-clad surface or pre-manufactured with factory/shop welded piece of membrane pre-welded to surface by membrane manufacturer.

4. Other Accessories: Shall be furnished and approved by the membrane manufacturer.

E. Asphalt-Compatible Membrane: Asphalt-compatible PVC membrane for flashings without fleece backing that will be in contact with existing asphalt residue

F. Tape: Aluminum tape locations where asphalt-based self-adhering sheet membrane flashings will be in contact with PVC roof membrane.

PART 3 – EXECUTION

3.01 SUBSTRATE INSPECTION AND PREPARATION

A. Inspect all surfaces to receive roofing for condition that will adversely affect execution, performance.

B. All roof surfaces and all sloped surfaces to gutters and outlets shall be checked and approved by the roofing contractor prior to the start of the roofing work.

C. Install roofing material only under satisfactory conditions as specified by the membrane manufacturer.

D. Scheduling: Schedule the roofing work in areas and sections in such a manner as to keep the new and existing insulation, roofing materials, and building dry and watertight during new roofing work.

E. Damage sustained to the facility or contents as a result of the scheduling of roofing work shall be the Contractor’s responsibility.

F. Preparation shall comply with the membrane manufacturer’s recommendations.

G. Mechanically secure separation material units to roofing deck independent of membrane attachment and cover immediately with membrane. Butt units tightly together, limiting joint separation to 1/8 inch, maximum. Meet attachment pattern requirements of the membrane manufacturer.

H. Prior to insulation installation, remove all dirt, debris and dust from deck surfaces with a vacuum. Insulation systems shall be installed on properly installed, clean, dry surfaces. Should surface moisture such as dew exist, the Contractor shall provide the necessary equipment to dry the surface prior to application. Do not dry with open flames.

I. Inspect insulation boards for defects, including but not limited to: broken corners, improperly adhered skins, excessive moisture content, dimensional irregularities, or other defects which may adversely effect the replacement roof system. Mark defective insulation boards and remove them from site.

J. Cut insulation to the minimum dimension of 12 inches; the minimum surface area shall be 2 square feet.

K. Do not deliver to site or install any material or system that has not been approved. Materials installed without approval may be required to be removed. All containers must bear the label and material classification of the manufacturer. Partially used containers and unlabeled containers may not be incorporated into the work.

L. Comply with the manufacture's written instructions and these specifications. In case of discrepancies, the greater quantity and/or better quality of work, as determined by the Owner, will be provided by the contractor at no additional cost.

M. Flashings shall be installed concurrently with the roof membrane to assure watertight terminations.

N. Do not cut any material with a solvent or dilutant unless approve by the owner in writing.

O. Keep covers tightly sealed on all canned and evaporative products to prevent premature curing.

P. Report any damaged or unsuitable deck sections immediately to the Owner's representative prior to covering and replacing.

Q. The contractor shall ensure that all applicable safety requirements are strictly followed. This includes OSHA, CALOSHA and other applicable requirements regarding work with construction equipment for workers and building occupants.

R. Welded seams shall be checked after cooling for continuity with a dull, flat head screwdriver or other suitable object. Daily, on-site evaluation of welded seams shall be made by the Contractor at locations as directed by the Owner's representative or membrane materials representative. Two inch wide cross-section cuts shall be taken through completed seams. Correct weld displays failure from shearing of the

membrane prior to separation of the weld. Each test cut cross-section area shall be patched by the Contractor at no extra charge to the Owner.

S. Membrane specified to be fully adhered to insulation and various other horizontal and vertical substrates must be adhered completely without voids, bridging of membrane or unattached membrane.

3.02 GENERAL REQUIREMENTS

A. Precautions

1. Do not lay out or expose insulation that cannot be covered by membrane on the same day.

2. In making field heat welds, make sure edges are clean and free of tar, mastic or other foreign items.

3. Do not expose membrane and accessories to a constant temperature in excess of 120 degrees Fahrenheit.

4. Sealants and adhesives should be applied according to the manufacturer's specifications and all containers shall be disposed of properly.

5. Start securing the membrane at the highest point and work towards the drains.

6. Storing, wheeling, or trucking directly on roof insulation or membrane surface is not recommended. Smooth, clean plywood or plank walkways, runways and platforms shall be provided as necessary.

B. Comply with local, state, and federal regulations regarding the removal and disposal of roofing materials.

C. Roofing shall not be applied when ambient temperature is less than 40^{o} F or more than 100^{o} F. Materials which have a temperature other than the recommended application temperature by the manufacturer shall not be installed.

D. Surfaces to receive membrane or flashings shall be thoroughly dry. Should surface moisture such as dew exist, the Contractor shall provide the necessary equipment to dry the surface prior to application. No open flames will be allowed.

E. Completed roof areas shall not be trafficked. Work shall be coordinated to prevent this situation by working toward the roof edges and access ways. Should access to completed roof areas be necessary, the Contractor shall provide (membrane covered) plywood protection for the trafficked areas.

F. Temporary waterstops shall be installed at the end of each day's work, and shall be removed before proceeding with the next day's work. Waterstops shall be compatible with all materials and shall not emit dangerous or incompatible fumes.

G. The Contractor is cautioned that thermoplastic membranes are incompatible with oil-based and asphaltic-based cement. Creosote and penta-based materials are also incompatible. The Contractor should consult the manufacturer with respect to material compatibility and shall provide protection against contamination of PVC membrane and flashings.

H. The Contractor shall provide necessary temporary protection and barriers to segregate the work area and to prevent damages to adjacent areas.

I. Prior to and during application, dirt, debris and dust shall be removed from surfaces either by vacuuming, sweeping or similar methods.

J. Liquid materials such as solvents and adhesives shall be stored and used away from open flames, sparks and excessive heat.

K. The Contractor shall be a licensed and approved applicator recommended by the manufacturer of the roof system specified. The Contractor shall notify the manufacturer prior to initiating the construction. It is the responsibility of the Contractor to arrange for the membrane manufacturer's technical representative to be on site when construction commences and a minimum of once per week until construction is completed. The Owner and Owner’s Representative should be notified of scheduled visits so that they may attend.

L. The building will be open to normal use during the time of construction. The Contractor shall take all precautions to create as little disruption as possible during the course of the work.

M. The Contractor shall provide and equip as many work crews as is necessary to complete the project within the Contract period and according to the Contract Specifications without sacrificing quality.

N. The Contractor shall closely follow adhesive application rates when adhering membranes and flashings. The contents within adhesive containers shall be thoroughly mixed prior to application. Submit adhesive container tags to the Owner’s Representative on a daily basis.

3.03 INSULATION INSTALLATION

A. Crickets:

1. Install cover board over tapered isocyanurate insulation. Crickets shall be constructed to ensure a minimum slope of 1/2 in. per foot along the valley towards the drainage point.

2. Butt each insulation board firmly to the adjacent board. Do not jam insulation boards or allow cracks between insulation boards.

3. Cut boards to allow a maximum ¼ in. gap away from vertical surfaces.

3.04 COVERBOARD INSTALLATION

A. Cover Board Installation

1. Cover board shall be installed with low-rise foam adhesive.

2. Cover boards shall have a maximum dimension of 4 feet by 8 feet.

3. The cover boards shall be staggered 50% from row to row.

4. Butt each cover board firmly to the adjacent board. Do not jam cover boards or allow cracks between cover boards.

5. Cut boards to allow a maximum ¼ in. gap away from vertical surfaces.

3.05 MEMBRANE INSTALLATION

A. Layout

1. Select the proper factory marked rolled sheet of roofing membrane for an outside corner or high point.

2. Orient the roofing membrane so the membrane long seams are running perpendicular to the direction of roof slope.

3. When laying out, pull the membrane tight.

B. Roof Sections

The intent of this Specification Section is to provide the Owner with a fully adhered membrane bonded to the substrate.

1. Ensure all bituminous substances and contaminants of the original system are removed or covered with slip sheet mechanically fasted to existing substrate at walls/curbs and adhered at roof deck. Clean flashings, etc., of all bitumen residue.

2. Install membrane system in accordance with the recommendations and requirements of the membrane materials manufacturer, as amended in these Specifications.

3. The membrane adhesive shall be used as the contact adhesive for the roof membrane.

4. Solvent-based adhesive, specially formulated for vertical surfaces, shall be used as the contact adhesive for flashings installed.

5. Inspect surface of roof cover boards prior to installation of roof membrane. Surfaces shall be clean and smooth with no excessive surface roughness. Contaminated surfaces or unsound surfaces shall be cleaned and voids shall be filled.

6. Over the properly installed and prepared gypsum fiberglass mat fire barrier board substrate, the adhesive shall be sprayed onto substrate only at a rate as recommended by the membrane manufacturer. Apply the adhesive in an even coating with no globs, puddles, or similar irregularities. Allow the adhesive to dry slightly but not completely.

7. The membrane shall be carefully unrolled into the wet adhesive. The adhesive shall be spread and the membrane rolled out until the entire roll has been set into adhesive. The membrane shall be pressed firmly in place with a weighted foam covered lawn roller by frequent rolls in two directions. Lap the adjacent sheets a minimum of 3 inches. Adhesive shall not be applied in seam areas.

C. Field Welding

1. Weld adjacent sheets in accordance with the manufacturer's written instructions. Both sides and end lap joints shall be hot-air welded. Hand welded laps shall be 4 inches wide minimum; machine welded laps shall be 3 inches wide minimum. Sheets must be welded immediately after installation.

2. Use welding equipment provided by the membrane materials manufacturer. All technicians shall successfully complete a course of instruction provided by the roof membrane manufacturer's representatives prior to welding. All weld surfaces must be clean and dry. No adhesive or other contaminant shall be present within the lap areas.

3. Hand welded seams shall be completed in three (3) stages. Warm up equipment for at least one (1) minute prior to welding.

   a. Tack weld the lap every 3 feet to hold seam in place.

b. Weld the back edge of the lap with a thin, continuous weld to prevent loss of the hot air during the final weld.

c. Insert the hot air nozzle into the lap, keeping the welding equipment at a 45° angle to the side lap. Once the material starts to flow, apply the hand roller at a right angle to the welding gun and press lightly. For straight laps, use the 1-1/2 inch wide nozzle. Correct weld speed will complete approximately 20 inches per minute. The hot air weld equipment shall have temperature adjustments to provide this proper speed and weld.

4. Alternately, an automatic lap welding machine may be used. Follow the manufacturer's strict requirements, instructions and local codes for electric supply, grounding and over current protection. The automatic weld machines power requirement is 218 to 230 volts at 30 amps. The availability of this voltage shall be verified at the work site on the roof before using the automatic welding machine. The use of portable generators is recommended. Prior to utilizing the automatic weld machine on the roof, detailed instructions and operating procedure shall be obtained from the membrane manufacturer's technical representatives.

5. Terminate the membrane at perimeters and penetrations once welding of adjacent sheet seams is completed. Membrane shall be terminated with the manufacturer's recommended metal termination bar fastened at 6 inches (maximum) on center.

6. Flashings shall be installed concurrently with the roof membrane in order to achieve a watertight condition as the work progresses. When a situation arises where a break in the day's work occurs in the central area of a roof, a temporary waterstop shall be constructed to provide a 100% watertight seal utilizing a raised temporary waterstop. Sweep back and totally clean a 6 inch edge along the existing roof and set a 2 inch x 4 inch stud atop the prepared area in roof cement. Carry the new membrane up and over 2 inch x 4 inch waterstop. Seal the edge of the membrane in a continuous heavy application of water cut-off mastic. Weight the membrane down in the sealant with a 2 inch x 10 inch wood member with ballast on top. Ballast should be approximately 20 pounds per linear foot. When restarting work, remove all sealant, membrane, insulation fillers, etc. from the work area. Do not reuse any of the temporary cut-off material in the new work. Cut off contaminated membrane and dispose of immediately. If inclement weather occurs while a temporary waterstop is in place, the Contractor shall provide the labor necessary to monitor the situation to maintain a watertight condition.

7. Inspect all field welds with a probe. Re-weld loose laps at the end of each workday.

D. Perimeter Nailing and Around All Types of Penetrations Fastening

1. The membrane shall be mechanically fastened at all roof perimeters, parapets, curbs, walls, penetrations, in accordance with the Contract Documents and roofing manufacturer's specifications and details, but not less than 1 fastener per every 12 inches of length.

E. Cut-Outs

1. Make cut-outs in roofing membrane for protrusions through the roof. Some situations might require that the deck membrane be slit to the section edge for fitting around protrusions.

2. Fasten around cut-outs with approved fasteners (see Section 2.02 Materials), 12 inches on center or a minimum of one per side.

F. Membrane Flashings

1. All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary membrane flashings shall be allowed without the prior written approval of the Owner. Approval shall only be given for specific locations on specific dates.

2. Follow the manufacturer's requirements and these Specifications. Ensure that shop drawings and material submittals have been approved.

3. Fully adhere polyester slip sheet at specified locations as detailed. Ensure that felt isolates bituminous products (new and existing) from new PVC flashings.

4. Wall flashings shall be fully adhered to the plywood/wood substrates or roof cover boards, where occurs on walls using a solvent-based adhesive. Cut the Membrane in six (6) foot long sections. Apply adhesive at walls to both substrate and membrane at rates per membrane manufacturer 50-60 square feet. Do not apply adhesive in lap areas. Allow the adhesive to become tacky when touched with a dry finger on both surfaces. The product on the membrane cannot be permitted to dry completely. The coated membrane shall be rolled onto the coated substrate being careful to avoid wrinkles. Adjacent sheets shall be overlapped 3-inches. Bring the top of the membrane up and over the parapet wall or wood blocking and secure with annular ring nails as shown in the contract drawings. The wall flashing membrane shall extend 4 inches onto the roof membrane.

5. Membrane flashings shall be hot-air welded at their seams and at their connections with the adhered roof membrane or membrane clad metal flashings.

6. Vent pipes shall be flashed to the top of the pipe. Asphalt contaminated vent pipes which cannot be thoroughly cleaned shall be wrapped with aluminum tape prior to the installation of membrane flashing. Field or shop fabricated pipe caps of the PVC membrane shall be installed as shown in the detail drawings. Provide stainless steel pipe clamp (drawband) terminations at all locations.

7. Membrane termination shall be flashed in with reinforced membrane. Termination bars shall be utilized as detailed in the contract drawings. Set termination bars in a bed of sealant with fasteners spaced at 3 inches on center.

8. All perimeter edge termination details must include sealant.

3.06 SPECIAL REQUIREMENTS:

A. Do not apply adhesive in lap areas

B. The applicator shall keep track of the amount of adhesive used to confirm required by manufacturer adhesive rate.

3.07 CLEAN-UP

A. Upon completion of the membrane installation, the Contractor shall remove all foreign matter, rubbish and scrap material from the roof.

B. The membrane surface shall be cleaned using cleaners recommended by the membrane manufacturer.

3.08 INSPECTION & WARRANTY

A. Inspection: The Contractor shall submit all required drawings, details, and completed questionnaires to the roofing manufacturer before obtaining the specified warranty. After the authorized Manufacturer has inspected the roof for determining acceptability for warranty issuance, deficiencies on the final inspection report shall be corrected by the Contractor and made ready for reinspection within five (5) working days.

B. Warranty: Upon receipt of required materials, certifying inspection, and acceptance of the roofing system by the roofing manufacturer, the warranty shall be duly executed and issued to the Owner. The Contractor shall engage the manufacturer technical representative for project monitoring.

3.09 REPAIRS

A. Future repairs or additions to the roofing system shall be made using the heat welding process.

B. Contractor shall provide repair procedures to the Owner and/or Owner's representative.

3.10 CONSTRUCTION DAMAGE

A. Upon completion of work, repair or replace as required, building materials damaged as a result of the roofing operations. Match existing materials and construction as determined by the Owner.

END OF SECTION

SECTION 07 60 00

FLASHING AND SHEET METAL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Sheet metal flashings shown on the Drawings

1.02 RELATED WORK

A. Section 07 54 00 – Thermoplastic Membrane Roofing System

B. Section 07 90 00 – Sealants

1.03 REFERENCES

A. ASTM A153 – Zinc Coating Hot-Dip Galvanized

B. SMACNA – Architectural Sheet Metal Manual

C. MIL-S-687ZB – General Specifications for Soldering Process

D. AWS D1.1 – Structural Welding Code

1.04 SUBMITTALS

A. Submit three (3), 6 inch by 6 inch samples, of each type and thickness of sheet metal to be used in the construction.

B. Submit three (3), samples of flashings to be used in the construction.

C. Submit standard color pallet and color chips for three color options (to be selected by owner) for prefinished sheet metal for coping.

D. Submit shop drawings with dimensions of all sheet metal details.

E. Submit mill certification.

F. Submit manufacturer literature for all accessory items in Part 2 of this Section.

1.05 STORAGE

A. Stack performed material to prevent twisting, bending, or abrasion, and provide ventilation.

B. Prevent contact with materials during storage, which may cause discoloration, staining or damage.

PART 2 - PRODUCTS

2.01 SHEET MATERIALS

A. Sheet Metal

1. 22 gauge galvanized steel: ASTM A123 and A525.

B. Steel bars

1. ASTM A36.

C. Vinyl Coated Drip Edge: 24 gauge galvalume with PVC coating by Duro-Last or approved equal.

D. Prefinished Sheet Metal: Kynar 500 coated 22 gauge sheet metal by MBCI or approved equal. Color: To be selected by Owner from Standard color pallet.

2.02 FINISHES

A. Not applicable.

2.03 ACCESSORIES

A. Fasteners

1. Sheet Metal-to-Wood Blocking: No.12, 1-1/2 inch minimum long Stubbs stainless steel nails, annular-thread shank.

2. Sheet Metal-to-Sheet Metal: No. 10, 1 inch long stainless steel sheet metal screws with metal capped neoprene washers.

3. New Flashing-to-Existing: Stainless steel pop rivets.

4. Unistrut: 3/8 inch diameter lag bolts, 3 inch long minimum.

B. Solder

1. 50% tin and 50% lead.

2. Flux: ASTM B32

C. Sealant and Backer Rod

1. Refer to Section 07 90 00 – Sealants.

D. Miscellaneous

1. Band clamps: Stainless steel, ½ inch wide, screw adjustable clamps.

2. Cold galvanized compound: Zinc-rich, spray-applied compound.

3. Reglet: SM Surface-Mounted Reglet by Fry Reglet or approved equal. Galvanized sheet metal, 24 gauge.

4. Hatch: O'Keefe, Bilco, or approved equal. Size to accommodate existing opening.

5. Drains: Z-121 (condensate drains) and Z-125 (roof and overflow drains by Zurn Industries or approved equal. Match existing bowl and pipe size.

6. High Temperature Sheet Membrane: Grace Ultra by GCP Applied Technologies or approved equal.

7. Aluminum Tape: A self-adhering, aluminum-faced Tape.

2.04 FABRICATION SCHEDULE

A. All sheet metal to be 22 gauge galvanized steel unless noted below.

B. Hook Strips for Parapet: 20 gauge.

2.05 FABRICATION

A. Form sections true to shape, accurate in size, square and free from distortion or defects.

B. Form pieces to maximum length of 8 feet.

C. Mechanically fasten and solder watertight joints, splices and transitions which are not designed for expansion/contraction.

1. Fasten metal for strength and watertightness by solid riveting, welding or forming double lock seams.

2. Sealing for water tightness by soldering: after soldering, immediately remove all traces of acid or flux with appropriate neutralizer, followed by repeated washing and scrubbing.

3. Sealant-filled joints may not be substituted for solder joints: Use sealant as indicated on the Drawings.

D. Do not fabricate any sheet metal components without approved shop drawings and fabrication samples.

PART 3 - EXECUTION

3.01 INSPECTION

A. Field measure site conditions prior to fabricating Work Notify Architect/Engineer immediately of any inconsistency between existing conditions and the drawings.

B. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION

A. Allow substrates to dry thoroughly. Do not proceed with flashing application if moisture content of exposed wood supporting metal flashing is above 19%.

B. Clean debris from all substrates.

3.03 INSTALLATION

A. General

1. Proceed with sheet metal installation in conjunction with roofing and flashing in each area.

2. Do not dilute primers, coatings, or sealants.

3. Keep containers closed except when removing materials from them.

4. Field fabricate sheet metal following the same criteria set forth in Paragraph 2.05 – FABRICATION.

5. Except as otherwise specifically shown on the Drawings or approved shop drawings, conform to the drawing details included in the SMACNA manual.

6. Comply with Military Specification MIL-S-6872B entitled, "General Specifications for Soldering Process" when forming soldered joints. Use conduction soldering methods. Areas to be joined shall be cleaned of all oil, grease, pencil marks, paint, dirt or other foreign substances. Remove all burrs using files, grinding stones or other methods. Hold parts in place using clamps, jigs and supports or by self-fixturing. If parts are tack-soldered to hold them in place, the area of tack-soldering shall be reworked into the final soldering. Parts cannot be allowed to move during the soldering process.

7. All corners, transition and termination pieces shall be mechanically fastened and soldered to provide strength and a weatherproof connection.

8. Apply sealant over the head when using pop rivets for fastening

9. All sheet metal edges shall be hemmed 1/4 inch minimum.

10. Roof deck flanges shall be 4 inches wide minimum.

11. Roof flanges shall be nailed 3 inches on center staggered.

12. Flash all roof flanges (top and bottom) in accordance with this Specification.

13. Flux shall be applied to all surfaces that will receive solder. Flux-cored solder shall not be used. Flux shall be fluid when heated and be effective in removing oxides and other impurities from the joint. Flux should be readily displaced by the molten solder.

14. Areas to be joined shall be heated above the liquious temperature of the solder. To deliver maximum heat, the copper bit of the soldering iron shall be applied at the right angle so that the flat side of the iron's bit provides maximum contact area. Solder shall be applied to the joint and not the bit of the iron. Allow solder to flow in place to provide a minimum 1 inch final width of solder over the joint. Joint shall not be disturbed until it has been allowed to completely cool. After soldering, completely remove all flux and acid by washing and scrubbing with a neutralizing agent.

B. Hook Strips/Cleats

1. Hook strips/cleats shall be formed with a 3 inch face and a 3/4 inch kick, bent out at a 60˚ angle to the face (or 30˚ to the wall).

2. Secure continuous hook strips/cleats to wood nailers with nails spaced at 6 inches on center.

3. Provide 1/8 inch gap at butt joints between hook strip/cleat sections.

C. Securement Clips

1. Securement clips shall be 6 inches long, 2 inches wide, and hemmed along each side of the long dimension.

2. Secure these clips to substrate with specified fasteners. Use a minimum of two (2) fasteners per clip and use 2 clips minimum. Space clips 32” o.c. maximum.

3. Bend clips a minimum of 1 inch over bottom drip edge of counterflashing and crimp tightly.

D. Counterflashing

1. Install counterflashing in accordance with approved shop drawings and manufacturer's product data to comply with specified performance requirements. Reglet and counter flashing components shall be true to line, without buckling, creasing, warp or bind in finished surfaces.

2. Coordinate counterflashing at roof surfaces with roofing work to provide weather tight condition at roof terminations.

3. Isolate dissimilar materials to prevent electrolysis. Separate bituminous coating.

4. Secure counterflashing using continuous cleats, clips and fasteners in accordance with product data and as indicated.

E. Skirt Flashing

1. Skirt flashings shall be formed with a 4 inch face and a ¾ inch kick, bent out a 60º angle to the face (or 30º to the wall).

2. Secure skirt flashings to the existing counterflashings with stainless steel rivets at all areas where existing counterflashings are being reused. Clean existing counterflashing and apply sealant over rivet heads.

F. Gravel Stop and Edge Metal

1. Secure continuous hook strips with the specified fasteners as previously noted.

2. Form gravel stop/edge metal cover plates to the dimensions indicated.

3. Provide 6 inch wide cover plates, set in full bed of sealant over all 1/8-inch gaps at butt joints in sheet metal sections. Hem edges of cover plates to fit snugly against fascias. Stagger butt joints between the hook strips and the fascias. At PVC coated edge metal, apply sealant at vertical edges of the back of two adjoining pieces, typical.

G. Sleeve Flashing and Storm Hoods

1. Storm hood and sleeve flashing shall be formed with locked and soldered seams. Sleeves shall have integral deck flanges with hemmed edges to the configurations shown on the Drawings. Storm hood shall counterflashing sleeves flashing 3 inches, minimum.

2. Secure sleeve flashings to wood blocking and flash into roof system.

3. Storm hood shall be secured to exhaust pipe with stainless steel band clamp. Set storm hood in full bed of sealant.

H. Mechanical Unit Cover Fasteners

1. Secure existing light mechanical unit covers to wood curbs with #10 stainless steel wood screws with integral metal-capped neoprene washers. Install screws at 12 inches on center, maximum, with a minimum of two screws per side of curb.

2. Secure mechanical unit to curb using 1/4 inch lag bolts installed through EPDM gasketed metal cap washer. Set EPDM gasket in bed of polyurethane sealant.

I. Vent, Duct, and Fan Flashings

1. Contractor shall provide samples or shop drawing for new vent, duct, and pan flashing with sheet metal covers. Do not fabricate prior to approval of samples and shop drawings.

2. Flashings shall be fabricated to be vandal resistant with solid welds and have slope toward free edges, on all four sides.

END OF SECTION

SECTION 07 90 00

SEALANTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Sealant for sheet metal joints

B. Sealant for hot pipes

1.02 RELATED SECTIONS

A. Section 07 54 05 – Thermoplastic Membrane Roofing System.

B. Section 07 60 00 – Flashing and Sheet Metal

1.03 SPECIAL JOB CONDITIONS

A. Comply with application temperatures of the manufacturer.

B. The Contractor shall utilize skilled and experienced specialty workers to install the Work. Experienced trade workers shall be utilized for all aspects of the Work.

1.04 SUBMITTALS

A. Submit Manufacturer literature, specifications and color charts for the sealants and primers.

PART 2 - MATERIALS

2.01 SEALANT

A. Metal-to-metal joints: One-part polyurethane conforming to ASTM C920 such as NP-1 by Sonneborne. Color to be selected by Owner.

B. Concealed metal-to-metal joints: One-part butyl sealant conforming to ASTM C1085.

C. Hot pipes: A non-corrosive one-part silicone, with a service temperature from -60° F to +400° F, such as Dow Corning 999-A or approved equal.

D. Skylight: Silicone, Dow Corning 795 or approved equal.

2.02 ACCESSORIES

A. Backer rod: Round, closed cell polyethylene with a waxed surface; size shall be sufficient to be compressed 25% to fit the joint width.

B. Primer, cleaners and similar joint preparation materials shall be as recommended by the sealant manufacturer.

PART 3 - EXECUTION

3.01 GENERAL WORKMANSHIP

A. All materials shall be stored in secure, dry locations and be protected from the environment.

B. Follow manufacturer's environmental limitations and material storage requirements.

C. Provide all devices (including heaters and insulation) necessary to maintain the correct temperature and humidity for proper curing.

3.02 CONCEALED SHEET METAL LOCATIONS

A. Provide sealant at all concealed sheet metal joints.

B. Use full beads of sealant along entire length of joints.

3.03 HIGH TEMPERATURE SEALANT

A. Install high temperature sealant at high temperature locations where required. Provide a full bead of sealant beneath storm hood locations.

3.04 SKYLIGHTS

A. Remove the existing sealant at glazing/frame joints.

B. Clean and prime substrate.

C. Install new sealant at joints.

3.05 REPRESENTATIVE SAMPLING

A. Extract representative samples of new sealant joints for inspection as directed by and in the presence of the Owner.

END OF SECTION

ROOF REPLACEMENT

LHS BUILDING

DIABLO VALLEY COLLEGE

APPENDIX

Enviro-S.T.A.R.
Environmental - Safety, Training And Resources, Inc.
2194 Edison Ave., Ste. I San Leandro, CA 94577

ASBESTOS SURVEY REPORT

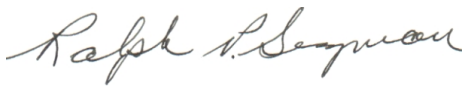
Diablo Valley College
Life Health Science
&
Horticulture Buildings
325 Golf Club Road,
Pleasant Hill, CA 94523

Prepared for:

Mr. James Buchanan
Building & Grounds
Diablo Valley College
321 Golf Club Road
Pleasant Hill, California, 94523

Enviro-S.T.A.R. Project No. 18-148
March 8, 2018

Prepared by:



Ralph P. Guzman
Certified Asbestos Consultant #93-0965

Telephone: (510) 568-5996 *Fax: (510) 568-7993*

TABLE OF CONTENTS

1.0 Introduction

Enviro-S.T.A.R., Inc., is pleased to submit the Asbestos-Containing Materials (ACM's) survey report. The survey was conducted at Diablo Valley College, the LHS (Life, Health Science) and Horticulture buildings, 321 Golf Club Rd., Pleasant Hill, CA 94523 on March 8, 2018. A total of six (6) suspect asbestos samples were collected.

2.0 Sampling Methodology

Representative asbestos bulk sample was collected from the material identified above. Sampling of the suspected ACM was performed in a manner that is consistent with industry standards. The sample was collected using hand tools which are routinely decontaminated between each sampling to prevent cross contamination. The individual sample was placed into a separate, clean ziploc sample bag and assigned a unique sample identification number. The number and type of sample collected was chosen in a "manner sufficient to determine" asbestos content for the materials subject to being disturbed during the renovation and reconstruction activities.

3.0 Laboratory Analytical Methods

Material identification of the suspect asbestos samples was performed by Micro Analytical Laboratories, Inc., 5900 Hollis St., Ste. M, Emeryville, CA 94608, using Polarized Light Microscopy with Dispersion Staining (PLM/DS) in accordance with the U.S. EPA "Method for the Determination of Asbestos in Bulk Building Materials" (EPA-600/R-93/116, July, 1993). .

Results are reported as a percent range of total asbestos present. Also specified in the analytical reports are the type(s) of asbestos detected. Other, non-asbestos materials may also be identified in the analysis with the percent concentration. Further testing of unanalyzed samples, such as point counting, may be requested. Most laboratories archive bulk samples for a minimum of 3 month period after receipt.

4.0 Interpretation of Results

None Detected

When "None Detected" appears on a report, it means that asbestos was not observed and that, if present, it exists in concentrations less than the limit of reliable detection (< 1%) and/or the fiber dimensions are too small for accurate optical microscopic resolution by normal PLM methodology.

Trace Asbestos

Reported results are the microscopist's visual estimate by area of asbestos concentration. These estimates are then formulated into results given in percent of asbestos by weight. Results for heterogeneous samples examined by component are reported as a composite. For example, if sheetrock joint compound percentage was 2-3% asbestos, the composite result may be reported as <1% (Trace), asbestos for the sheetrock system. The lower limit of reliable detection for the PLM

method is 1%. Samples which contain more than 1% asbestos are reported in 1% ranges.

Samples which contain asbestos in a concentration lower than the limit of reliable detection (<1%) are reported as <1% (Trace) asbestos. For a lower limit of detection, "point counting" gravimetry is used. This method is described below.

Point Counting

Bay Area Air Quality Management District (BAAQMD) require point counting results to be reported on their removal notifications for certain materials with PLM results of less than 10% asbestos or assume these materials are ACM. Point counting is conducted by the EPA Method 600/R-93/116 or 600/M4-82-020. This method involves ashing the sample in a furnace and then re-weighing it to determine the amount of material lost on ignition. Acidified water is added and the sample is ultrasonicated to break up solid materials. This material is then filtered, dried, weighed and the filter residue is then analyzed by PLM. Laboratory protocol states that the limit of detection for point counting using 1000 points, is 0.10 area estimates. This point count is then multiplied by the reduction factor (RF) to obtain the actual percentage of asbestos. Percentage levels of 0.1% or greater up to 1%, are considered to be Asbestos Containing Construction Materials (ACCM) by Cal/OSHA.

5.0 Asbestos Material Categories

Federal regulations provide "categories" to classify asbestos material types. In California, Air Quality Management Districts require ACM be listed by category in their notification forms. Table 1 below, which provides the asbestos sampling results, also provides categories for these materials.

The **Regulated Asbestos Containing Material (RACM)** category designation is for friable asbestos, sprayed on or troweled-on surfacing, fireproofing or thermal system insulation (TSI).

The **Category I** designation is used for non-friable materials such as: tar based roofing, mastics, putties, paints, vinyl floor tile and resilient sheet flooring (excepting the friable paper backing). Note that Vinyl Floor Tile is considered to be rendered friable by some mechanical removal or demolition means.

The **Category II** designation is used for certain other types of non-friable materials such as: Transite pipe and panels, cementitious products, gaskets, clapboard, siding shingles, or any non-friable materials that would be rendered friable by mechanical means during removal. Category I materials may be demolished in place depending upon the means of demolition.

6.0 Asbestos Laboratory Results

According the laboratory analytical results (see Table I) the following material tested positive for asbestos:

- Vinyl floor tile.

The following materials were analyzed as none detected for asbestos:

- Floor tile mastic,
- Roofing felts, and
- Roofing mastic.

TABLE I
ASBESTOS SAMPLING RESULTS

Sample No.	Location	Description	Est. Qty.	Asbestos Results	NESHAP Category	OSHA Classification
0308-01	Horticulture Bldg. - Floor	Vinyl floor tile & mastic	~800 sf	**Vinyl tile: 8% Chry** Mastic: ND	I	II
0308-02	LHS Bldg. - Roof	Roof S/E - main field	n/a	ND	n/a	n/a
0308-03	LHS Bldg. - Roof	Roof So. - main field	n/a	ND	n/a	n/a
0308-04	LHS Bldg. - Roof	Roof Center - main field	n/a	ND	n/a	n/a
0308-05	LHS Bldg. - Roof	Roof West - main field	n/a	ND	n/a	n/a
0308-06	LHS Bldg. - Roof	Roof East - main field	n/a	ND	n/a	n/a

Footnotes:
Method of Analysis - (PLM) Polarized Light Microscopy EPA/600/R-93/116, 1993.
ND - None Detected
Chry - Chrysotile asbestos

7.0 Applicable Asbestos Regulatory Agencies

The United States Environmental Protection Agency (USEPA) classifies a building material as asbestos-containing when the material is found to contain asbestos in quantities of greater than one-percent (>1%) by weight. This classification is the same as Cal-OSHA's (State of California-Occupational Safety and Health Administration) definition of an **Asbestos-Containing Material (ACM).** However, Cal-OSHA has an additional classification for manufactured materials found to contain asbestos in quantities between 0.1% to 1% (one tenth to one percent) by weight. According to Cal-OSHA's Asbestos Construction Standard CCR Title 8, Section 1529 this material is classified as **"Asbestos-Containing Construction Material (ACCM)"**.

Cal-OSHA and Bay Area Air Quality Management District (BAAQMD) require notification if the ACM will be disturbed in quantities set forth by these respective agencies. Additionally, Cal-OSHA classification of manufactured building materials as ACM and/or ACCM (when the ACCM will be

disturbed by renovation activities and in quantities of greater than one hundred (100) feet requires removal of the ACCM to be performed by a contractor who is a DOSH registered asbestos contractor. The ACM / ACCM removal work must be performed utilizing appropriate work practices, proper engineering controls, respirator protection and workers under medical surveillance, with the appropriate medical an training certificates.

8.0 Recommendations

- Cal/OSHA classifies the removal of the vinyl floor tile as Class II type abatement work. The removal should be conducted within a negative pressure enclosure (NPE) with a two-stage decontamination unit.

- During the abatement process site-surveillance, air monitoring and inspections should be performed. Final inspection should be performed at the conclusion of the abatement followed by air clearances.

Should you have any questions of require further assistance, please do not hesitate to contact me at (925) 285-3717.

Sincerely,

Ralph P. Guzman
BS, IH
Certified Asbestos Consultant (#93-0965)

Appendix - A

ASBESTOS BULK (PLM) SAMPLE DATA

Laboratory Report
&
Chain-of-Custody

MICRO ANALYTICAL LABORATORIES, INC.

BULK ASBESTOS ANALYSIS - POLARIZED LIGHT MICROSCOPY (PLM)

1012
Ralph Guzman
Enviro - Star
5 Devon Circle
Pleasant Hill, CA 94523

PROJECT:
DIABLO VALLEY COLLEGE
HORTICULTURE AND LHS

Micro Log In **242605**
Total Samples 6
Date Sampled 03/08/2018
Date Received 03/08/2018
Date Analyzed 03/08/2018

SAMPLE IDENTIFICATION	QUANTITY (AREA %) / TYPES / LAYERS ASBESTOS INFORMATION ND = NO ASBESTOS DETECTED	DOMINANT OTHER MATERIALS
Client #: 0308-01 Micro #: 242605-01 Analyst: EK GR **HORTICULTURE CLASS ROOM TILE / MASTIC**	**FLOOR TILE: 8% CHRYSOTILE ASBESTOS** **BLACK MASTIC: ND**	NFM: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE
Client #: 0308-02 Micro #: 242605-02 Analyst: EK **LHS - ROOF SE ROOFING FELT / TAR**	**TAR WITH GRAVEL: ND** **FIBERGLASS FELT: ND** **INSULATION (BROWN): ND**	30 % CELLULOSE 20 % FIBROUS GLASS NFM: TAR/ASPHALT, BINDER
Client #: 0308-03 Micro #: 242605-03 Analyst: EK **LHS - ROOF S MASTIC**	**ROOFING MASTIC: ND**	NFM: TAR/ASPHALT, BINDER
Client #: 0308-04 Micro #: 242605-04 Analyst: EK **LHS - ROOF CETNER ROOF FELT / TAR**	**GLOSSY / DULL TAR LAYERS: ND** **FIBERGLASS FELT LAYERS: ND** **INSULATION (BROWN): ND**	30 % CELLULOSE 20 % FIBROUS GLASS NFM: TAR/ASPHALT, BINDER
Client #: 0308-05 Micro #: 242605-05 Analyst: EK **LHS - ROOF WEST ROOF FELT / TAR**	**TAR WITH GRAVEL: ND** **FIBERGLASS FELTS: ND**	20 % FIBROUS GLASS NFM: TAR/ASPHALT, BINDER

Technical Supervisor: _____ 3/8/2018
Gamini Ranatunga, Ph.D. Date Reported

NVLAP Lab Code 101872-0. CA ELAP Certification #1037. Analyses use Polarized Light Microscopy (PLM), Micro Analytical SOP PLM-101. Basic techniques follow the EPA Interim Method for Bulk Insulation Samples (1982), and EPA-600/R93-116 (1993). The 1993 method covers all types of bulk materials and is based on the 1982 Method, with improved analytical techniques for layered samples as required for NESHAP compliance. Asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (much less than 1%) may not be reliable or reproducible by PLM. Weight % cannot be determined by PLM. Asbestos with diameter below ~1 µm may not be detected by PLM. Absence of asbestos in dust, debris, and some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM).Interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties.Tremolite-asbestos or actinolite- asbestos may be indistinguishable by PLM from some similar, non-regulated amphiboles (e.g. the "Libby Amphiboles" richterite and winchite), and should be confirmed by TEM. The lower quantitation limit (reporting limit) of PLM estimation is 1%. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos; however, reliable determination of asbestos percent at this level cannot be done by PLM estimation; PLM Point Counting or TEM weight percent analysis are recommended. Only dominant non-asbestos materials (fibrous and non-fibrous) are listed. This analysis shall not be construed as conclusive for the presence of any reported materials other than asbestos, or for the absence of any non-asbestos material. Common interferences include, but are not limited to: cellulose, fibrous glass, other man-made vitreous fibers, synthetic fibers, elongate fragments of calcium sulfate, talc, wollastonite, animal hair, and other miscellaneous elongate particles. Sample heterogeneity is indicated by listing more than one distinct layer or material on the report. If more than one distinct sample is received in the same container, samples shall be marked with letters and analyzed separately. Layers within a sample are analyzed separately when feasible; if asbestos is detected, percentages are reported for individual layers. Interlayer contamination is possible among any layers in a sample. The notation ND (or "NONE DETECTED") indicates a result of "NO ASBESTOS DETECTED" in a homogeneous sample, or in a layer of a heterogeneous sample. Composite asbestos percentages from multiple layers are applicable only to wallboard / joint compound systems; compositing is based on customers' descriptions of material as "joint compound". Customers are solely responsible for identification and description of bulk materials listed on field forms. Laboratory descriptions may differ from those given by customers. Quality Control (QC): all results have been determined to be within acceptance limits prior to reporting. Reanalyzed samples are denoted by two sets of analyst initials. Unless otherwise stated herein, all samples were received in acceptable condition for analysis. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report shall not be reproduced except in full, without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed. NFM = Non-fibrous materials.

MICRO ANALYTICAL LABORATORIES, INC.

BULK ASBESTOS ANALYSIS - POLARIZED LIGHT MICROSCOPY (PLM)

1012
Ralph Guzman
Enviro - Star
5 Devon Circle
Pleasant Hill, CA 94523

PROJECT:
DIABLO VALLEY COLLEGE
HORTICULTURE AND LHS

Micro Log In	**242605**
Total Samples	6
Date Sampled	03/08/2018
Date Received	03/08/2018
Date Analyzed	03/08/2018

SAMPLE IDENTIFICATION	QUANTITY (AREA %) / TYPES / LAYERS ASBESTOS INFORMATION ND = NO ASBESTOS DETECTED	DOMINANT OTHER MATERIALS
Client #: 0308-06 Micro #: 242605-06 Analyst: EK **LHS - ROOF EAST ROOF FELT / TAR**	**TAR WITH GRAVEL: ND** **FIBERGLASS FELTS: ND**	20 % FIBROUS GLASS NFM: TAR/ASPHALT, BINDER

Technical Supervisor: _____ 3/8/2018
Gamini Ranatunga, Ph.D. Date Reported

NVLAP Lab Code 101872-0. CA ELAP Certification #1037. Analyses use Polarized Light Microscopy (PLM), Micro Analytical SOP PLM-101. Basic techniques follow the EPA Interim Method for Bulk Insulation Samples (1982), and EPA-600/R93-116 (1993). The 1993 method covers all types of bulk materials and is based on the 1982 Method, with improved analytical techniques for layered samples as required for NESHAP compliance. Asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (much less than 1%) may not be reliable or reproducible by PLM. Weight % cannot be determined by PLM. Asbestos with diameter below ~1 μm may not be detected by PLM. Absence of asbestos in dust, debris, and some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM).Interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties.Tremolite-asbestos or actinolite- asbestos may be indistinguishable by PLM from some similar, non-regulated amphiboles (e.g. the "Libby Amphiboles" richterite and winchite), and should be confirmed by TEM. The lower quantitation limit (reporting limit) of PLM estimation is 1%. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos; however, reliable determination of asbestos percent at this level cannot be done by PLM estimation; PLM Point Counting or TEM weight percent analysis are recommended. Only dominant non-asbestos materials (fibrous and non-fibrous) are listed. This analysis shall not be construed as conclusive for the presence of any reported materials other than asbestos, or for the absence of any non-asbestos material. Common interferences include, but are not limited to: cellulose, fibrous glass, other man-made vitreous fibers, synthetic fibers, elongate fragments of calcium sulfate, talc, wollastonite, animal hair, and other miscellaneous elongate particles. Sample heterogeneity is indicated by listing more than one distinct layer or material on the report. If more than one distinct sample is received in the same container, samples shall be marked with letters and analyzed separately. Layers within a sample are analyzed separately when feasible; if asbestos is detected, percentages are reported for individual layers. Interlayer contamination is possible among any layers in a sample. The notation ND (or "NONE DETECTED") indicates a result of "NO ASBESTOS DETECTED" in a homogeneous sample, or in a layer of a heterogeneous sample. Composite asbestos percentages from multiple layers are applicable only to wallboard / joint compound systems; compositing is based on customers' descriptions of material as "joint compound". Customers are solely responsible for identification and description of bulk materials listed on field forms. Laboratory descriptions may differ from those given by customers. Quality Control (QC): all results have been determined to be within acceptance limits prior to reporting. Reanalyzed samples are denoted by two sets of analyst initials. Unless otherwise stated herein, all samples were received in acceptable condition for analysis. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report shall not be reproduced except in full, without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed. NFM = Non-fibrous materials.

Enviro-S.T.A.R., Inc.

Environmental Safety Training and Resources, Incorporated

2194 Edison Avenue, Suite I, San Leandro, CA 94577

242605

BULK SAMPLE CHAIN OF CUSTODY

Client: Diablo Valley College

Page 1 of 1

Location: Horticulture + LHS

Date: 3/8/18

Project Number: _____ Claim #: _____ I.H.: ECG / TCP

Turn Around Time: ☐ Rush ☐ 8 Hr. ☑ 24 Hr. ☐ 2-3 Day ☐ Standard

	Sample Number	Sample Type	Sample Information
1	30308 -01	PCM	Location: Horticulture Class Room
	Est. area:		Description: Tile / Mastic
			☐ liner ft. ☐ sq. ft. ☐ cu. ft.
2	-02		Location: LHS - Roof SE
	Est. area:		Description: Roofing Felt / Tar
			☐ liner ft. ☐ sq. ft. ☐ cu. ft.
3	-03		Location: LHS - Roof S
	Est. area:		Description: Mastic
			☐ liner ft. ☐ sq. ft. ☐ cu. ft.
4	-04		Location: LHS - Roof Center
	Est. area:		Description: Roof Felt / Tar
			☐ liner ft. ☐ sq. ft. ☐ cu. ft.
5	-05		Location: LHS - Roof West
	Est. area:		Description: Roof Felt / Tar
			☐ liner ft. ☐ sq. ft. ☐ cu. ft.
6	-06		Location: LHS - Roof East
	Est. area:		Description: Roof Felt / Tar
			☐ liner ft. ☐ sq. ft. ☐ cu. ft.
			Location:
	Est. area:		Description:
			☐ liner ft. ☐ sq. ft. ☐ cu. ft.
			Location:
	Est. area:		Description:
			☐ liner ft. ☐ sq. ft. ☐ cu. ft.
			Location:
	Est. area:		Description:
			☐ liner ft. ☐ sq. ft. ☐ cu. ft.

Comments/notes:

Relinquished by: _____ 3/8/18 Date/Time

Received by: _____ 3/8/18 15:00 Date/Time

Relinquished by: _____ Date/Time

Received by: _____ Date/Time

Web site: www.Enviro-STAR.com **Phone: 510-568-5996** **Fax: 510-568-7993**