

SECTION 00 40 00
FORM OF PROPOSAL

Clovis, California
, 2023

CUSD Representative:

The undersigned, doing business under the firm name of:

having carefully examined the Instructions to Bidders, the General Conditions & Supplemental General Conditions of the Contract, the Plans and Specifications, and all other Documents, titled:

REROOF OF:

COLE ELEMENTARY SCHOOL
615 W. STUART AVENUE
CLOVIS, CA

For:

CLOVIS UNIFIED SCHOOL DISTRICT
1490 HERNDON AVENUE
CLOVIS, CALIFORNIA

proposes to perform the contract, including all of its component parts, and to furnish all materials and labor called for by them for the entire work, including all taxes for the following amount:

BASE BID:

For the performance of all Work on the areas indicated on the project drawings including removal of specified steep-slope and low-slope roofing systems and related elements as indicated or as required to install specified low-slope and steep-slope roofing systems and related elements as indicated in project plans and specifications. Bid includes specified contractor and manufacturer warranties. Lump sum price of:

_____ Dollars (\$ _____)

UNIT PRICE BID NO. 1: REPLACEMENT OF DAMAGED PLYWOOD ROOF SHEATHING:

For the removal, disposal and replacement of one (1) 4' x 8' sheet of plywood to match existing thickness as authorized by Owner. Replacement plywood grade and installation to be per specifications Bid including all labor and material of:

_____ Dollars (\$ _____)
Per 4' x 8' panel

The Building Owner reserves the right to select all or any of the above bid proposals.

If written notice of the acceptance of this bid is mailed, or delivered to the undersigned within the time set forth in the Notice to Contractors, or any time thereafter before this bid is withdrawn, the undersigned will, within ten (10) days after the date of such mailing, telegraphing, or delivering of such notice, execute and deliver a contract in the form of agreement present in these contract documents and give Performance and Contractor's Bonds in accordance with the specification and bid as accepted.

The undersigned hereby designates as his office to which such notice of acceptance may be mailed, or delivered:

Our Public Liability and Property Damage Insurance is placed with

Our Workmen's Compensation Insurance is placed with _____

Circular letters, bulletins, addenda, etc., bound with specifications issued during the time of bidding are included in the proposal, and, in completing the contract, they are to become part thereof.

The receipt of the following addenda to the specifications is acknowledged:

Addendum No. _____ Date _____

Addendum No. _____ Date _____

Addendum No. _____ Date _____

This bid may be withdrawn at any time prior to the scheduled time for the opening of bids or any authorized postponement thereof.

Dated _____ Signed _____

By _____

(Business Address)

License No. _____ Classification No. _____ Expiration Date: _____

NOTE: If Bidder is a corporation, write State of incorporation under signature and attach proof of authority to bind corporation; and, if a partnership, give full name of all partners.

Do not include in the envelope any bids for other work.

DESIGNATION OF SUB-CONTRACTORS

Each bidder shall set forth below the name and location of the shop or office of each subcontractor in or about the construction of the work or improvement to be performed under this specification and the portion of the work which will be done by each subcontractor.

If the Contractor fails to specify a subcontractor for any portion of the work to be performed under the contractor, he shall be deemed to have agreed to perform such portion himself, and he shall not be permitted to subcontract that portion of the work except under the conditions hereinafter set forth. Designation of subcontractors per State of California requirements.

PORTION OF WORK	NAME	LOCATION	LICENSE NUMBER	EXPIRATION DATE

SECTION 00 41 00

JOB REFERENCES

Reroof of Portion of:

**Reroof of:
Cole Elementary School
615 W. Stuart Avenue
Clovis, California**

JOB REFERENCES

Bidders submit a list of at least five (5) projects of similar dollar volume and scope of work completed within the last 24 months for reference purposes.

Name of Bidder _____

Date of Project	Project	Contact Person	Telephone

END OF SECTION 00 41 00

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01 01 00

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SCOPE:

Work Included:

- A. Remove existing steep-slope and low-slope roofing systems, patches, repairs, and insulation and related flashings down to roof decks at locations indicated on drawings. Install new laminated asphalt shingle roof system at steep-slope roof areas as indicated on drawings with related elements. New asphalt shingles and underlayment to be per specifications.
- B. Install modified bitumen roofing system with gypsum coverboard and high thermal rigid insulation at locations indicated on drawings, and related elements per specifications and drawings.
- C. Removal of existing sheet metal flashing elements where indicated on drawings. Dispose of or store for reinstallation as indicated on project drawings.
- D. Work is defined as including all material, labor, equipment and services necessary to complete all work shown on the Drawings and/or as called for in the Specifications. All work to comply with manufacturer specifications.
- E. Install new or reinstall existing sheet metal and/or new clad metal flashings where indicated on drawings.
- F. Install new sheet metal step flashings, transition flashings and miscellaneous flashings as indicated on drawings or as required to properly install new roof system per manufacturer requirements.
- G. Remove existing coping and install new engineered sheet metal coping. Install in accordance with details on drawings.
- H. Contractor shall include thirty (30) 4' x 8" plywood roof panels in the bid for the work, including labor and material to replace damaged or defective plywood panels as authorized by the Building Owner. Contractor shall deduct the cost of unused panels based on unit price from the final billing provided to the Building Owner.
- I. Provide Additive Unit Bid for replacement of additional defective plywood roof panels, including all labor and material to remove existing panel and install new plywood panel. Unit bid to be based on replacement cost per 4' x 8' panel of equal thickness.
- J. Install new expansion joints and pipe supports at locations indicated on drawings. See Section 07 60 00 for requirements and approved products.
- K. Remove existing and install new expansion joints where indicated on drawings.
- L. Refer to drawings and technical specifications for additional information concerning specified scope of work.

M. Scope of Contract:

Excepting as otherwise expressly provided herein, the Contractor shall furnish all plant, labor, materials, tools, appliances, access means, equipment, services, fuel and transportation required to complete the general construction of the roof replacement with these specifications and the drawings. The contract will include but shall not be limited to, the principal items of work denoted by the titles of the specifications listed in the index. The work of the contractor shall be made complete and finished in a workmanlike manner in all parts and respects. Work and materials indicated on the drawings or expressly called for in the specifications, but which are manifestly necessary for the proper, full and faithful performance of the work in accordance with the true intent and meaning of the work and contract documents, shall be provided and incorporated in the work by and at the expense of the Contractor and to the same effect as if both indicated on the drawings and hereinafter specified.

N. Specifications:

All work indicated on the drawings shall conform to all requirements of the terms and conditions, safety and fire regulations, the general conditions, the specifications and to all addenda and instruction that may be issued subsequently by Clovis Unified School District to supplement, modify, or to interpret the work indicated on the drawings. Changes to be by written Change Orders or addenda. All Change Orders shall be signed by representative of Clovis Unified School District, and the Contractor.

O. Drawings:

All work shall conform to all requirements of the drawings and to such supplemental detail drawings as may be issued subsequently by Clovis Unified School District to further delineate and explain the work of the contractor.

P. Mandatory Pre-Bid Site Visit:

A mandatory pre-bid conference shall be required for this contract at the time(s) and date(s) as determined by Clovis Unified School District. Failure to attend and sign-in at the pre-bid conference will result in the rejection of the bid.

PART 2 - SCHEDULES

2.01 CODES:

A. All materials and workmanship must conform to the current standards and the requirements of the following codes and regulations. A copy of these codes shall be at the job site at all times.

1. CCR-T8 California Code of Regulations, Title 8 - Industrial Safety.
2. CCR-T19 California Code of Regulations, Title 19 - Public Safety.
3. CCR-T24. California Code of Regulations, Title 24, Part 1 Administrative Regulations, DSA-SSS.
4. CBC California Building Code, California Code of Regulations, Title 24, Part 2, CCR-T24, Current Edition.
5. CEC California Electrical Code, California Code of Regulations, Title 24, Part 3.
6. CMC California Mechanical Code, California Code of Regulations, Title 24, Part 4.
7. CPC California Plumbing Code, California Code of Regulations, Title 24, Part 5.
8. CFC California Fire Code (based on the National Fire Code by NFPA)

2.02 CONSTRUCTION SCHEDULE:

- A. **Work on the referenced project is authorized to proceed upon written Notice of Award, contingent upon acceptance and approval of required documentation referenced in these specifications and Clovis Unified School District “General Conditions”.**
- B. Contractor shall furnish the Clovis Unified School District with a copy of construction schedule showing relative dates for completion of project. It shall also cooperate with Clovis Unified School District in minimizing disruption of the building occupants.

2.03 CONSTRUCTION COORDINATION:

Students, faculty, employees of the facility, private citizens and other contractors may be within the buildings or on the school grounds during the roof construction project. Contractor shall plan and execute his work with an awareness of the potential presence and location of building occupants and those occupying the building grounds.

PART 3 - EXECUTION

3.01 BUILDING PROTECTION FROM ELEMENTS:

The Contractor shall provide for protection from rain or other moisture through the roof plane at all times during this contract. Any damage resulting from such happening shall be the full responsibility of the Contractor. Contractor shall repair any and all damage to satisfaction of Clovis Unified School District resulting from or associated with moisture intrusion associated with the work performed under the contract. Contractor shall be responsible for all costs required to restore interior and exterior areas to previous condition to satisfaction of Clovis Unified School District.

PART 4 - CLEANING UP:

4.01 CLEAN UP:

Contractor shall leave premises clean, neat and orderly.

PART 5 - PROJECT CLOSE OUT:

5.01 NOTICE OF COMPLETION:

Clovis Unified School District’s Representative shall be notified by Contractor after completion of all work under the Agreement and a final inspection shall be performed by the Clovis Unified School District’s Representative, its Designated Roofing Consultant and the Contractor.

5.02 GUARANTEES:

The Contractor shall deliver to the Clovis Unified School District all guarantees and/or warranties as called for in other divisions of the specifications and one copy (or more as required) of all such guarantees to Clovis Unified School District’s Representative.

END OF SECTION 01 01 00

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01 30 00

SUBMITTALS

PART 1 - GENERAL

1.01 GENERAL:

- A. The Contractor shall check, verify, and be responsible for all field measurements.
- B. All submittals shall be approved before work will commence.
- C. Clovis Unified School District's Representative will make any corrections with reasonable promptness and return the submittal to the Contractor within a time frame required to complete the work within the designated contract period.
- D. Clovis Unified School District's Representative review of submittals and shop drawings shall not relieve the Contractor of responsibility for deviations from the drawings or specifications, unless he has, in writing, called Clovis Unified School District's Representative's attention to such deviations at the time of original submission, and secured written approval.

1.02 CONTRACT SUBMITTALS:

- A. Material Information: Submit material information requested in each section of specifications.
- B. Samples of proposed roofing materials, samples of available shingle colors, insulation, fasteners, and paint colors.
- C. Manufacturer's Data: Submit manufacturer literature and proof of manufacturer notifications with respect to warranty as required in Section 07 54 20 (PVC Thermoplastic Membrane Roofing).
- D. Material Safety Data Sheets (MSDS) for all products used which are classified as hazardous by State and Federal Governments.
- E. Any other documents required by the Clovis Unified School District or its Consultant.

1.03 PRE-CONSTRUCTION SUBMITTALS:

- A. Construction Schedule: The Contractor shall submit a proposed construction schedule.

1.04 PROJECT CLOSE OUT SUBMITTALS:

- A. Contractor's Workmanship Guarantee (on letterhead)
- B. Manufacturer's Roof System Guarantee.
- C. Additional documents as required by Clovis Unified School District

END OF SECTION 01 30 00

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01 50 00

TEMPORARY FACILITIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 SUMMARY:

This Section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security and protection.

A. Temporary construction and support facilities required include but are not limited to:

1. Temporary enclosures.
2. Hoists.
3. Temporary Project identification signs and bulletin boards.
4. Waste disposal services.
5. Construction aids and miscellaneous services and facilities.
6. Portable Restroom Facilities (to be cleaned and serviced weekly).

B. Security and protection facilities required include but are not limited to:

1. Temporary fire protection.
2. Barricades, warning signs, lights.
3. Sidewalk bridge or enclosure fence for the site.
4. Environmental protection.
5. Fall protection

1.03 TEMPORARY FENCING:

Provide and install temporary fencing as required by the Clovis Unified School District or as necessary to protect Contractor's property and equipment. If the fenced area is to be locked during non-occupied hours, Clovis Unified School District shall be provided with a key for the lock or the combination. Submit site map indicating location of all proposed fencing for approval by CUSD Representative. Location of all temporarily fenced areas to be approved by CUSD.

1.04 FALL PROTECTION

Contractor to provide, install and utilize fall protection as required by Cal/OSHA regulations. Contractor shall retain the services of a fall protection specialist or Professional Engineer as required to provide fall protection design and calculations to provide code compliant fall protection system based on current regulatory requirements.

1.05 SUBMITTALS:

- A. Description of temporary fencing utilized during periods when school site locations are in session.
- B. Copy of fall protection plan signed by safety representative of the contracting firm, licensed Safety Professional, and/or Professional Engineer.

1.06 QUALITY ASSURANCE:

- A. Regulations: Comply with industry standards and applicable laws and regulations if authorities having jurisdiction, including but not limited to:
 - 1. Building Code requirements.
 - 2. Health and safety regulations.
 - 3. Utility company regulations.
 - 4. Police, Fire Department and Rescue Squad rules.
 - 5. Environmental protection regulations.
- B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library "Temporary Electrical Facilities."
- C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.07 PROJECT CONDITIONS:

- A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to Clovis Unified School District, change over from use of temporary service to use of the permanent service.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities or permit them to interfere with progress. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. General: Provide new materials; if acceptable to the Clovis Unified School District's Representative, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.
- B. Lumber and Plywood: Comply with requirements in Division-6 Section "Rough Carpentry."
- C. For safety barriers, sidewalk bridges and similar uses, provide minimum 5/8" thick exterior plywood.

2.02 EQUIPMENT:

- A. General: Provide new equipment. If acceptable to Clovis Unified School District's Representative, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.
- B. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.
- C. Electrical Power Cords: Provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.

- D. Temporary Toilet Units: Provide self-contained single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material. Place at location approved by facility.
- E. First Aid Supplies: Comply with governing regulations.
- F. Fire Extinguishers: Provide hand-carried, portable UL-rated, class "A" fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL-rated, class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures. Fire Extinguishers are to be located on the roof at all times and at each location where fossil fuels and/or flammable adhesives are stored at the project site.
- G. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Use Charges: Cost or use charges for temporary facilities are not chargeable to Clovis Unified School District and will not be accepted as a basis of claims for a Change Order.

3.02 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION:

- A. Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures. Comply with regulations and health codes for the type, number, location, operation and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs. Sanitary facilities shall be locked during all times that Contractor personnel are not on the project site.
- B. Provide toilet tissue, paper towels, paper cups and similar disposable materials for each facility. Provide covered waste containers for used material.
- C. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- D. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.
- E. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 degrees F. (27 degrees C.) Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner.
- F. Provide temporary shade structure for use on roofs by Contractor employees as required under Cal/OSHA.

3.03 SECURITY AND PROTECTION FACILITIES INSTALLATION:

- A. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers," and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations."
- B. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than two fire extinguishers on the roof maintained in the area of stored materials adjacent to the immediate work area.
- C. Store combustible materials in containers in fire-safe locations in a locked, sealed container or vehicle on the site, or remove daily from the site.
- D. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.
- E. Barricades, Warning Signs and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed provide lighting, including flashing red or amber lights.
- F. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.
- G. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

3.04 OPERATION, TERMINATION AND REMOVAL:

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
- C. Termination and Removal: Unless the Clovis Unified School District's Representative requests that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired.
- D. Materials and facilities that constitute temporary facilities are property of the Contractor.

END OF SECTION 01 50 00

DIVISION 2 - SITEWORK

SECTION 02 05 00

DEMOLITION

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Work Included:

1. Furnish all labor and materials to remove existing low-slope and steep-slope roofing systems, insulation, and related components at specified building locations in order to install new low and steep-slope roofing systems. Remove and dispose of existing flashings where indicated on drawings. Remove existing flashings as indicated on the drawings and store carefully for reinstallation in watertight condition.
2. The work includes, but is not limited to the following:
 - a. Removal and disposal of existing low-slope and steep-slope roofing systems where indicated on drawings.
 - b. Remove and dispose of existing sheet metal coping.
 - c. Remove existing flashings at base of walls where indicated. Store flashings for reinstallation or install new sheet metal step-flashings in accordance with details on drawings.
 - d. Removal of existing roof flashings and other elements as specified or as required for appropriate for removal of existing roofing and installation of new asphalt shingle and thermoplastic roofing systems and related flashings. Store elements, and flashings for reinstallation as indicated on drawings.
 - e. Removal of non-functioning service lines, flashings and related components as indicated on drawings or as required to properly install new roofing systems.
 - f. Remove existing edge metal. Install new edge metal at locations indicated on drawings.
 - g. Modify existing roof eaves as indicated on drawings.
 - h. Disassemble existing roof drains as required to remove existing roofing and to install new roofing system. Replace drain bolts and washers with new stainless steel elements. Replace drain strainers if damaged.
 - i. Temporarily support roof elements as required to remove existing roofing system and to properly install new insulation and specified roofing systems and related elements. Reinstall on existing or new supports as indicated on drawings.
 - j. Disassemble and reassemble existing roof drains as indicated on drawings.
 - k. All miscellaneous demolition required for proper installation of new roof systems.

- B. The Contractor shall be solely responsible for his methods in regard to demolition, shoring and bracing. This responsibility extends to the preparation of engineered designs and the ultimate performance of all shoring or bracing systems.
- C. The requirements of this Section apply to all demolition work and are additional to the requirements related to the abatement of asbestos containing roofing materials.

1.02 RELATED WORK DESCRIBED ELSEWHERE:

- A. Section 01 01 00 Summary of Work
- B. Section 06 10 00 Rough Carpentry
- C. Section 07 31 11 Asphalt Shingle Roofing System
- D. Section 07 54 20 PVC Thermoplastic Roofing System
- E. Section 07 60 00 Sheet Metal Work

1.03 CONDITIONS OF PREMISES:

- A. Visit site, accept premises as found. Clovis Unified School District assumes no responsibility for condition of building on site, or continuation in conditions existing at time of proposal invitation or thereafter.
- B. Assume risk regarding damage or loss, whether by reason of fire, theft or other casualty or happening to specified buildings from and after proposal invitation date; no such damage or loss shall relieve Contractor from contract obligations to complete the work.

1.04 SCHEDULE:

All demolition work shall be coordinated with Clovis Unified School District and shall be conducted during hours as stipulated. This work shall be coordinated with Clovis Unified School District prior to commencing work operations. Work shall commence within 10 days of Notice to Proceed and shall be completed within 60 calendar days. Liquidated damages shall accrue for each calendar day after 60 calendar days in the amount of \$750.00 (or amount indicated in CUSD General Conditions section) shall be deducted from monies owed Contractor under the Agreement for each day after the specified contract period.

1.05 REGULATORY REQUIREMENTS

Perform all Work in compliance with all applicable Federal, State, regional and local statutes, laws, regulations, rules, and ordinances.

1.06 DEMOLITION PROCEDURES:

- A. Debris:
 - 1. Materials on the site specified to be removed shall be disposed of by the Contractor (except as specifically reserved for other use or specified to be reused in the work) and any salvage value of such material shall be reflected in the Contractor's bid.
 - 2. Where the word "remove" occurs herein, it shall mean removal from the site unless indicated otherwise.
 - 3. Remove all debris from the roof surface prior to installation of new roofing system.
 - 4. Remove or modify existing vent pipe flashings, sheet metal jacks, counterflashings and similar items where indicated or as required to install roofing system.

5. Remove, as it accumulates, debris resulting from demolition operations, except as otherwise specified. Do not store or permit debris to accumulate on site. No overnight stockpiling of debris on the roof shall be permitted.
 6. If Contractor fails to remove excess debris promptly, Clovis Unified School District reserves the right to cause same to be removed at Contractor's expense.
 7. Contractor shall clean up the building roofs and be responsible for keeping the building roofs and surrounding ground areas in a neat and orderly condition.
 8. Clean the roof deck surfaces of all loose material and other impediments that will be detrimental to the application of the new roofing materials.
 9. Contractor shall notify Clovis Unified School District of any defective conditions discovered immediately so that corrective measures may be taken.
- B. Maintaining Traffic:
1. Do not close or obstruct access ways utilized for building and facility operations, nor store material in passageways without permission of Clovis Unified School District. Clovis Unified School District shall be notified concerning how long an area will be inaccessible to employees, and the general public.
 2. Conduct operations with no interference with normal building operation.
- C. Protection of Structures and Property:
1. Execute demolition work to insure adjacent property and buildings against damages which might occur from falling debris or other cause. Do not interfere with use of adjacent buildings, maintain free, safe passage to and from same.
 2. Repair damage done to Clovis Unified School District's property of any other person or persons on or off the premises by reason of required work.
 3. Take necessary safety precautions to guard against any accidents to either the occupants of the building or those of the Contractor.
 4. Protect the contents in building from dirt, debris, and asphalt during demolition.
 5. Take necessary steps to protect building occupant vehicles from damage due to actions of the Contractor. Contractor shall be responsible for all damage to vehicles, which is the result of his actions.

1.07 UNFORESEEN CONDITIONS

- A. Should unforeseen conditions be encountered that affect the execution of the Work, investigate the existing conditions fully and submit a detailed written report to Clovis Unified School District. While awaiting Clovis Unified School District's response, reschedule operations as necessary to avoid delaying the completion of the project.

1.08 CLEANING

- A. Upon completing work, remove tools, materials, branch apparatus, temporary toilets and rubbish of every kind.
- B. Leave premises clean, neat and orderly.

END OF SECTION 02 05 00

DIVISION 6 - WOOD
SECTION 06 10 00
ROUGH CARPENTRY

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Work Included:
1. Supply and install all lumber and plywood as shown on the drawings and/or as specified herein and as required.
 2. Replace damaged or defective plywood roof panels as directed by Owner's Representative. Replacement panels to match existing panel thickness. Nail per current building code requirements. Contractor to provide Unit Cost for replacement of one (1) damaged or defective plywood roof panel (4' x 8'). Cost to include all labor and material to remove existing panel and to provide and install replacement panel.
 3. Plywood shall be secured with non-corrosive nails of appropriate length and diameter to secure component in place per applicable building code requirements. Unless indicated otherwise, fasteners shall be spaced at 6-inches on center in a staggered pattern in field and 4" o.c. on panel edges. Lengths will vary depending on thickness of deck and component to which they are attached. Submit specifications of proposed fasteners as part of project submittal.
 4. Contractor shall include thirty (30) 4' x 8" plywood roof panels in the bid for the work, including labor and material to replace damaged or defective plywood panels as authorized by the Building Owner. Contractor shall deduct the cost of unused panels based on unit price from the final billing provided to the Building Owner.
 5. Modify existing curbs to provide finished height a minimum of 6" above finished roof height per details on drawings and as required by roofing materials manufacturer.
 6. All miscellaneous carpentry and lumber shown on the Drawings or called for in the Specifications.
- B. The work required under this section consists of all roofing related items necessary and required to complete the work as indicated in the Contract Documents.
- C. The Contractor shall comply with the requirements of OSHA's Hazard Communications Standard including hazardous materials and employee training.
- D. Provide all material, labor, equipment and services necessary to complete all carpentry, accessories and other related items necessary to complete the Project as indicated by the Construction Documents unless specifically excluded.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

- | | | |
|----|------------------|----------------------------------|
| A. | Section 07 31 11 | Asphalt Shingle Roofing |
| B. | Section 07 54 20 | PVC Thermoplastic Roofing System |
| C. | Section 07 60 00 | Sheet Metal Work |

1.03 CODES AND STANDARDS:

All Codes, laws, ordinances, rules, regulations, orders, and other legal requirements of City, County, State, Federal and other public authorities which bear on performances of Work shall be applicable to The Project. Latest editions shall be applicable unless specified otherwise. Relationship between Applicable Codes and Contract Documents: The Contract Documents have been developed with the intent to conform with applicable codes. Nothing within the Contract Documents shall be construed to permit Work not conforming with applicable codes.

In accordance with the following Standards and any other applicable current Codes and Standards as described above:

ALSC	American Lumber Standards Committee
FS	Federal Specification
NBS	National Bureau of Standards
RIS	Redwood Inspection Service
UBCS	Uniform Building Code Standards
WCLIB	West Coast Lumber Inspection Bureau
WWPA	Western Wood Products Association
APA	American Plywood Association
AWPB	American Wood Preservers Bureau
AWPA	American Wood Preservers Association

1.04 QUALITY ASSURANCE:

A. Codes and Standards: Comply with all pertinent provisions of the following codes and standards:

1. Federal Specifications (Fed. Spec.)
FF-B-561C Bolts, (Screw), Lag
FF-N-105B(3) Nails, Brads, Staples, Spikes, Wire, Cut and Wrought
QQ-Z-32C Zinc Coated, Electro Deposited
2. U.S. Department of Commerce Product Standards:

PS 1-83 Construction and Industrial Plywood
PS 20-70 American Softwood Lumber Standard
3. American Forest & Paper Association (AFPA) Publications:
2004 Edition. National Design Specification for Wood Construction and Supplement,
Design Values for Wood Construction.
4. Redwood Inspection Service (RIS) Publication: Standard Specifications for Grade of
California Redwood Lumber, Latest Edition.
5. International Conference of Building Officials (ICBO) Publication & State of California:
6. Uniform Building Code Standards, Current Edition
7. California Code of Regulations, Latest Edition
Title 24, Part 2, California Code of Regulations
8. West Coast Lumber Inspection Bureau (WCLIB) Publication: Standard Grading Rules
for West Coast Lumber, No, 17, Latest Edition
9. Western Wood Products Association (WWPA) Publication: Standard Grading Rules for
Western Lumber, Latest Edition.

- B. **Conflicting Requirements:** In the event of conflict between pertinent codes and regulations and the requirements of the referenced standards or these specifications, the provisions of the more stringent shall govern.
- C. **Qualifications of Personnel:**
 - 1. Throughout progress of the work of this section, provide at least one person thoroughly familiar with the specification requirements, completely trained and experienced in the necessary skills, and who shall be present at the site and shall direct all work performed under this section.
 - 2. In actual installation of the work under this section, use adequate numbers of skilled workmen to ensure installation in accordance with the approved design and approved recommendations of the manufacturer of the material which is being installed or applied.

1.05 SUBMITTALS:

- A. **General:** Make submittals in accordance with requirements of Section 01300.
- B. **Pneumatically-Driven Fasteners:** Submit manufacturer's literature and installation instructions and one sample for review by the Clovis Unified School District's Representative.

1.06 DELIVERY AND STORAGE:

- A. **Protection:** Use all means necessary to protect the materials of this Section before, during and after installation, and to protect the work and materials of all other trades.
- B. **Replacement:** In the event of damage, immediately make all repairs and replacements necessary and at no additional cost to the Clovis Unified School District.

Deliver and store materials in dry, protected areas as directed by Clovis Unified School District. Keep free of stain or other damage. Replace any damaged material at no cost to Clovis Unified School District. When ready to install, plywood shall be placed on the roof in small stacks over column locations until applied.

PART 2 - MATERIALS

2.01 FRAMING LUMBER:

- A. Lumber shall be dry and well-seasoned. The moisture content shall not exceed 19% in boards 8" or less in depth, 15% in lumber more than 8" in depth and plywood.
- B. Lumber herein referred to shall be graded and grade marked and shall conform to the following specifications, as applicable. All material shall be new.
- C. Redwood to be foundation grade or better.

2.02 PLYWOOD:

- A. Douglas Fir Select Structural I. Per standard grading and dressing rules #16 of the West Coast Lumber Inspection Bureau (WCLIB).
- B. Plywood: Replacement sheathing, Structural I, CD (exterior glue) shall conform to the requirements designed in American Plywood Association, US Production Standard for soft plywood. Each Standard PS 1-74 size panel shall be legibly identified with appropriate grade

trademark of American Plywood association, visibly shown. Do not incorporate improperly or illegibly identified plywood into the work.

- C. Plywood manufactured in Brazil and labeled as “Structural I” plywood is not permitted to be Installed as part of the project.

2.03 PRESERVATIVES

- A. Pressure-treat above ground items with EPA approved water-borne preservatives, and in accordance with AWPB LP-2. After treatment, kiln-dry lumber and plywood to a maximum moisture content, respectively, of 19 percent and 15 percent.
- B. If items are cut after treatment, coat cut surfaces with two coats of same chemical used for treatment and to comply with AWPB M4.

2.04 MISCELLANEOUS MATERIALS:

- A. Fasteners: All nails for fastening plywood to roof supports shall be **common nails**: flat head, diamond point, hot-dipped galvanized. All nails shall be hot-dip galvanized. Federal Specification FF-N-105B.
- B. Concrete Nails: Flat countersunk head, diamond point, quench hardened steel.
- C. Mechanical Fasteners: Approved Hilti or Rawl Fasteners. Submit for approval.
- D. Wood Screws: Fed. Spec. FF-S-111D, ANSI B 18.6.1 (Galvanized Finish)
- E. Bolts and Nuts: Steel bolts complying with ASTM A-307, Grade C for structural; with ASTM A 563 hex nuts and where indicated, flat washers.
- F. Lag Screws: Fed Spec FF-B-561C
- G. Metal connectors (Joist hangers) for joist fastenings to supports shall be by Simpson Company of San Leandro, California. Nails shall also be by Simpson.
- H. Anchors to be steel sheet zinc-coated by hot dip process on continuous lines prior to fabrication to comply with ASTM A 525 for Coating Designation G 60 and ASTM A 653, SQ grade (structural quality); ASTM A 526 (commercial quality); or ASTM 527 (lock-forming quality); as standard with manufacturer for type of anchor indicated.
- I. Hangers: Simpson Strong-Tie Connectors, or approved equal.

PART 3 - EXECUTION

3.01 INSPECTION:

Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 WOOD MATERIALS:

All materials shall be new when incorporated into the work.

3.03 WORKMANSHIP:

The entire work of this division shall be performed in accordance with the best standards of practice relating to the trade and under the constant supervision of a competent foreman who shall carefully plan and lay out the work as required to carry out the intent of the drawings and to properly accommodate the work of other trades. All lumber framing shall be accurately cut and fitted into the respective location, true to lines, grades and level as indicated or required and permanently secured in proper position with spikes, or other fastenings or fittings as detailed to render the work substantial and rigid in all parts and connections. All framing shall comply with the requirements of the local building codes. Do not cut, notch, or bore framing for passage of pipe, ducts, or conduit without approval of Clovis Unified School District unless specifically indicated on the Project Drawings. Prior to cutting, notching, or boring through any framing member, inquire of Clovis Unified School District's Representative if alternative is available.

3.04 FASTENING:

A. Nailing:

1. Nails in plywood shall not be overdriven to the extent that nail-heads penetrate the face ply more than the thickness of the nail head.
2. The spacing center to center of nails shall not be less than the required penetration. Edge or end distance shall not be less than one-half the required penetration. The required penetration is 11 nail diameters for Douglas Fir Lumber.
3. Do all nailing without splitting the wood. Pre-bore to a diameter smaller than the nail when required to avoid splitting. Replace all split members.

3.05 CLEANING UP:

- A. Keep the premises in a neat, safe and orderly condition at all times during execution of this portion of the work, free from accumulation of sawdust, cut-ends, and debris.
- B. The entire project site grounds shall be thoroughly cleaned at the end of each day. A magnetic nail roller or strong magnet shall be used to pick-up all nails at the end of each day.

END OF SECTION 06 10 00

DIVISION 7 – THERMAL & MOISTURE PROTECTION

SECTION 07 22 00

ROOF DECK INSULATION & GYPSUM COVER BOARD

PART 1 – GENERAL

Contractor shall provide labor, material and equipment to perform the work, including but not limited to the following:

1.01 DESCRIPTION:

A. Work Included:

1. After removal of existing roofing and insulation, install new rigid, high thermal polyisocyanurate insulation and 1/4" gypsum coverboard to be secured to plywood roof decks using approved mechanical fasteners in accordance these specifications and manufacturer requirements.
2. Install layer of 1/4" (minimum) thickness gypsum coverboard over rigid insulation. Insulation boards shall be secured to substrate using mechanical fasteners at minimum rate of one (12) fastener per 4' x 8' insulation board. Install additional fasteners as required by manufacturer based on warranty requirements. Install additional fasteners at perimeter and corner areas per manufacturer requirements based on 1-90 wind warranty. Gypsum coverboards shall cover all crickets.
3. Contractor shall submit copy of proposed insulation fastening pattern for roof system for approval documenting that mechanical attachment complies with wind uplift requirements.
4. Installation of new tapered insulation crickets at uphill sides of all HVAC units and other elements wider than 4' or as indicated on drawings.
5. Disassemble existing roof drains indicated on drawings or as required to remove existing roof and to install new roofing system. After installing new roof system, reinstall existing roof drains. Replace drain bolts and washers with new stainless-steel elements.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

- | | | |
|----|------------------|------------------------------------|
| A. | Division 1 | General Requirements |
| B. | Section 07 54 20 | PVC Thermoplastic Membrane Roofing |
| C. | Section 07 60 00 | Sheet Metal Work |

1.03 DELIVERY AND STORAGE:

- A. Delivery: Deliver materials to the job site in manufacturer's original packaging, containers and bundles with manufacturer's brand name and identification intact and legible.
- B. Storage and handling: Rigid insulation and "Dens-Deck" (or approved equal) must be kept dry during storage and application. Outside storage must be off ground and protected by a breathable waterproof covering. If any material becomes wet, it must be dried before installation. Insulation and "gypsum coverboards must be roofed same day as laid.

1.04 SUBMITTALS:

A. Product Data & Samples.

Submit product literature, samples, and material safety data sheets for the items specified in this Section.

B. These include:

1. Rigid Polyisocyanurate insulation (1 layer of 2.0" thickness)
2. Tapered Insulation Crickets (1/4" per foot slope) where indicated on drawings
3. Gypsum Cover Board (min. 1/4" thickness). Provide thicker cover board if required to roofing Materials manufacturer to comply with required Class "A" fire rating.
4. Sealant/Caulking (If applicable)
5. Low-rise adhesive
6. Shop Drawings: Submit shop drawings indicating fastener patterns for FMRC wind uplift resistance specified.
7. Certification: Submit manufacturer's written certification that product meets specified fire-resistance requirements.
8. Copy of proposed mechanical fastener layout. Submittal shall specify fastener layout for field, perimeter, and corner areas.

1.05 LIMITATIONS

- A. Rigid insulation boards and gypsum cover boards must be kept dry at all times. Apply only as much material as can be covered by a waterproof roof membrane system the same day or install approved waterblocks to protect exposed material. Contractor shall remove all wet or water-damaged insulation and coverboard from the project site as requested by Building Owner or its Representative.
- B. Accumulation of water due to leaks or condensation in or on Insulation and/or gypsum coverboard must be avoided during construction and after construction. Avoid application of insulation boards or gypsum cover board during rains, heavy fogs and all other conditions that may deposit moisture on the surface.
- C. Conditions beyond the control of the manufacturer such as weather conditions, dew, application temperatures and techniques may cause adverse effects with adhered roofing systems. Always consult roofing manufacturer for their specific instructions on applying their products to "Dens-Deck" (or approved equal).
- D. When applying solvent-based adhesives or primers, allow sufficient time for the solvent to flash off to avoid damage to roofing components.

PART 2 – PRODUCT

2.01 RIGID POLYISOCYANURATE ROOF INSULATION:

- A. Acceptable product: Rigid polyisocyanurate roof insulation w/ fiberglass facer
- B. Composition: Non-structural
- C. Size: 4' x 8' (Max.)
- D. Thickness: 2.0" (1 layer)
- E. Dimensional Stability: 2.0% (L x W) (ASTM D2126)
- F. Density: 2.0 pcf nominal (ASTM D1622)
- G. Permeance: 1.0 perm (ASTM E96)
- H. "R" Value (ASTM C-518): Varies by manufacturer
- I. Fire Resistance: UL 1256, UL Class A
- J. Compressive Strength: 20 psi (ASTM D1621)

2.02 TAPERED POLYISOCYANURATE ROOF INSULATION (CRICKETS)

- A. Acceptable product: Rigid polyisocyanurate roof insulation w/ fiberglass facer
- B. Composition: Non-structural
- C. Size: Varies
- D. Thickness: Varies
- E. Slope: 1/4"/foot at crickets
- F. Dimensional Stability: 2.0% (LxW) (ASTM D2126)
- G. Density: 2.0 pcf nominal (ASTM D1622)
- H. Permeance: 1.0 perm (ASTM E96)
- I. "R" Value (ASTM C-518): Varies by manufacturer
- J. Fire Resistance: UL 1256, UL Class A
- K. Compressive Strength: 20 psi (ASTM D1621)

2.03 GYPSUM CORE ROOF BOARD DECKING:

- A. Description: Non-structural, glass mat-embedded front and back, silicone treated core, water-resistant gypsum core panel, UL-classified Type DGG, compiling with ASTM C1177. The panel surface shall be factory primed with a non-asphaltic primer.
- B. Acceptable product: G-P Gypsum Corporation, "Dens-Deck Prime (or approved equal).
- C. Composition: Non-structural, fiberglass-embedded, treated gypsum core panel with facer
- D. Size: Nominal 4'-0" x 8'-0"
- E. Thickness: Min. ¼-inch (6.4 mm) (install 1/2" thickness product if required by roofing materials manufacturer based on Manufacturer warranty and required fire rating).
- F. Weight, (lbs/sq. ft.): 1.2
- G. Permeance (perms) (ASTM E-96): 50

- H. "R" Value (ASTM C-518): 0.28
- I. Fire Resistance: UL 1256, UL Class A
- J. Compressive Strength: 600 psi

2.04 MISCELLANEOUS MATERIALS: ATTACHEMENT OF INSULATION AND GYPSUM BOARDS

- A. FMRC approved fasteners: Provide size and type in accordance with FMRC requirements and roof membrane manufacturer's written recommendations. Screws shall exceed corrosion resistance requirements of Factory Mutual Standard 4470. Submit fastener for approval.
- B. Screws and plates shall be approved by roofing materials manufacturer for use in their fully warranted roof system.

2.05 MISCELLANEOUS FASTENERS AND ANCHORS

All fasteners, anchors, nails, straps, bars, etc. shall be post-galvanized steel, aluminum or stainless-steel dependent upon the composition of the elements they are attached to or penetrating through. Mixing metal types and methods of contact shall be assembled in such a manner as to avoid galvanic corrosion. Fasteners for attachment of metal to masonry shall be expansion type fasteners with stainless steel pins. All concrete fasteners and anchors shall have a minimum embedment of 1 ¼ inch (32 mm) and shall be approved for such use by the fastener manufacturer. All miscellaneous wood fasteners and anchors used for flashings shall have a minimum embedment of 1 inch (25 mm) and shall be approved for such use by the fastener manufacturer.

PART 3 - EXECUTION

3.01 GENERAL:

- A. Use maximum lengths possible to minimize number and joints.
- B. Offset joints of gypsum cover board from insulation boards by minimum of 2' in all directions.
- C. Stagger joints of insulation boards min. of 2' in all directions.
- D. Install new 2.0" thickness polyisocyanurate insulation and ¼-inch thickness gypsum cover board at roof areas indicated on drawings. Secure Insulation and gypsum boards to roof substrate using approved mechanical fasteners at specified rate. Install additional mechanical fasteners (with plates) at rate or twelve (12) fasteners per 4' x 8' insulation board and six (6) fasteners per 4' x 4' insulation board. Install additional fasteners as required by the manufacturer. Install additional fasteners are perimeter and corner areas as required by manufacturer per required wind warranty (I-90). Insulation boards and cover boards shall be applied per the roofing material manufacturer's recommendations or as herein specified. Gypsum cover boards shall be installed over all crickets and shall extend to perimeter walls.

3.02 WOOD NAILER INSTALLATION

- A. Install new wood nailers at locations shown on the project Drawings, as required by primary roofing materials manufacturer, or as required to properly install roof system, base flashings, and related flashings.
- B. Nailers shall be anchored to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons/lineal meter) in any direction. Individual nailer lengths shall not be less than 3 feet (0.9 meter) long, nor more than 10' in length. Nailer fastener spacing shall be at 12 inches (0.3 m) unless indicated otherwise on project drawings. Fasteners for securement of nailers shall be

staggered 1/3 the nailer width and installed within 6 inches (0.15 m) of each end. Two fasteners shall be installed at ends of nailer lengths. Nailer attachment shall meet this requirement and that of the current Factory Mutual Loss Prevention Data Sheet 1-49.

- C. Nailer thickness shall match substrate or insulation height to allow a smooth transition. Where nominal thickness lumber does not match up with insulation thickness, have lumber milled or ripped to match thickness.
- D. Any existing nailer woodwork which is to remain shall be firmly anchored in place to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons/lineal meter) in any direction and shall be free of rot, excess moisture or deterioration. Only woodwork shown to be reused in Detail Drawings shall be left in place. All other nailer woodwork shall be removed.

3.03 INSULATION INSTALLATION

A. General Criteria:

- 1. Insulation shall be installed according to manufacturer recommendations and published installation requirements.
- 2. Insulation shall be neatly cut to fit around penetrations and projections.
- 3. Install tapered insulation in accordance with manufacturer's requirements.
- 4. Do not install more insulation and cover board than can be covered with roof membrane and be in completely watertight condition by end of work shift, or before onset of inclement weather.

B. Application of Insulation and Gypsum Cover Board Using Mechanical Fasteners:

- 1. Insulation and gypsum cover board shall be secured to roof substrate using approved mechanical fasteners at minimum rate of twelve (12) fasteners with plates per 4' x 8' insulation board and six (6) fasteners per 4' x 4' board. Contractor shall install additional fasteners as required by manufacturer based on required wind warranty. Install additional fasteners at perimeter and corner areas as required by roofing materials manufacturer and/ or applicable building code. Refer to roofing membrane manufacturer's recommendations for fastening rates and patterns based on required wind uplift rating (I-90).
- 2. Insulation boards shall be installed in a manner so that they rest evenly on the roof deck/substrate, and so that there are no significant and avoidable air spaces between the boards and the substrate. Each insulation board shall be installed tightly against the adjacent boards on all sides. Insulation boards shall not be cut so as to contour to irregularities in the structural deck.
- 3. Fasteners are to be installed consistently in accordance with fastener manufacturer's recommendations. Fasteners are to have minimum penetration into structural deck recommended by the fastener manufacturer and membrane manufacturer. Install additional fasteners in field of roof and at corners and perimeters per manufacturer requirements based on required wind rating and warranty requirements.
- 4. Gypsum coverboard shall be installed directly over rigid insulation with all joints offset per manufacturer requirements. Mechanical fasteners shall be installed to secure both gypsum coverboard and rigid insulation to wood substrates at rate of not less than one (12) fasteners per 4' x 8' insulation board. Gypsum cover joints shall be offset from insulation joints as required by primary roofing materials manufacturer to comply with wind warranty and required fire rating. Insulation boards and gypsum cover board may be secured together using single fastener application if approved by manufacturer.

5. Contractor may install tapered insulation crickets in low-rise adhesive where allowed by manufacturer. Installation shall be per manufacturer requirements.
6. Contractor shall have manufacturer or independent testing company perform fastener pull-out tests as required by roofing materials manufacturer. Cost of fastener pull-out tests shall be provided at no cost to the Building Owner.

3.04 WIND UPLIFT REQUIREMENTS

- A. The roof system shall meet Factory Mutual wind uplift requirements per these specifications.
- B. Composition of roofing assembly shall match tested, rated requirements for water resistance, fire resistance, attachment and adhesion.
- C. Designed wind speed: Minimum roof covering uplift resistance in accordance with FM 4470, UL580, or UL1897:
- D. Manufacturer to determine boundaries of all perimeter and corner areas.
- E. Required wind design requirements: I-90

END OF SECTION 07 22 00

DIVISION 7 – MOISTURE PROTECTION

SECTION 07 31 11

REFLECTIVE LAMINATED ASPHALT SHINGLE ROOFING

PART 1 - GENERAL

1.01 SCOPE:

- A. The work required under this section consists of all asphalt shingle roofing and related items necessary and/or required, or as specified to complete the work as indicated in the Contract Documents.
- B. The Contractor shall comply with the requirements of OSHA's Hazard Communications Standard including hazardous materials and employee training.
- C. The Contractor shall provide all items, articles, materials, operations, or methods listed, mentioned or scheduled on the drawings and/or specified herein, including all labor, materials, equipment, and incidentals necessary and required for their completion.

1.02 WORK INCLUDED:

- A. Without restricting the volume or generality of the above "Scope" the work to be performed under this section shall include, but is not limited to the following:
 - 1. Description of work:

Removal of all existing asphalt shingles, underlayment, sheet metal and sheet lead flashings, vents, and all other roof related materials down to the structural roof deck at specified steep-slope roof areas, installation of new synthetic underlayment, specified reflective asphalt shingles and related flashings. Contractor shall remove all demolition materials from the jobsite.

 - a. Installation of new synthetic underlayment at all specified roof areas.
 - b. Installation of new reflective, laminated asphalt shingle roofing system over approved underlayment at specified roof areas. Color to be selected by Owner.
 - c. Installation of new galvanized iron sheet metal flashings, counterflashings, and related flashings as indicated on project drawings and these specifications.
 - d. Installation of all new sheet metal flashings at all plumbing vent pipes.
 - e. Installation of new, low-profile roof attic vents per drawings, local jurisdiction requirements and manufacturer requirements. Vents shall be installed at high and low areas in order to provide maximum ventilation. Contractor shall submit calculations and diagram of proposed locations to local jurisdiction for approval as requested by Building Owner or its Roofing Consultant. In the event Contractor fails to submit a proposed vent layout for approval by CUSD, CUSD shall determine the number and locations of vents to be installed on each building.
 - f. Remove and replace existing gutters where indicated on drawings.
 - g. Modify roof perimeter edges as indicated on drawings.

- h. All work and materials required to complete the new roof installation and related flashings as described or shown in the project drawings and specifications.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 07 60 00 Sheet Metal Work

1.04 REFERENCES:

- A. ASTM D 146-90: Standard Test Methods for Sampling and Testing Bitumen-Saturated Felts and Woven Fabrics for Roofing and Waterproofing 2009.
- B. ASTM D226: Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- C. ASTM D228: Method of Testing Asphalt Roll Roofing, Cap Sheets and Shingles.
- D. ASTM D361: Sheet Steel, Zinc Coated (Galvanized) by the Hot-Dip Process for Roofing and Siding.
- E. ASTM D4586: Standard Specification for Asphalt Roof Cement, Asbestos Free; 2009
- F. ASTM D3018-89(Type 1): Standard Specification for Class “A” Rated Asphalt Shingles Surfaced with Mineral Granules; 2009.
- G. ASTM D3161: Wind Resistance of Asphalt Shingles.
- H. ASTM D 3462-87: Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules; 2009.
- I. ASTM E 108-90: Standard Test Methods for Fire Tests of Roof Coverings; 2009
- J. Building Materials Directory; Underwriter Laboratories, Inc. (UL); 2009.
- K. The NRCA Steep Roofing Manual, National Roofing Contractors Association; 2009.
- L. ARMA – Residential Asphalt Roofing Manual.
- M. UL 790: Tests for Fire Resistance of Roofing Covering Materials; Underwriters Laboratories Inc.; 2009
- N. UL 997: Wind Resistance of Prepared Roof Covering Materials; Underwriters Laboratories Inc.; 2009.
- O. ASTM D 226/ D4869/E108/UL 790: Synthetic Shingle Underlayment
- P. 2016 California Title 24 Part 6 Cool Roof Requirements (Title 4, Part 6)
- Q. ASTM D7158: Class H Wind Resistance
- R. ICC-ES AC438
- S. PRI ER 1378E01

1.05 SUBMITTALS:

- A. Roofing contractor shall submit the following to the Owner for approval:
1. **Manufacturer's Data:** Submit two copies of specifications, installation instructions and general recommendations from the shingle material manufacturer for each type of roofing product required. Submit color catalog or sample board showing manufacturer's standard colors. Include manufacturer's data substantiating that the materials comply with the contract documents. Asphalt shingle samples shall be submitted to Owner for color selection.
 2. **Asphalt Shingles:** One (1) Shingle Board from proposed manufacturer shall be submitted to the Owner for review for color selection.
 3. **Fasteners:** Product literature for each type and size.
 4. **Synthetic Underlayment:** Product literature for proposed product.
 5. **Self-Adhering Membrane:** Product literature for proposed product.

1.06 QUALITY ASSURANCE:

- A. **Fire Resistance:** Provide shingles and accessory materials which have been tested, listed and labeled by UL for the following Class or Rating roofing: Provide Class "A" rating, except as otherwise indicated.
- B. **Installer Qualifications:** Application shall be performed by a roofing contractor with not less than five (5) years of experience as a licensed roofing contractor in the State of California.

1.07 REGULATORY REQUIREMENTS

- A. Conform to all applicable state and local codes.
- B. UL 790, Class A; UL 997, Wind Resistance.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Furnish material wrapped in manufacturer's original packaging.
- B. Store materials separated from the ground and in a dry location, protected until installation in accordance with manufacturer's instructions. Store on a flat surface, to a height 4" off the ground.
- C. Storage at the job site shall be in a covered, ventilated area – maximum temperature 100° F.
- D. Do not store materials near steam pipes, radiators, etc., or in sunlight. All rolls shall be store on end.
- E. In accordance with good roofing practice, bundles should not be dropped on edge nor should attempt be made to separate shingles by "breaking" over ridge or other bundles. This is particularly important at temperatures of 40° F or below.
- F. Handle carefully. Shingles can be broken in cold weather or their edges damaged in hot weather.

1.09 PRODUCT

- A. Substrate: Before starting installation work complete substrate installation including roof penetrations. Substrate shall be smooth, dry, securely anchored, and free of construction debris.
- B. Follow manufacturer's instructions regarding acceptable weather conditions for installation of shingle products.
- C. The contractor and his crews shall comply with current safety standards set forth by the Occupational Safety & Health Administration (OSHA) at all times.

1.10 MANUFACTURER WARRANTY:

- A. Submit manufacturer's warranty guaranteeing to correct failures in product which may occur during the warranty period, without reducing or otherwise limiting any other rights to correction which the Owner may have under the contract documents.

MANUFACTURER MATERIAL WARRANTY PERIOD: Limited Lifetime

1.11 CONTRACTOR GUARANTEE:

- A. Guarantee by Contractor

Contractor shall present to Owner a written guarantee upon completion and acceptance of the building. The guarantee shall be signed by the Roofing Contractor and shall stipulate that it will maintain and repair the roof and replace any defective materials, which would cause the roof to leak for a period of three (3) years after the date of acceptance of the roofing work by the Owner.

- B. Warranty by Manufacturer

The specified manufacturer system warranty shall be provided at the expense of the contractor and shall be included in the bid for the work. The warranty shall be provided to the Owner as a condition of project completion and prior to processing of the final invoice for the work. The warranty shall be a Limited Lifetime warranty from the manufacturer.

PART 2 - PRODUCTS

2.01 MANUFACTURER:

- A. Laminated Architectural "Energy Rated" Asphalt Shingles:
 - 1. Provide products complying with requirements of the contract documents and made by one of the following:
 - Manufacturer: GAF**
 - Style: Timberline HDZ RS Shingles**
 - Color: Sagewood**
- B. 1. No other manufacturer or product will be considered as an equal to the specified product for the project.

2.02 MATERIALS:

A. Solar Reflective Laminated Asphalt Shingles:

1. Three-piece laminated fiber glass base construction
2. ASTM D228, ASTM D3018, ASTM D3462
3. Fire resistance: Class A; UL 790, ASTM E108
4. Wind resistance: ASTM D3161 – Class F (130 MPH Wind Rating)
5. Tear Resistance: ASTM D3462 – Min. 2,000
6. ICC-ES ESR-1389 & ESR-3537
7. CRRC approved – State of California (Title 24, Part 6)
Initial Solar Reflectance: 0.26
Initial Thermal Emittance: 0.92
8. Color: TBD
9. Provide factory prefabricated hip and ridge shingles, which match field shingles.
10. Solar Reflectance Standards: Min. 0.25 solar reflectance index/3-year aged solar reflectance of 0.15
11. Algae Resistance: 10 years

B. Synthetic Shingle Underlayment

Approved Products:

1. Manufacturer: Owens Corning “Titanium UDL50 or Approved Equal
2. Product must be approved by shingle manufacturer for use with the warranted roof system.
3. ASTM D 226/ D4869/E108/UL 790
4. Weight: 4 lbs. per square
5. Water Vapor Transmission (US Perms): >1 (ASTM E96)
6. Tensile Strength: per ASTM D 4073

2.03 ACCESSORY PRODUCTS

- A. Starter Shingles: Manufacturers standard product or approved product for use with warranted roof system.
- B. Factory Ridge Shingles: Manufacturers standard product approved for use with specified asphalt shingles. Ridge shingles to be installed per manufacturer requirements.
- C. Asphalt Plastic Cement: ASTM D 4586, fibrated asphalt cement, asbestos free. Type I or Type II.

D. Elastomeric Roof Cement: ASTM D4586 & 3409

Approved Manufacturer: Tropical Roofing Products 505 – All Weather Modified Mastic or Approved Equal
Color: Black

Application: For adhering asphalt shingles at locations where mechanical attachment isn't feasible.

E. Fasteners:

1. Nails: 11 or 12 gauge, hot-dipped galvanized, with barbed shanks, minimum 3/8 inch diameter head. STAPLES ARE NOT ACCEPTABLE.
2. Length as necessary to penetrate through sheathing, or 3/4 inch into solid decking.

F. New 24-gauge galvanized iron sheet metal edge flashings, counterflashings, pan flashings, edge metal and jacks where indicated drawings or where required to install in accordance with applicable building code and manufacturer requirements. See Section 07 60 00 for sheet metal flashing requirements. All flashings installed as part of roof system shall comply with manufacturer requirements.

G. New sheet metal jacks at all gas and electrical penetrations and any other pipe penetrations.

H. Attic Vents: Low profile type vents at locations on drawings or as required to meet building code requirements and manufacturer requirements. Vents to include screens to prevent entry of animals.

I. Any other accessories or materials required to provide a fully functional, waterproof roofing system.

J. Valley Metal: Double-ribbed valley metal of constructed of 24 gauge, galvanized-iron.

K. Stepped Flashing: Stepped Flashing: For sloping roofs which abut vertical surfaces, provide stepped metal flashing in accordance with Section 07900 - Sheet Metal. Min. 24 GA. Galvanized-Iron.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Examine substrate to receive shingles for obstructions, loose sheathing or protruding nails. Repair or replace unacceptable work, which may affect proper material installation.
- B. Verify deck is dry, sound, clean and smooth, free of depressions, waves, or projections. Do not proceed with shingling work until satisfactory conditions have been corrected.
- C. Replace damaged or defective plywood and/or wood board roof decking with new material to match per plans and specs. New material to match thickness of existing decking material. Contractor to document plywood replacement quantities and locations on building-by-building basis.

3.02 PREPARATION:

- A. General:

1. Remove projections and debris from substrate before starting installation. Lay sheet metal over minor voids and nail to substrate.
 2. Coordinate shingle installation with flashing and other work integral with shingles.
 3. Secure all vent stacks, curbs, and other penetrations to substrate before starting shingle installation.
 4. Install new valley metal at prior valley metal locations. Install valley metal, underlayment, and asphalt shingles per manufacturer requirements to provide watertight condition. Valley metal to comply with code requirements.
 5. All raised nailheads are to be reset even with the roof surface using a hammer.
 6. All intersecting plywood panels with vertically offset panel edges shall receive an inverted layer of mineral surface cap sheet over the offset prior to installing the felt underlayment in the event the offset cannot be corrected by installation of additional nails.
- B. Preparation for Reroofing:
1. Comply with recommendations with NRCA in "The NRCA Steep Roofing Manual" for preparation of the existing plywood and wood board roof substrate to receive new shingle roof system.

3.03 INSTALLATION:

- A. Metal Edging
1. Application: Provide and install new sheet metal edging over specified underlayment at all eave locations. Secure with galvanized mechanical fasteners spaced not more than 3" apart in staggered pattern. Install synthetic underlayment directly over the plywood roof deck. Nail to deck per manufacturer requirements.
- B. Self-Adhering Membrane:
1. Secure layer of self-adhering membrane over flange of metal edging prior to installing underlayment. Membrane to extend minimum of 2" beyond inside edge of flange.
- C. Synthetic Underlayment:
1. Underlayment: Install one layer of approved underlayment horizontally over the substrate at all specified roof areas. Underlayment to be laid parallel to eaves, lapping ends and sides per manufacturer's written installation specifications. Where conflict exists between design documents and manufacturer's installation requirements, manufacturer requirements will prevail.
- D. Application of Shingles over Underlayment: See manufacturer's published specifications for the proper application of asphalt shingles over underlayment.
1. Starter Strip: Apply a starter strip at the eaves constructed of a shingle of the same color. Apply by removing 7" from the left-hand side and then trimming 7-3/8" inches from the top edge along the long the dimension of the shingle. Apply the starter strip along the eaves with a 1/2" drip edge, overlaying and finishing even with the lower edge of the eaves flashing strip; fasten in a line parallel to, and 3" to 4" above, the eave edge. Place fasteners so that the top of the fastener will not be exposed. Be sure to nail securely along rakes and between self-sealing cement along the eave. Start at left rake

and lay horizontally. Where conflict between specifications and manufacturer exists, manufacturer requirements shall prevail.

2. Shingle Courses: Start the first course with a full shingle at the left rake and continue across with full shingles laid flush with the starter course. Place the shingles close together but do not crowd. Do not nail ends first, as doing so may cause buckling. Trim remaining courses per manufactures recommendations.
3. General: Do not drive fasteners into or above the factory-applied adhesive. Place all fasteners so that they are concealed by the shingle top lap and so that they penetrate the head lap of the overlapped shingle. Top lap is considered to be that portion of a shingle overlapping the shingle in the course below. Head lap is considered to be that portion of a shingle extending from the top edge of the shingle in the course below to the butt edge of the shingle in the course above. Exposure is considered to be that portion of a shingle between exposed butt edges of overlapping courses of shingles.
4. Shingles Applied using Nails: Nominal 5" exposure. Apply each shingle with not less than 4 nails. Place one nail one inch from each end and evenly space nails on a horizontal line not less than 5/8" above the tops of cutouts.
5. Install new roof vents over underlayment as required to meet current building code requirements. Install in watertight condition. Set vents in bed of roofing cement or strip-in using approved underlayment as required by industry standard and manufacturer requirements. Vents shall include screens to prevent entry of animals. Vents shall be installed at high and low points of each roof area to provide maximum ventilation. Submit vent layout and calculations for venting requirements for review by Building Owner and it's Roofing Consultant.
6. Install stripping layer of underlayment over all deck flanges for vents, flashings and other roof elements extending 12" beyond edge of deck flange.
7. Start the first course with a full shingle at the left rake and continue across with full shingles laid flush with the starter course. Place the shingles close together but do not crowd. Do not nail ends first, as doing so may cause buckling. Trim remaining courses per manufacturer recommendations.
8. General: Do not drive fasteners into or above the factory-applied adhesive. Place all fasteners so that they are concealed by the shingle top lap and so that they penetrate the head lap of the overlapped shingle. Top lap is considered to be that portion of a shingle overlapping the shingle in the course below. Head lap is considered to be that portion of a shingle extending from the top edge of the shingle in the course below to the butt edge of the shingle in the course above. Exposure is considered to be that portion of a shingle between exposed butt edges of overlapping courses of shingles.
9. Shingles Applied With Nails: Nominal 5" exposure. Apply each shingle with not less than 4 nails. Place one nail one inch from each end and evenly space nails on a horizontal line not less than 5/8" above the tops of cutouts.
10. Shingles shall be installed in manner that meets manufacturer's warranty requirements.

E. Application of Asphalt Shingles in Elastomeric Roof Cement

1. Install asphalt shingles in solid bed of elastomeric roof cement are edges of roof cut outs and breezeways where mechanical attachment isn't feasible. Refer to drawings for locations.

F. Flashing:

1. Stepped Flashing: For sloping roofs which abut vertical surfaces, provide stepped metal flashing in accordance with Section 07900 - Sheet Metal.
2. Pan Flashings: Install in accordance with Section 07900 and drawings.

G. Hips and Ridges

1. Start on end of ridge opposite prevailing wind. Secure hip and ridge shingles using two fasteners each, 5-1/2" from the exposed butt end and 1" from the side edges.
2. Start hips at the bottom. Apply ridge after hips are installed. Finish with last ridge cap piece set in plastic cement. Do not leave any fasteners exposed.

H. Vent Pipes/Flashings

1. Apply shingles up to vent pipe and cut hole in next shingle to go over pipe. Set the shingle in plastic roof cement or product approved by roofing material manufacturer.
2. Install pre-manufactured sheet metal flashings over shingle and vent pipe, set in plastic roof cement.
3. Cut shingles around the vent pipe and set in plastic roof cement.
4. Install miscellaneous sheet metal or sheet lead flashings at locations of miscellaneous roof penetrations.

3.04 CLEANING:

- A. All rubbish, debris and excess material resulting from the operation of this trade shall be cleaned up as the work progresses and removed from the site.
- B. Contractor shall remove bituminous or other markings from finished surfaces. Contractor is to keep the roof and premises clean and free from accumulations of waste materials and rubbish from the work area daily. Surplus materials and all equipment shall be promptly removed from the site upon completion of the work. Prior to final acceptance, the Contractor shall restore all areas affected by his work to their original state of cleanliness and repair all damage done to the premises, by his workmen, equipment, or sub-contractors working under his direction.

END OF SECTION 07 31 11

DIVISION 7 – THERMAL & MOISTURE PROTECTION
SECTION 07 54 10- APPLICATION OF ELASTOMERIC
SILICONE ROOF COATING OVER METAL ROOF SYSTEMS

PART 1 - GENERAL

1.01 Work Included

- A. Preparation of roof surfaces for application of elastomeric silicone coating over existing metal roofs. Power-wash roof surfaces to remove dirt, vegetation, and debris that will negatively impact coating adhesion to metal surfaces per manufacturer recommendations. Clean roof surface and properly prepare surface for application of new coating system.
- B. Remove existing gutter and downspouts where indicated on drawings. Install new gutters and downspouts to match.
- C. Application of Title 24 approved elastomeric silicone coating over existing metal roof surfaces where indicated on drawings. Repair rips, gouges, and other defects prior to application of coating system. Apply 6' wide polyester fabric over all vertical ribs and field seams in metal roof systems per manufacturer requirements and fully incorporate into silicone coating system.
- D. Properly mask all rooftop elements to prevent overspray.
- E. Temporarily support roof-mounted elements in order allow for coating application below existing supports.
- F. Install new sheet metal counterflashings where indicated on drawings in watertight condition. Caulk to provide watertight condition.

1.02 Safety Precautions

Contractor shall be responsible for injury to its employees if they access or perform work on designated roof areas prior without conducting onsite safety orientation and using fall protection and fall arrest systems as required under Cal/OSHA regulations.

1.03 Related Sections

Section 07 60 00: Sheet Metal Work

1.04 Quality Assurance

- A. Contractor Qualifications: Must be a Manufacturer Approved Applicator in order to qualify for roof warranties. Contractor shall carry minimum of \$1,000,000 liability insurance coverage. Contractor shall have been in business a minimum of ten years under the same name.
- B. The Approved Applicator shall perform the work of this section. Subcontracting the roofing work is not allowed.
- C. Inspections: Completed application will be inspected by Building Owner's Representative to verify compliance with manufacturer requirements, current industry standards, and warranty requirements. Manufacturer's representative will conduct a final inspection to confirm compliance with manufacturer's requirements.

1.05 Submittals

- A. Product Data: Provide two copies of product data sheets for proposed silicone coating.
- B. Submit verification that the applicator is a currently approved applicator.
- C. Provide specimen of manufacturer’s warranty to be issued for coating application.

1.06 Delivery, Storage and Handling

- A. Deliver materials to the site in their original, tightly sealed containers, all clearly labeled with manufacturer’s name, product identification and lot number.
- B. Store materials in their original containers out of the weather and where the temperatures are within the limits specified by the manufacturer.
- C. All materials shall be stored in compliance with applicable fire and safety requirements.
- D. Protect materials from damage during transit, handling, storage and installation.

1.07 Environmental Conditions

- A. The silicone roof coating shall be applied during periods of inclement weather (rain, snow, fog, mist or high humidity).
- B. Do not apply silicone roof coating when weather conditions will not permit complete cure before rain, dew, fog or freezing temperatures occur. Do not apply in late afternoon if heavy moisture condensation may appear during the night.
- C. When wind speeds exceed 10 miles per hour at the job site, windscreens shall be used during the application of the surface primer and silicone roof coating to prevent overspray onto surfaces not intended to receive coating. Under no circumstances shall the surface primer or silicone roof coating be applied when wind speeds exceed 25 miles per hour.

1.08 Contractor Workmanship Warranty

Upon satisfactory completion of the work, provide three (3) year Contractor workmanship guarantee.

PART 2 - PRODUCTS

2.01 Energy Star Silicone Roof Coating

- A. The elastomeric silicon roof coating shall be Energy Star listed and meet ASTM D-6694-08 & 07 standards, along with the physical property requirements listed herein.
- B. Typical physical properties per ASTM D-6694-08:

Property	Method	Result
Initial Tensile Strength (psi)	ASTM D-412	300
Initial Elongation (%)	ASTM D-412	250% (+/-15%)
Adhesion to SPF	ASTM C-794	2.3 pli
Tear Strength (lbf/in)	ASTM D-624	45
10,000-hr Accelerated Weathering	ASTM D-822	No Degradation
Permanent Change – Heat Aged	ASTM D-412	0%
Durometer hardness – Shore A	ASTM D-2240	45-55
Permeability (U.S. perms)	ASTM E-96	7.9

Water Absorption	ASTM D-570	0.2
Cure Time Min/Max	ASTM D-6694	Min. 2 Hrs./Max. 8 Hrs.
Volume Solids (%)	ASTM D-2697	98
Weight Solids (%)	ASTM D-1644	98
Flashpoint	ASTM D-56	244 F

C. Approved Manufacturers:

1. Gaco
2. G. E.
3. KM
4. General Coatings
5. Carlisle
6. Approved Equal

2.02 Sealant

Sealant shall be compatible with system, approved for use by manufacturer and in a color to best match the topcoat color.

2.03 Substrate Primer

The primer shall be appropriate for use over metal surfaces. To be used if recommended by coating manufacturer prior to application of silicone elastomeric coating system.

2.04 Cleaning Solution

- A. Cleaning solution shall be a water-based biodegradable solution approved by the EPA for cleaning roof surfaces.
- B. Approved Cleaners: Approved for use by roof system manufacturer in conjunction with their system.

PART 3 - EXECUTION

3.01 Inspection

- A. Verify that all surfaces to receive roof system components are clean, dry and free of dust, dirt, debris, oil, solvents and all material that may adversely affect the adhesion of the surface primer and silicone elastomeric coating.
- B. Verify that all roof penetrations are properly installed and secured.
- C. Do not begin applying coating system until substrate and environmental conditions are satisfactory.
- D. Installation of coating at repair locations.

- E. Apply specified elastomeric silicone coating system over existing metal roof surfaces per these specifications and manufacturer requirements.
- F. Properly mask roof elements to protect against coating overspray.
- G. Properly raise and support rooftop services lines, including gas, water, and electrical lines above the roof surface.
- H. Do not shut off any HVAC equipment without notification of tenant and without approval. Coordinate all equipment shutdowns and provide approximate time for activation of all equipment.
- I. Properly mask HVAC equipment to prevent intake of coating fumes. Coordinate with Building Owner.

3.02 SURFACE PRIMER

- A. Inspection
 - 1. Contact manufacturer's technical service department for recommendations concerning surface preparations on surfaces to receive the coating system.
 - 2. Prior to application of the primer, inspect the substrates to be primed to ensure proper adhesion to roof surfaces.
- B. Application
 - 1. Apply the surface primer in strict accordance with the manufacturer's application instructions.
 - 2. Confirm primer is cured before installing silicone coating system.

3.03 SILICONE ROOF COATING APPLICATION – ROOF SURFACES

- A. Inspection
 - 1. Prior to the application of the silicone roof coating inspect the roof surfaces to ensure the roof surfaces are suitable for coating application.
 - 2. The roof surfaces shall be free of dust, dirt, debris and other contaminants that would impair the adhesion of the coating system.
 - 3. The roof surfaces must be dry prior to the silicone coating application.
 - 4. Make sure all environmental conditions are met prior to silicone coating application.
- B. Application
 - 1. The silicone shall not be subjected to foot traffic or be disturbed until it is cured.
 - 2. Apply coating system over entire roof surface at specified rate. Existing roof surfaces shall be properly cleaned and/or prepared to allow for coating bond.
 - 3. Apply the coating in a uniform manner to achieve a total protective coating system dry film thickness of 36 mils (approximately 2 gallons per 100 square feet or more based manufacturer) for coating alone. Silicone coating shall be Energy Star approved.

4. Allow the new silicone coating to cure and inspect the finished coating surface for pinholes, cracks, thin areas or other deviations. Repair any deviations observed with buttergrade sealant and/or additional silicone roof coating.
5. Fully incorporate new roof drains fixtures into coating system. Caulk prior to coating application as required to provide a long-term, watertight condition.
6. It is the contractor's responsibility to ensure the minimum total dry film thickness specified is achieved throughout the entire roof area.

3.04 Field Quality Control – Manufacturer Warranted Roofs

Slit samples of the acrylic roof coating system will be secured by the Owner's Representative in a manner and fashion to provide assurance to the Owner that the installation has been completed in accordance with these specifications and industry standards. Contractor shall cooperate in repairing all sampled areas, using replacement silicone coating.

3.05 Coating System Manufacturer Guarantee

Upon satisfactory completion of the work, provide twenty (20) year manufacturer guarantee to include both labor and material. Guarantee shall be for entire specified period from acceptance of work by Owner, and shall not depreciate over duration of guarantee period.

3.06 Safety Requirements

- A. Proper safety precautions shall be followed throughout the entire roofing operation OSHA and local regulations shall be strictly followed. Refer to the roofing product's Material Safety Data Sheets for specific safety information on handling and working with all materials. Dispose of all trash, debris and empty containers in accordance with local, state and federal regulations.
- B. Contractor or its employees shall not access specified roof area without permission of Owner due to possible discharge of potentially injurious chemical compounds from vents located on the roof. Contractor shall provide schedule for roof related work on the referenced area to ensure that exhaust of chemical compounds has been terminated prior to accessing the roof area.

3.07 Cleanup

Contractor shall cleanup all debris associated with roofing work including but not limited to nails, screws, masking materials, tape, overspray, and other debris to satisfaction of Building Owner or its designated representative.

END OF SECTION 07 54 10

DIVISION 7 – MOISTURE PROTECTION

SECTION 07 54 20

PVC THERMOPLASTIC MEMBRANE ROOFING

PART 1 - GENERAL CONDITIONS

1.01 DESCRIPTION

A. Work Included:

1. Furnish all labor and materials to completely remove existing roofing and related flashings, as indicated on the drawings and/or as specified herein.
2. Tear off, remove and haul away all existing roofing material, insulation, wall and base flashings, related sheet metal flashings, repairs, and mastics, as indicated on drawings, or as required to prepare the roof substrate for application of the new roof system.
3. Replace all damaged or defective plywood roof panels as directed by CUSD or its consultant representative. Refer to Section 06 10 00 for requirements.
4. Replace all damaged or defective plywood panels as directed by CUSD's representative or its consultant. The Base Bid shall include all labor and material to replace a total of up to twenty (20) defective plywood roof panels for the entire project. Contractor shall provide unit cost for replacement (per 4' x 8' panel) of additional panels as directed by CUSD representative or its Consultant. At completion of the project, the contractor shall credit CUSD for all labor and material for replacement panels in the event less than twenty (20) panels are replaced. Credit shall be based on Unit Cost per panel as included on Bid Form.
5. Over the properly prepared plywood roof deck surfaces, install layer of minimum 1/4", including crickets. Gypsum cover boards shall be secured to the roof deck using mechanical fasteners at minimum rate of twelve (12) fasteners for 4' x 8' insulation boards and six (6) fasteners per 4' x 4' insulation board. Contractor shall install additional mechanical fasteners as required by manufacturer. Minimum board size shall be 4' x 4'.
6. Install additional mechanical fasteners at perimeter and corner areas (as required by manufacturer) in accordance with required 90-mph wind warranty.
7. Contractor may install tapered insulation crickets using low-rise adhesive as allowed by primary roofing materials manufacturer.
8. Gypsum cover boards shall be secured to walls and/or curbs using mechanical fasteners and/or approved adhesive as indicated on drawings and as required by roofing materials manufacturer.
9. Install fully adhered minimum 80-mil reinforced PVC (ASTM D-4434) roof system with manufacturer warranty (20-year NDL-type), with reinforced PVC flashings at all perimeters, penetrations, and drain locations per project design documents, addendums, and manufacturer requirements.

10. The thermoplastic membrane shall be installed directly over the gypsum cover board. The roof system shall meet 90 mph wind uplift requirements and the primary roofing materials manufacturer shall provide a twenty (20) year NDL type (labor and material) manufacturer warranty as specified. The Contractor shall provide a three (3) year workmanship guarantee on the installation.
11. Roof system shall include all roof related sheet metal flashings as required to ensure a watertight installation of all plumbing, mechanical piping, electrical conduits, and other roof penetrations. All additional flashing and detail work shall be installed in accordance with these specifications and project drawings and will comply with Roofing Manufacturer's standard written and detail requirements. Should the roof system manufacturer require incorporation of roofing details not referenced on project drawings, Contractor shall submit manufacturer approved details for approval by CUSD and its Consultant.

- B. The Contractor shall be solely responsible for its methods in regard to demolition, shoring and bracing. This responsibility extends to the preparation of engineered designs and the ultimate performance of all shoring or bracing systems.

1.02 RELATED WORK DESCRIBED ELSEWHERE:

- A. Section 06 10 00 – Rough Carpentry
- B. Section 07 22 00 – Roof Deck Insulation & Gypsum Cover Board
- C. Section 07 60 00 – Sheet Metal
- D. Section 09 90 00 – Painting
- E. Section 15 40 60 – Roof Drainage System

1.03 QUALITY ASSURANCE

- A. The roofing system shall be applied only by an approved applicator of the proposed Roofing Manufacturer's material.
- B. The Roofing Manufacturer shall have a minimum of ten (10) years of experience manufacturing the specified roof membrane. The PVC membrane shall have also maintained a consistent formulation for a minimum of ten (10) years.
- C. Upon completion of the installation and the delivery to the Manufacturer by the Applicator of a certification that all work has been done in strict accordance with the contract specifications and Manufacturer's requirements, an inspection shall be made by a Technical Representative of the Manufacturer to review the installed roof system.
- D. There shall be no deviation made from the Project Specification or the approved shop drawings without prior written approval by the Clovis Unified School District, and the roofing materials Manufacturer.
- E. All work pertaining to the installation of the Manufacturer's membrane and flashings shall only be completed by Applicator personnel trained and authorized by the Manufacturer in those procedures.

1.04 SUBMITTALS

Following award of contract, the Contractor shall submit to Clovis Unified School District and its Consultant the following:

- A. Written approval by the insulation manufacturer (as applicable) for use and performance of the product in the proposed system.
- B. Letter from the proposed Roofing Manufacturer stating that it has a minimum of ten (10) years consistent experience in successfully manufacturing the proposed membrane. The letter shall also state that the proposed Manufacturer membrane has maintained a consistent formulation for a minimum of ten (10) years.
- C. Letter from the proposed roofing materials manufacturer stating its membrane system as specified meets Title 24 energy requirements.
- D. Certifications by manufacturers of roofing and insulating materials that all materials supplied comply with all requirements of the identified ASTM and industry standards or practices.
- E. Copy of the Manufacturer's Warranty, Applicator's Warranty, and Safety Data Sheets (SDS) for all roofing products to be installed as part of the roof system.
- F. Shop drawings shall include:
 - 1. Profile of details of flashing methods for conditions not detailed on the project drawings.
 - 2. All details submitted by Contractor for approval shall have been reviewed and approved by primary roofing materials manufacturer.

1.05 CODE REQUIREMENTS

- A. The applicator shall submit evidence that the proposed roof system meets the requirements of the local building code and has been tested and approved or listed by the following test organizations. These requirements are minimum standards. No roofing work shall commence without written documentation of the system's compliance, as required in the "Submittals" section of this specification.
 - 1. Factory Mutual Research Corporation (FM) - Norwood, MA
 - 2. Letter from roofing materials manufacturer stating that warranty does not exclude warranty coverage for winds below 60 mph.
 - 3. Underwriters Laboratories, Inc. - Northbrook, IL
 - 4. Class A rated assembly

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. All products delivered to the job site shall be in the original unopened containers or wrappings bearing all seals and approvals.
- B. Handle all materials to prevent damage. Place all materials on pallets and fully protect from moisture.
- C. Membrane rolls shall be stored lying down on pallets and fully protected from the weather with clean canvas tarpaulins. Unvented polyethylene tarpaulins are not accepted due to the

accumulation of moisture beneath the tarpaulin in certain weather conditions that may affect the ease of membrane weldability.

- D. All adhesives shall be stored at temperatures between 40° F (5° C) and 80° F (27° C) or in accordance with the requirements of the manufacturer.
- E. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions outlined on containers or supplied by material manufacturer/supplier.
- F. All materials determined by the Clovis Unified School District, its Representative, or the Roofing Materials Manufacturer to be wet or otherwise damaged are to be removed from the job site and replaced at no cost to the Clovis Unified School District.

1.07 JOB CONDITIONS

- A. The Manufacturer's materials may be installed under certain adverse weather conditions only within the tolerances approved by the Manufacturer.
- B. Only as much new roofing as can be made weather-tight each day, including flashing and detail work, shall be installed. All seams shall be cleaned and heat welded before leaving the job site that day. Temporary sealing of incomplete systems are to meet current industry standards.
- C. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The existing building and its contents shall be protected against project-related work. The Contractor shall be responsible for all interior damages.
- D. All surfaces to receive new insulation, membrane or flashings shall be dry. Should surface moisture be present or develop during the installation process, the Contractor shall provide the necessary equipment to dry the surface prior to application in accordance with manufacturer requirements and current industry standards.
- E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.
- F. Waterstops shall be installed at the end of each day's work and shall be completely removed before proceeding with the next day's work. Water-stops shall not emit dangerous or unsafe fumes and shall not remain in contact with the finished roof as the installation progresses. Contaminated roofing materials shall be replaced at no cost to Clovis Unified School District.
- G. The Contractor is cautioned that certain Manufacturer membranes may be incompatible with asphalt, coal tar, heavy oils, roofing cements, creosote and some preservative materials. Such materials shall not remain in contact with the Manufacturer's membranes. The Applicator shall consult the Manufacturer regarding compatibility, precautions and recommendations.
- H. Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the Applicator shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas. A substantial protection layer consisting of plywood over insulation board shall be provided for all new and existing roof areas that receive rooftop traffic during construction.
- I. Prior to and during application, all dirt, debris and dust shall be removed from surfaces either by vacuuming, sweeping, blowing with compressed air and/or similar methods. If removed roofing system contain asbestos, refer to enclosed Section 02075 for requirements.
- J. The Applicator shall follow all safety regulations as required by OSHA and any other applicable authority having jurisdiction.

- K. All roofing, insulation, flashings and metal work removed during construction shall be immediately taken off site to a legal dumping area authorized to receive such materials.
- L. All new roofing waste material (i.e., scrap roof membrane, empty cans of adhesive) shall be immediately removed from the site by the Applicator and properly transported to a legal dumping area authorized to receive such material.
- M. The Applicator shall take precautions that storage and/or application of materials and/or equipment does not overload the roof deck or building structure.
- N. Flammable adhesives and deck primers shall not be stored and not be used in the vicinity of open flames, sparks and excessive heat.
- O. All rooftop contamination that is anticipated or that occurs shall be reported to Clovis Unified School District to determine the corrective steps to be taken.
- P. Applicator shall immediately stop work if any unusual or concealed condition is discovered and shall immediately notify Clovis Unified School District of such conditions in writing for correction at the Owner's expense.
- Q. Site cleanup, including both interior and exterior building areas that have been affected by construction, shall be completed to the Clovis Unified School District's satisfaction.
- R. All landscaped areas, including but not limited to plants, trees, sprinkler elements, concrete or other planting materials damaged by construction activities shall be repaired at no cost to Clovis Unified School District to its satisfaction.
- S. The Applicator shall conduct tests to ensure adequate adhesion of insulation boards to substrate if required by insulation manufacturer and/or roofing materials manufacturer for purposes of compliance with warranty or roof system guarantee.
- T. Cautions shall be taken when using Manufacturer approved adhesives at or near rooftop vents or air intakes. Adhesive odors could enter the building. Coordinate the operation of vents and air intakes in such a manner as to avoid the intake of adhesive odor while ventilating the building. Keep lids on unused cans at all times. Vents shall be sealed or isolated during work performed in close proximity with use of solvent based adhesive.
- U. Protective wear, including respiratory protection shall be worn when using solvents or adhesives where required by manufacturer of OSHA regulations. Cartridges shall be for fumes and vapors.

1.08 WARRANTIES

- A. **20 Year System Warranty:** Upon successful completion of the work to the Manufacturer's satisfaction and receipt of final payment, the twenty (20) year labor and materials roof system warranty shall be issued.
- B. The Manufacturer's roof system warranty shall not exclude coverage for wind speeds of less 60 m.p.h.
- C. Provide three (3) year contractor workmanship guarantee.
- D. Clovis Unified School District shall notify both the Manufacturer and the roof system Applicator of any leaks as they occur during the time period when both warranties are in effect so that repairs can be made in a timely manner. Failure to notify the manufacturer and/or the contractor shall not invalidate any aspect of the warranties.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Approved manufacturers for the fully-adhered, PVC thermoplastic roof system include the following:

***Sika Sarnafil
Carlisle
Soprema***

- B. Consideration of equals shall be submitted for review and acceptance by Clovis Unified School District in accordance with Clovis Unified School District's written requirements for consideration of equals. The Contractor shall submit all requested documentation, including specifications, installation instructions, technical data, physical properties, limitations, samples of each product proposed for use in conjunction with proposed manufacturer's products.
- C. Bidders submitting for acceptance of an "equal" shall provide a form comparing all physical property data for proposed product with specification requirements.
- D. Consideration of "or equals" shall be in accordance with CUSD General & Supplemental Condition requirements.
- E. Bidders shall comply with the timelines and strict requirements of the CUSD General & Supplemental Condition requirements.

2.02 MEMBRANE SYSTEM OPTIONS

- A. A minimum 80-mil thermoplastic membrane with fiberglass and/or polyester mat reinforcement
- B. Membrane shall conform to ASTM D4434-96 (or latest revision), "Standard for Polyvinyl Chloride (PVC) Sheet Roofing". Classification: Type II, Grade I.
- C. Color of Membrane: White
- D. Approved Manufacturers & Products or the fully-adhered thermoplastic roof system includes the following for the 80 mil PVC membrane:

***Sika Sarnafil – G410
Carlisle – Sure Flex P
Soprema – G200***

Typical Physical Properties of PVC Membrane:

<u>Parameters</u>	<u>ASTM Test Method</u>	<u>Minimum ASTM Requirement</u>
Reinforcing Material – Polyester		-
Overall Thickness, min., inches (mm)	D751	0.080
Breaking Strength min. lbf/in.	D751	110 (489)
Elongation at Break, min	D751	250 & 220
Low Temperature Bend, -40°F (-40°C)	D2136	Pass
Weight Change After Immersion in Water, max.	D570	1.79%
Static Puncture Resistance, 33 lbf (15 kg)	D5602	Pass
Solar Reflectance	C1549	> 80%
Thermal Emittance	C1371	0.88
Solar Reflective Index (SRI)	E1980	>100
Dynamic Puncture Resistance, 14.7 ft-lbf (20 J)	D5636	Pass

2.03 FLASHING MATERIALS

A. Flashings

1. Sheet Metal Flashings

PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. 24 gauge, G-90 galvanized clad sheet metal with a 20 mil (1 mm) unsupported manufacturer approved membrane laminated on one side.

2. Non-Typical Sheet Metal Flashings

Project-specific perimeter edge detail reviewed and accepted for one-time use by the Manufacturer’s Technical Department. Consult Regional Technical Manager prior to job start for review and consideration for acceptance.

3. Miscellaneous Sheet Metal Flashings (Not adhered to by thermoplastic membrane)
 Min. 24-gauge, galvanized sheet metal and/or 4 lb. sheet lead flashings. See Section 07600 (Sheet Metal).

4. Flashings at roof penetrations: PVC-coated, heat-weldable sheet metal, and/or prefabricated flashing element as provided by roofing materials manufacturer which is compatible with thermoplastic membrane and existing flashing elements.

2.04 TAPERED INSULATION & TAPERED INSULATION CRICKETS

A. One or more layers of rigid polyisocyanurate roof insulation to provide slope to drain with minimum 1/4” and/ or 1/8” per foot of slope as specified at roof areas indicated on drawings. Refer to Section 07220 for additional information and requirements. Mechanical fasteners to be installed per these specifications with additional fasteners per manufacturer requirements.

B. Tapered insulation in field of roof and at crickets shall be secured to substrate using approved mechanical fasteners at specified rate. Mechanical fasteners to be installed per manufacturer requirements. Insulation product to be approved by manufacturer for use in their fully warranted roofing system.

C. Attachment using low-rise adhesive may be used as allowed by primary roofing materials manufacturer. Attachment to comply with specified wind warranty requirements.

- D. Mechanical fasteners and/or adhesive shall meet minimum wind uplift resistance (I-90) requirements as required by primary roofing materials manufacturer.

2.05 GYPSUM ROOF BOARD

- A. A 1/2" thickness, gypsum coverboard for installation over specified plywood deck areas for application of specified fully-adhered roof membrane system.
- B. Gypsum board shall be rated by UL "Class A" for fire resistance
- C. Board shall be pre-primed and be compatible with proposed adhesive
- D. Approved Product: "Dens Deck" by Georgia Pacific, "Securock" by U.S. Gypsum, or Approved Equal
- E. Product to be Pre-Primed by manufacturer for use with fully-adhered PVC membranes.

2.06 ATTACHMENT COMPONENTS – WALLS/CURBS

- A. Manufacturer approved fasteners with plates for attachment of gypsum cover boards to the substrate where indicated on drawings, or where indicated or as required by roofing materials manufacturer as follows:
 - 1. Approved Product: Corrosion resistant mechanical fasteners approved by primary roofing materials manufacturer for use in their fully guaranteed roof system.
 - 2. Mechanical fasteners shall be minimum #12 corrosion-resistant threaded screws with self-tapping tip. Plates shall be round or square and include a galvalume coating. Minimum plate diameter is 3".
 - 3. Fastener layout shall meet manufacturer requirements based on warranty requirements square feet of surface area. Applicator shall provide additional mechanical fasteners as required by primary roofing materials manufacturers based on their minimum requirements, and as required under their warranty.
 - 4. Additional fasteners shall be installed as required at corner and perimeter areas per the primary roofing materials manufacturer to meet the required I-90 wind uplift rating and the manufacturer warranty requirements.
 - 5. Contractor may secure gypsum cover boards to walls and/or curb surfaces using approved adhesive where allowed by primary roofing materials manufacturer.

Notes:

- 1. There is a significant increase in drying time due to an increase in humidity and/or a decrease in temperature. Do not install when outdoor or substrate temperatures during drying period are expected to fall below 40°F (5°C).
- 2. Do not allow adhesive to skin-over or surface-dry prior to installation of membrane.
- 3. Use a water-filled, foam-covered lawn roller to consistently and evenly press the membrane into the adhesive layer.

B. Manufacturer Approved Membrane Adhesive for Vertical Attachment of Flashings

APPLICATION RATES FOR FELT FLASHINGS*						
	Adhesive Rates - Gallons/100 Ft ² (<i>Liters/Meter²</i>)					Approximate Sq. Ft./Pail (<i>meter²</i>)
	Substrate (1 st coat)	Substrate (2 nd coat)	Membrane	Total		
Smooth plywood	1.00 (0.41)	+ 1.00 (0.41)	+ 0.50 (0.20)	= 2.50 (1.02)		167 (15.51)
Concrete wall	1.00 (0.41)	+ 1.00 (0.41)	+ 0.50 (0.20)	= 2.50 (1.02)		167 (15.51)
Masonry wall	1.00 (0.41)	+ 1.00 (0.41)	+ 0.50 (0.20)	= 2.50 (1.02)		167 (15.51)
Granular bitumen	1.00 (0.41)	+ 1.00 (0.41)	+ 0.50 (0.20)	= 2.50 (1.02)		167 (15.51)
Smooth aged bitumen	1.00 (0.41)	+ 1.00 (0.41)	+ 0.50 (0.20)	= 2.50 (1.02)		167 (15.51)

* Individual manufacturer application rates may vary

Notes:

- Due to an increase in viscosity when outdoor temperatures during installation are below 40° F (5° C), add ½ gal/100 ft² (0.2 l/m²) to rate for estimating purposes. Do not install when air temperature is within 5° F of dew point. Solvent evaporation time increases significantly when temperatures drop. Ensure first layer of adhesive shall fully dry before second layer is applied to the back of the membrane for proper reactivation.
- Use a water-filled, foam-covered lawn roller to consistently and evenly press the membrane into the adhesive layer.
- Manufacturer requirements will prevail in the event of discrepancy between the specified application rates and manufacturer requirements.
- Adhesive must be applied as a continuous layer.
- Use a water-filled, foam-covered lawn roller to consistently and evenly press insulation into adhesive layer.
- Storage temperatures in excess of 90° F (32° C) may affect shelf life.
- If exposed to temperatures below 40° F (5° C), restored to a minimum temperature of 60°F (15° C) before use.
- Job site conditions may affect performance. Adhesive shall not be used if surface and/or ambient temperatures below 40° F (5° C) are expected during application or subsequent curing time.
- In The addition of a Catalyst to Part B may be required when temperatures are between 40° F (5° C) and 80° F (27° C).
- Adhesive shall not be applied to wet or damp surfaces.

C. Manufacturer Approved Fastener

A heavy-duty, corrosion resistant fastener (with plate) used to attach wood elements to the structural plywood roof deck. The fastener shall have a shank diameter of approximately 0.21 inch (5.3 mm) and shall have a deformed shank or be an expansion type fastener appropriate for use in anchoring elements to plywood. Contractor shall submit examples of proposed fastener as part of material submittal for approval by Clovis Unified School District.

D. Manufacturer Approved Flat Pressure Bar for Walls and Curbs

An extruded aluminum, low profile bar used with manufacturer approved fasteners to attach to the walls/curbs at terminations, penetrations and at incline changes of the substrate. The pressure bar material shall be an FM approved, heavy-duty, 14 gauge, galvanized or stainless, roll-formed steel bar pre-punched with holes every 6-inches (152 mm) on center to allow various fastener spacing options. The pressure bar material shall be 1-inch (25 mm) wide, flat aluminum bar 1/8 inch (3 mm) thick. Where curbs and wall elements are of structural concrete, fasteners shall be appropriate for use in securing elements to structural concrete and shall be expansion or wedge type anchors. Alternate fastening systems by manufacturer will be acceptable as long as securement system is included as part of manufacturer system warranty.

E. Manufacturer Approved Formed Pressure Bar for Roof Decks

An extruded aluminum, low profile bar used with manufacturer approved fasteners to attach to the walls/curbs at terminations, penetrations and at incline changes of the substrate. The pressure bar material shall be an FM approved, heavy duty, 14 gauge, galvanized or stainless, roll-formed steel bar pre-punched with holes every 6-inches (152 mm) on center to allow various fastener spacing options. The pressure bar material shall be 1-inch (25 mm) wide, flat aluminum bar 1/8 inch (3 mm) thick.

2.07 SEALANTS

A. Manufacturer Approved Multi-Purpose Sealant (for flashing and termination details).

1. As approved by primary manufacturer in there fully warranted system.

B. Depending on substrates, the following sealants are options for temporary overnight tie-ins:

1. Method approved by manufacturer
2. Spray-applied, water-resistant urethane foam (2 lb. density min.)
3. Mechanical attachment with rigid bars and compressed sealant.

C. All temporary overnight tie-ins shall be completely removed to expose uncontaminated material for installation of new roof system. All used temporary materials shall be disposed and not reused.

2.08 MISCELLANEOUS FASTENERS AND ANCHORS

A. All fasteners, anchors, nails, straps, bars, etc. shall be post-galvanized steel, aluminum or stainless steel dependent upon the composition of the elements they are attached to or penetrating through. Mixing metal types and methods of contact shall be assembled in such a manner as to avoid galvanic corrosion. Fasteners for attachment of metal to masonry shall be expansion type fasteners with stainless steel pins. All concrete fasteners and anchors shall have a minimum embedment of 1¼ inch (32 mm) and shall be approved for such use by the fastener manufacturer. All miscellaneous wood fasteners and anchors used for flashings shall have a minimum embedment of 1 inch (25 mm) and shall be approved for such use by the fastener manufacturer.

2.09 RELATED MATERIALS

A. Wood Nailer

Treated wood nailers shall be installed at locations indicted on drawings, and around such other roof projections and penetrations as specified on Project Drawings or as required by the roofing

materials manufacturer. Existing nailers, if in good condition may be supplemented by adding new wood components. Thickness of nailers must match the insulation thickness to achieve a smooth transition. Wood nailers shall be treated for fire and rot resistance (wolmanized or osmose treated) and be #1 quality or better lumber. **Creosote or asphalt-treated wood is not acceptable.** Wood nailers shall conform to Factory Mutual Loss Prevention Data Sheet 1-49. All wood shall have a maximum moisture content of 19% by weight on a dry-weight basis.

B. Plywood

When bonding to plywood, a minimum ½ inch (12 mm) CDX (C side out), smooth-surfaced exterior grade plywood with exterior glue shall be used. Plywood shall have a maximum moisture content of 19% by weight on a dry weight basis.

C. Low-Rise Adhesive

Product to be approved by primary roofing materials manufacturer for use in their fully warranted roof system. Product shall be installed in a manner to comply with the specified wind warranty (I-90).

PART 3 – EXECUTION

3.01 PRE-CONSTRUCTION CONFERENCE

A. The Contractor, Owner and its Representative shall attend a pre-construction conference.

1. The meeting shall discuss all aspects of the project including but not limited to:

- a. Safety
- b. Set-up
- c. Construction schedule
- d. Contract conditions
- e. Coordination of the work
- f. Fall Protection requirements.

3.02 SUBSTRATE CONDITION

A. Applicator shall be responsible for acceptance or provision of proper substrate to receive new roofing materials.

B. Applicator shall verify that the work done under related sections meets the following conditions:

1. Roof curbs, nailers, equipment supports, vents and other roof penetrations are properly secured and prepared to receive new roofing materials.
2. All surfaces are smooth and free of dirt, debris and incompatible materials.
3. All roof surfaces shall be free of water, ice and snow.
4. The Owner shall ensure that all roof elements are secured to the roof deck system according to local building code and in such a manner as to resist all anticipated wind loads in that location. Rigid insulation shall be adhered to the roof deck using materials and methods which will resist wind uplift forces of up to 60 mph or greater as warranted by the primary roofing materials manufacturer.

3.03 SUBSTRATE PREPARATION

A. The roof deck and existing roof construction must be structurally sound to provide support for the new roof system. The applicator shall load materials on the rooftop in such a manner to eliminate risk of deck overload due to concentrated weight.

B. General Criteria

All existing roofing, base flashing, deteriorated wood blocking or deteriorated metal flashings shall be removed where indicated or required to remove the existing roofing system and to install the new roof membrane, insulation and flashing systems. Remove only that amount of roofing and flashing which can be made watertight with new materials during a one-day period or before the onset of inclement weather.

3.04 SUBSTRATE INSPECTION

A. A dry, clean and smooth substrate shall be prepared to receive fully-adhered roof system.

B. The Contractor shall inspect the substrate for defects such as excessive surface roughness, contamination, structural inadequacy, or any other condition that will adversely affect the quality of work.

C. The substrate shall be clean, smooth, dry, free of flaws, sharp edges, loose and foreign material, oil and grease. Roofing shall not start until all defects have been corrected.

D. All roof surfaces shall be free of water, ice and snow.

3.05 GYPSUM COVER BOARD APPLICATION

A. General Criteria: Approved Gypsum Cover Boards Adhered to Existing Roof Substrate with approved mechanical fasteners and plates.

1. Cover boards shall be neatly cut to fit around penetrations and projections.

2. Cover boards shall cover all exposed insulation boards, including crickets.

3. Do not install more cover boards than can be covered with new roof membrane by the end of the day or the onset of inclement weather.

4. Cover boards shall be installed with all joints offset by two (2)' in all directions.

5. Gypsum cover boards shall be secured to existing roof surface in accordance with these specifications and manufacturer requirements, with additional fasteners per manufacturer requirements. The gypsum cover boards shall be applied in such a manner as to allow the insulation boards to rest evenly on the roof substrate so that there are no significant and avoidable air spaces between the boards and the substrate.

6. Contractor shall install gypsum cover boards as required by membrane manufacturer to meet wind uplift and warranty requirements as required due to localized variations in deck surface.

7. Gypsum cover boards shall be attached to vertical walls and curbs using approved mechanical fasteners or adhesive approved for use by manufacturer of gypsum cover boards and roofing materials manufacturer.

3.06 INSTALLATION OF THERMOPLASTIC MEMBRANE

The surface of the gypsum cover boards shall be inspected prior to installation of the fully adhered thermoplastic membrane. The substrate shall be clean, dry, free from debris and smooth with no surface roughness or contamination. Broken, delaminated, wet or damaged insulation and gypsum cover boards shall be removed and replaced at no cost to the Owner.

A. Manufacturer Approved Adhesive for Field of Roof

1. Over the properly installed and prepared substrate, membrane adhesive shall be poured out of the pail and spread using notched ¼" inch x 1/4 inch x 1/4 inch (6 mm x 6 mm x 6 mm) rubber squeegees. The adhesive shall be applied at a rate according to manufacturer's requirements. No adhesive is applied to the back of the membrane. **Do not allow adhesive to skin-over or surface-dry prior to installation of membrane.**
2. The roof membrane is unrolled immediately into the wet adhesive. Adjacent rolls overlap previous rolls by 3 inches (75 mm). This process is repeated throughout the roof area. Immediately after application into adhesive, each roll shall be pressed firmly into place with a water-filled, foam-covered lawn roller by frequent rolling in two directions. **Do not allow adhesive to skin-over or surface-dry prior to installation of membrane.**
3. Manufacturer approved adhesive shall not be used if temperatures below 40° F (5° C) are expected during application or subsequent drying time.
4. No adhesive shall be applied in seam areas. All membrane shall be applied in the same manner.
5. All membrane seams shall be heat-welded in accordance with Section 3.08.

B. Manufacturer Approved Adhesive for Flashing

1. Over the properly installed and prepared substrate surface, the manufacturer approved adhesive shall be applied using solvent-resistant ¾ inch (19 mm) nap paint rollers. The adhesive shall be applied to the substrate at a rate according to the manufacturer's requirements. The adhesive shall be applied in smooth, even coating with no gaps, globs, puddles or similar inconsistencies. Only an area which can be completely covered in the same day's operations shall be coated with adhesive. The first layer of adhesive shall be allowed to dry completely prior to installing the membrane. **Do not allow the second application of adhesive to dry prior to application.**
2. When the adhesive on the substrate is dry, the roof membrane is unrolled. Adjacent sheets shall be overlapped 3 inches (75 mm). Once in place, one-half of the sheet's length shall be turned back and the underside shall be coated with manufacturer approved adhesive at a rate of ½ gallon per 100 ft² (0.2 liters/m²). When the membrane adhesive has dried slightly to produce strings when touched with a dry finger, the coated membrane shall be rolled onto the previously-coated substrate being careful to avoid wrinkles. **Do not allow adhesive on the underside of the membrane to dry completely.** The amount of membrane that can be coated with adhesive before rolling into substrate will be determined by ambient temperature, humidity and crew. The bonded sheet shall be pressed firmly in place with a water-filled, foam-covered lawn roller by frequent rolling in two directions. The remaining un-bonded half of the sheet shall be folded back and the procedure repeated.

3. The Contractor shall count the amount of pails of adhesive used per area per day to verify conformance to the specified adhesive rate.
4. No adhesive shall be applied in seam areas. All membrane shall be applied in the same manner.

3.07 HOT- AIR WELDING OF SEAM OVERLAPS

A. General

1. All seams shall be hot-air welded. Seam overlaps should be 3 inches (75 mm) wide when automatic machine-welding and 4 inches (100 mm) wide when hand-welding, except for certain details. If manufacturer specifications are different, manufacturer requirements will prevail.
2. Welding equipment shall be provided by or approved by the manufacturer. All mechanics intending to use the equipment shall have successfully completed a training course provided by the Manufacturer's Technical Representative prior to welding.
3. All membrane to be welded shall be clean and dry.

B. Hand-Welding

1. Hand-welded seams shall be completed in two stages. Hot-air welding equipment shall be allowed to warm up for at least one minute prior to welding.
2. The back edge of the seam shall be welded with a narrow but continuous weld to prevent loss of hot air during the final welding.
3. The nozzle shall be inserted into the seam at a 45-degree angle to the edge of the membrane. Once the proper welding temperature has been reached and the membrane begins to "flow," the hand roller is positioned perpendicular to the nozzle and pressed lightly. For straight seams, the 40 mm wide nozzle is recommended for use. For corners and compound connections, the 20 mm wide nozzle shall be used.
4. Exercise care when heat welding to avoid melting the felt on the back of the membrane.

C. Machine Welding

1. Machine welded seams are achieved by the use of manufacturer approved automatic welding equipment. When using this equipment, the manufacturer's instructions shall be followed and local codes for electric supply, grounding and over current protection observed. Dedicated circuit house power or a dedicated portable generator is recommended. No other equipment shall be operated off the generator.
2. Metal tracks may be used over the deck membrane and under the machine welder to minimize or eliminate wrinkles.

D. Quality Control of Welded Seams

1. The Contractor shall check all welded seams for continuity using a rounded screwdriver. Visible evidence that welding is proceeding correctly is smoke during the welding operation, shiny membrane surfaces, and an uninterrupted flow of dark grey material from the underside of the top membrane. Thorough evaluation of welded seams shall be made daily by the Contractor prior to leaving the site. Any loose, unsealed or defective seams shall be repaired the same day. One inch (25 mm) wide cross-section samples of welded seams may be taken at least three times a day at the discretion of the Owner. Correct welds display failure from shearing of the membrane

prior to separation of the weld. Each test cut shall be patched by the Contractor at no extra cost to Owner.

3.08 MEMBRANE FLASHINGS

- A. All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of Owner or its Representative and the Manufacturer. Approval shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing, the affected area shall be removed and replaced at the Applicator's expense. Flashing shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces. Use caution to ensure adhesive fumes are not drawn into the building.
- B. Manufacturer Approved Adhesive for Membrane Flashings
 - 1. Over the properly installed and prepared flashing substrate, manufacturer approved adhesive shall be applied according to instructions found on the Product Data Sheet. The manufacturer approved adhesive shall be applied in smooth, even coats with no gaps, globs or similar inconsistencies. Only an area which can be completely covered in the same day's operations shall be flashed. The bonded sheet shall be pressed firmly in place with a hand roller.
 - 2. No adhesive shall be applied in seam areas that are to be welded. All panels of membrane shall be applied in the same manner, overlapping the edges of the panels as required by welding techniques.
- C. Install new pressure bar according to the project drawings or details included in the specification with approved fasteners into the structural deck at the base of parapets, walls and curbs. New pressure bar is required at the base of all tapered edge strips and at transitions, peaks, and valleys in compliance with the project details.
- D. The Manufacturer's requirements and recommendations, in addition to these specifications shall be followed explicitly. All material submittals shall have been accepted by Owner and its Representative and the Manufacturer prior to proceeding with any work related to the project.
- E. All flashings shall extend a minimum of 6 inches (0.2 m) above roofing level unless otherwise accepted in writing by Owner or its Representative and the Roofing Material Manufacturer's Technical Department.
- F. All flashing membranes shall be consistently adhered to substrates. All interior and exterior corners and miters shall be cut and hot-air welded into place. No bitumen shall be in contact with the new roof membrane.
- G. All flashing membranes shall be mechanically fastened along the counter-flashed top edge with new pressure bar at 6-8 inches (0.15-0.20 m) on center.
- H. The Manufacturer approved flashings shall be terminated according to the Manufacturer's recommended details.
- I. All flashings that exceed 30-inches (0.75 m) in height shall receive additional securement. The Manufacturer's Technical Department shall provide securement methods.
- J. Any details necessary and/or required to properly install the roof system which are not included on the drawings shall be provided by the Contractor as part of the submittal and shall be approved in writing by the roofing materials manufacturer.

3.09 METAL FLASHINGS

- A. Metal details, fabrication practices and installation methods shall conform to the applicable requirements of the following:
 - 1. Factory Mutual Loss Prevention Data Sheet 1-49 (latest issue).
 - 2. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - latest issue.
- B. Complete all metal work in conjunction with roofing and flashings so that a watertight condition exists daily.
- C. Metal shall be installed to provide adequate resistance to bending to allow for normal thermal expansion and contraction.
- D. All metal lap joints shall be a minimum of four (4) inches. Set laps in manufacturer approved sealant. Metal joints shall be watertight. The bottom drip edge shall be ½” hemmed. All bottom edges shall be interlocked at the lap joints.
- E. Metal flashings shall be securely fastened into solid wood blocking. Fasteners shall penetrate the wood nailer a minimum of 1 inch (25 mm).
- F. Airtight and continuous metal hook strips are required behind metal fascias. Hook strips are to be fastened 12 inches (0.3 m) on center into the wood nailer or masonry wall.
- G. Counter flashings shall overlap base flashings at least 4 inches (100 mm).
- H. Hook strips shall extend past wood nailers over wall surfaces by 1½ inch (38 mm) minimum and shall be securely sealed from air entry.

3.10 METALCLAD BASE FLASHINGS/EDGE METAL

- A. All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of Owner or its Representative and Manufacturer. Acceptance shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing due to incomplete flashings, the affected area shall be removed and replaced at the Contractor's expense.
- B. Manufacturer approved metal flashings shall be formed and installed per the project drawings or details included at the end of this section.
- C. All metal flashings shall be fastened into solid nailers with two rows of post galvanized flat head annular ring nails, 4 inches (100 mm) on center staggered. Fasteners shall penetrate the nailer a minimum of 1 inch (25 mm).
- D. Metal shall be installed to provide adequate resistance to bending and allow for normal thermal expansion and contraction.
- E. Adjacent sheets of approved manufacturer's sheet metal clad flashing material shall be spaced ¼ inch (6 mm) apart. The joint shall be covered with 2 inch (50 mm) wide aluminum tape. A 4 inch minimum (100 mm) wide strip of manufacturer approved flashing membrane shall be hot-air welded over the joint.
- F. All clad metal flashings shall be provided by the roof membrane manufacturer or approved for use with their fully guaranteed roof system.

3.11 TEMPORARY CUT-OFF

- A. All flashings shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the work progresses. All temporary waterstops shall be constructed to provide a 100% watertight seal. The stagger of the insulation joints shall be made even by installing partial panels of insulation. The new membrane shall be carried into the waterstop. The waterstop shall be sealed to the deck and/or substrate so that water will not be allowed to travel under the new or existing roofing. When work resumes, the contaminated membrane shall be cut out. All sealant, contaminated membrane, insulation fillers, etc. shall be removed from the work area and properly disposed of off -site. None of these materials shall be used in the new work.
- B. 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.
- C. If any water is allowed to enter under the newly-completed roofing, the affected area shall be removed and replaced at the Contractor's expense.

3.12 COMPLETION

Prior to demobilization from the site, the work shall be reviewed by Owner or its Representative and the Contractor. All defects noted and non-compliances with these specifications shall be completed or repaired to satisfaction of CUSD and the manufacturer. All items deemed to be incomplete or unsatisfactory shall be noted in a written punchlist prepared by CUSD's roofing consultant representative. These items must be corrected immediately by the Contractor to the satisfaction of Owner and its Representative and the Manufacturer's Representative prior to demobilization.

All Warranties referenced in this Specification shall have been submitted and have been accepted at time of contract award.

END OF SECTION 07 54 20

DIVISION 7 - MOISTURE PROTECTION

SECTION 07 60 00

SHEET METAL WORK

PART 1 - GENERAL

1.01 SCOPE:

- A. The work required under this section consists of all shop and field fabricated sheet metal flashings and related items necessary and required to complete the work as indicated in the Contract Documents.
- B. The Contractor shall provide all items, articles, materials, operations or methods listed, mentioned or schedules on the drawings and/or specified herein, including all labor, materials, equipment, and incidentals necessary and required for this completion.
- C. The Contractor shall comply with the requirements of OSHA's Hazard Communications Standard including hazardous materials and employee training.

1.02 WORK INCLUDED:

- A. Without restricting the volume or generality of the above "Scope", the work to be performed under this section shall include, but is not limited to, the following:
 - 1. Install new sheet metal flashings and clad sheet metal flashings as noted on the project drawings and as required to properly install the specified thermoplastic roofing system and related elements.
 - 2. Replace or modify existing sheet metal flashings where indicated on project drawings or as required based on membrane manufacturer's requirements.
 - 3. Sheet metal flashings which are to be reused shall be carefully removed and temporarily stored for reinstallation. Reused flashings to be reinstalled in watertight condition.
 - 4. Install new PVC-clad metal flashings as indicated on project drawings. Secure to substrate using approved corrosion-resistant nails.
 - 5. Disassemble and reassemble existing roof drains as required to remove existing roofing and to install new single-ply roofing system. Caulk to provide long-term, watertight condition. Replace all existing drain bolts and washers with new, stainless-steel elements. Replace drain strainers if damaged.
 - 6. Removal of existing sheet metal coping and reinstallation following installation of new roofing systems in accordance with details on drawings.
 - 7. Removal of existing expansion joints and installation of new expansion joints in accordance with details on drawings. Paint to match existing.
 - 8. Refer to project drawings for miscellaneous sheet metal work not specifically addressed herein.

1.03 RELATED WORK:

- A. Section 02 05 00 Demolition

- B. Section 06 10 00 Rough Carpentry
- C. Section 07 54 20 PVC Thermoplastic Roofing

1.04 REFERENCES:

- A. American Society for Testing and Materials (ASTM) Standards.
- B. Sheet Metal and Air Conditioning Contractors National Association (SMACNA) Architectural Sheet Metal Manual.

1.05 QUALITY ASSURANCE:

- A. Installer: All work of this section must be performed by a licensed sheet metal contractor with five years of successful experience with installation of sheet metal flashing and trim similar in type and scope to project requirements.
- B. Quality Standard: Fabricate and install sheet metal work in accordance with Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA) "Architectural Sheet Metal Manual", unless specifically indicated otherwise.
- C. All sheet metal work shall be per SMACNA recommendations.

PART 2 - PRODUCTS

2.01 GALVANIZED SHEET STEEL:

- A. Galvanized Steel Sheet: ASTM A 526, commercial quality, G-90 hot dip galvanized. Minimum thickness: 24 gage (0.0239 inch), unless otherwise shown on the drawings or specified herein. Galvanized steel sheets shall be acid etched to receive paint finish.
- B. Steel Pipe: Steel drainpipe shall be per ASTM 760
- C. Cast Iron Pipe: Cast iron drainpipe shall be per ASTM A888-13a
- D. Cast Iron Fittings: Fittings shall be per ASTM A74-13a
- E. Factory painted metal for use in new flashings and coatings to be include Kynar® finish.

2.02 FASTENERS:

- A. Nails: Shall be hot-dipped, galvanized. All nails shall be approved type and selected for their intended use.
- B. Screws: Minimum No. 8 size screw with watertight neoprene washers under screw head where exposed shall be used for the fastening of sheet metal into wood nailers. Self-tapping, #3 sheet metal screws of ½" length shall be used for the fastening of sheet metal to sheet metal. All screws shall be of corrosion resistant metal of same material as the material being fastened. All exposed fasteners shall have 5/8" steel/neoprene washers under head.
- C. Concrete & Masonry Anchors: Hilti Hit Anchors, Rawl Zamac Nailin Hit anchors, 1-1/2" length, 1/4" diameter or approved equal shall be used for securing sheet metal to masonry or concrete surfaces.

2.03 ACCESSORY MATERIALS:

- A. Sealant: Elastomeric sealant shall be a low modulus, high performance, one part polyurethane type conforming to Federal Specifications No. TT-S-00230C, Type II, Class A, such as Sonolastic NP-1 by Sonneborn Building Products, Sikaflex-15LM or approved equal.
- B. Solder: ASTM B 32-89, 50/50 tin-lead, rosin flux shall conform to Federal Specification O-F-506C, Type I, Form A or B.
- C. Lead Flashing: Shall be hard type, complying with Federal Specification No. QQ-L-201; weighing four pounds per square foot for roof drain flashing sheets.
- D. Copper Flashing: Shall be soft type, complying with ASTM B-370, 16 oz. for use in flashing pipe and conduit penetrations.
- E. Bituminous Coating: Heavy bodied bituminous mastic, sulfur-free, compounded for 15 mil (0.38 mm) dry film thickness per coat; inert-type non-corrosive compound, nominally free of sulfur components and other deleterious impurities.
- F. Pipe Supports: Portable Pipe Hangers or approved equal. Install support best suited to roof conditions. Contractor to submit proposed support for approval.
- G. Stainless Steel: Replacement drain bolts and washers.
- H. Flexible Expansion Joint Covers: "Roof Joint" by *Sika Emseal* or approved equal.
- I. Pipe Supports: 20" "Base Strut" by *Miro Industries* or approved equal.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Examine substrates and conditions under which products of this section are to be installed and verify that work may properly commence. Do not proceed with the work until unsatisfactory conditions have been fully resolved.
- B. Verify that nailers, blocking, and other attachment provisions for sheet metal work are properly located and securely fastened to resist effects of wind and thermal stresses.

3.02 PREPARATION:

- A. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- B. Verify that surfaces to receive sheet metal are smooth, clean of all foreign matter, and have no water present in any form.

3.03 INSTALLATION:

- A. Sheet metal work shall be executed in a first-class, workmanlike manner in accordance with standard shop practices. Comply with sheet metal manufacturer's installation methods and recommendations in the SMACNA "Architectural Sheet Metal Manual".
- B. The sheet metal work shall be accurately formed to dimensions and shapes detailed or required. Broken shapes shall finish with true, straight, sharp lines, and angles; and where intersecting, shall be coped to a precise fit and be securely soldered and scraped smooth. Lock seam work shall be made flat and true to line, sweated full of solder.

- C. All sheet work shall be so formed and installed as to provide suitable allowance for expansion and contraction without causing undue stresses in any part of the completed work and shall finish water and weather tight throughout. Provide movement joints at maximum spacing of ten feet. No joints within 2 feet of corner or intersection.
- D. Mechanically fasten all joints, splices and transitions, which are not designed for expansion. Fasten metal by solid riveting or forming double lock seams. Seal by continuous soldering.
- E. Galvanic Action Protection: Isolate different metal types from each other to prevent galvanic action.
- F. Use elastomeric sealant where necessary to make a watertight installation.
- G. Form a ½ - inch hem on the underside of all exposed edges.
- H. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, non-corrosive metal recommended by sheet metal manufacturer.
- I. The gage thickness shall be as recommended by SMACNA for application but in no case less than gage of metal being secured.

3.04 INSPECTION:

Before completing the work, the Owner or its Representative shall carefully examine, and if necessary, test all sheet metal work and equipment specified herein, and the Contractor shall make all repairs to the work if damaged, leaving it in a condition satisfactory to the Owner.

3.05 CLEAN UP:

All debris and/or rubbish resulting from the operations of this trade shall be cleaned up and removed from the site as the work progresses. The prime contractor shall be ultimately responsible for removal of refuse by all subcontractors working under their direction.

END OF SECTION 07 60 00

DIVISION 9 - FINISHES

SECTION 09 90 00

PAINTING

PART 1 - GENERAL

1.01 SCOPE:

Provide all labor and materials required to complete all painting and finishing work required by the Contract Documents.

1.02 WORK INCLUDED:

Without restricting the volume or generality of the above "Scope", the work to be performed under this section shall include, but is not limited to the following:

- A. Work shall include:
 - 1. Painting of miscellaneous penetration flashings, and sheet metal elements which are part of the new roof assembly and which are visible from ground level. Contractor shall submit color samples for approval by Owner.
 - 2. Contractor may use pre-painted metal it complies with specification and where approved. Factory metal used for gutter or flashings shall have Kynar® finish.
- B. The work required under this section consists of all roofing related items necessary and required to complete the work as indicated in the Contract Documents.
- C. The Contractor shall comply with the requirements of OSHA's Hazard Communications Standard including hazardous materials and employee training.
- D. The Contractor shall provide all items, articles, materials, operations, or methods listed, mentioned or scheduled on the drawings and/or specified herein, including all labor, materials, equipment, and incidentals necessary and required for their completion.
- E. All painted finishes to match existing building finish.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

- A. Division 1 General Requirements
- B. Section 06 10 00 Rough Carpentry
- C. Section 07 54 20 PVC Thermoplastic Roofing System
- D. Section 07 60 00 Sheet Metal Work

1.04 QUALITY ASSURANCE:

- A. Comply with all state and local regulations governing the use of paint materials. All paint primers and finishes will comply with California Air Resource Board and Environmental Protection Agency regulations.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials to job site in unopened containers bearing manufacturer's name and product description.
- B. Store materials in a dry, clean, well-ventilated area. Close containers.

PART 2 - PRODUCTS

2.01 PAINT MATERIALS:

- A. Acceptable Manufacturers:
 - **Sinclair Paint Company (ICI Paint Stores)**
 - **Dunn-Edwards Paint Corporation**
 - **Sherwin-Williams Co.**
 - **(Or Approved Equal)**

2.02 EXTERIOR PAINT SYSTEMS:

Provide following paint systems for various substrate as indicated:

- A. Zinc Coated Metal & Lead Flashings:

Pretreatment - (ICI Sinclair Vinyl Wash Primer, Dunn-Edwards Galva-Etch GE 123, Sherwin Williams B50W3).

1st coat - Primer Coat. (ICI Devoe Devguard #4120, Dunn-Edwards W 711, Sherwin Williams B42N8).

2nd coat - Water base acrylic, semi-gloss enamel finish coat (ICI Sinclair #2406 Decrashield Semigloss Finish, Dunn-Edwards W901, Sherwin Williams A84)

3rd coat - Water base acrylic, semi-gloss enamel finish coat (ICI Sinclair #2406 Decrashield Semigloss Finish, Dunn-Edwards W901, Sherwin Williams A84)

Where specified products are not available, Contractor may submit approved equal

- B. Factory Painted Metal:

All factory painted metal used for fabrication of new coping and/or flashings shall have Kynar® finish.

- C. Wood:

1st Coat - Exterior Wood Primer (ICI Sinclair Ultra-Hide Durus #2110, Dunn- Edwards W 42-1, Sherwin Williams Y24W20).

2nd Coat - Water base acrylic, semi-gloss enamel finish coat (ICI Sinclair #2406 Decrashield Semigloss Finish, Dunn-Edwards W901, Sherwin Williams A84)

3rd Coat - Water base acrylic, semi-gloss enamel finish coat (ICI Sinclair #2406 Decrashield Semigloss Finish, Dunn-Edwards W901, Sherwin Williams A84)

Where specified products are not available, Contractor may submit approved equal

2.03 SUBMITTALS/SUBSTITUTIONS:

Contractor shall provide product information (manufacturer, type, product number, etc.) and material safety data sheets for review and approval.

PART 3 - EXECUTION:

3.01 CONDITION OF SURFACES:

Examine surfaces scheduled to receive paint and finishes for conditions that will adversely affect execution, permanence and quality of work. Do not apply paint or finish until conditions are satisfactory.

3.02 PREPARATION:

- A. Prepare surfaces in a skillful manner to produce finish work of first class appearance and durability.
- B. Clean surfaces free of dust, dirt, oil, grease and other foreign matter prior to the application of the prime coat.
- C. Repair all voids, nicks, cracks, dents, etc., with suitable patching material and finish flush to adjacent surface.

3.03 APPLICATION:

- A. Apply material evenly, free from sags, runs, crawls, holidays or defects.
- B. Apply paint by brush, roller or spray.
- C. Employ coats and undercoats for all types of finishes in strict accordance with the recommendations of the paint manufacturer.
- D. Allow each coat to dry before succeeding coat application.

3.04 REINSTALLATION OF REMOVED ITEMS:

Following completion of painting each space, promptly reinstall all items removed for painting, using only workmen skilled in the particular trade.

3.05 CLEANING:

Remove all surplus materials and debris from site at completion of each days work. Remove all paint spatter from all finish and ground surfaces.

END OF SECTION 09 90 00

DIVISION 15 - MECHANICAL

SECTION 15 40 60

ROOF DRAINAGE SYSTEMS

PART 1 - GENERAL

1.01 SCOPE:

- A. The work required under this section consists of all plumbing and roofing related items necessary to complete the work as indicated in the Contract Documents.
- B. The Contractor shall comply with the requirements of OSHA's Hazard Communications Standard including hazardous materials and employee training.
- C. The Contractor shall provide all items, articles, materials, operations, methods listed, mentioned or scheduled on the drawings and/or specified herein, including all labor, materials, equipment, and incidentals necessary and required for their completion.

1.02 WORK INCLUDED:

- A. Install new gutter and downspout at locations indicated on drawings. Paint to match building finish.
- B. Disassemble existing roof drains. Reinstall drains following installation of new roofing system. Replace drain bolts and washers with new stainless-steel elements. Replace drain strainers if damaged or missing.
- C. Complete all miscellaneous drainage related work indicated on drawings or required to install fully-functioning roof drainage systems.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

- A. Division 1
- B. Section 02 05 00 Demolition
- C. Section 07 54 20 PVC Thermoplastic Roofing System
- D. Section 07 60 00 Sheet Metal Work

1.04 CODE RULES AND SAFETY ORDERS:

Provide all work and materials in full accordance with the latest rules and regulations of the State Fire Marshal, safety orders of the Division of Industrial Safety and the Uniform Plumbing Code as published by the Western Plumbing Officials Association and other applicable laws or regulations.

1.05 PROJECT CONDITIONS:

Contractor shall examine and familiarize himself with all site conditions, plans and specifications. Report any discrepancies to Owner's Representative prior to bid for clarification. No allowance shall be made to Contractor for failure to comply with this requirement.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Galvanized Steel Sheet: ASTM A 526, commercial quality, G-90 hot dip galvanized. Minimum thickness: 24 gage (0.0239 inch), unless otherwise shown on the drawings or specified herein. Galvanized steel sheets shall be acid etched to receive paint finish.

2.02 FASTENERS:

- A. Nails: Shall be hot-dipped, galvanized. All nails shall be approved type and selected for their intended use.
- B. Screws: Minimum No. 8 size screw with watertight neoprene washers under screw head where exposed shall be used for the fastening of sheet metal into wood nailers. Self-tapping, #3 sheet metal screws of ½" length shall be used for the fastening of sheet metal to sheet metal. All screws shall be of corrosion resistant metal of same material as the material being fastened. All exposed fasteners shall have 5/8" steel/neoprene washers under head.
- C. Concrete & Masonry Anchors: Hilti Hit Anchors, Rawl Zamac Nailin Hit anchors, 1-1/2" length, 1/4" diameter or approved equal shall be used for securing sheet metal to masonry or concrete surfaces.
- D. Miscellaneous:
 - 1. Sheet Lead Flashings: 4 lb. per square foot lead, 20"x20" (if required)
 - 2. Vent Flashings: 4 lb. per square foot lead..
- E. Fixtures and Equipment: Refer to drawings for models, sizes and capacities. Provide fixtures and equipment shown or approved substitute.
- F. Escutcheons: Install wherever pipe penetrates wall, floor or ceiling. Chrome plated brass. Crane 13-BC with set screw or approved equal.
- G. Pipe Hangers, support rods, anchors: Install in accordance with California Code of Regulations (CCR), Part 2, Title 24. Assemblies will be of standard manufacturer rated for service used. Hangers rods shall have galvanized finish.
- H. Leader Pipe: Schedule 40 steel pipe.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Flash all penetrations of pipe through roof and outside walls using approved method to prevent water or moisture from entering structure.
- B. Penetrations Through Fire Rated Walls & Ceilings: Pipes passing through fire rated surfaces shall have the space around the pipe sealed with fire rated materials in accordance with all code requirements.
- C. The Contractor shall do all cutting, fitting or patching of existing construction and his work as may be required to install roof drainage equipment to match existing materials. Any cost caused by defective or ill-timed work shall be borne by the party responsible therefore.

END OF SECTION 15 40 60

Appendix A

Laboratory Results for Asbestos & Chain of Custody (PLM Analysis)



EMSL Analytical, Inc.

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Tel/Fax: (602) 276-4344 / (602) 276-4053

<http://www.EMSL.com> / phoenixlab@emsl.com

EMSL Order: 122300351
Customer ID: BROK78
Customer PO:
Project ID:

Attention: Lab Reports Provost & Pritchard Consulting Group 455 West Fir Avenue Clovis, CA 93611	Phone: (559) 298-9135 Fax: (559) 298-2281 Received Date: 01/17/2023 10:30 AM Analysis Date: 01/18/2023 - 01/19/2023 Collected Date: 01/13/2023
Project: Cole Elementary School / 615 W. Stuart, Clovis	

**Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E
Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy**

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
1-1-Coating <small>122300351-0001</small>	MPR Bldg Built-Up Roof W/ Coating	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
1-1-Shingle <small>122300351-0001A</small>	MPR Bldg Built-Up Roof W/ Coating	Gray/Black Fibrous Heterogeneous	20% Glass	80% Non-fibrous (Other)	None Detected
1-1-Felt 1 <small>122300351-0001B</small>	MPR Bldg Built-Up Roof W/ Coating	Black Fibrous Homogeneous	3% Synthetic 30% Glass	67% Non-fibrous (Other)	None Detected
1-1-Felt 2 <small>122300351-0001C</small>	MPR Bldg Built-Up Roof W/ Coating	Black Fibrous Homogeneous	80% Cellulose	20% Non-fibrous (Other)	None Detected
1-1-Insulation <small>122300351-0001D</small>	MPR Bldg Built-Up Roof W/ Coating	Brown Fibrous Homogeneous	99% Cellulose	1% Non-fibrous (Other)	None Detected
2-1-Shingle <small>122300351-0002</small>	MPR Bldg Asphalt Shingle W/ Felt	Various Fibrous Heterogeneous	20% Glass	80% Non-fibrous (Other)	None Detected
2-1-Felt <small>122300351-0002A</small>	MPR Bldg Asphalt Shingle W/ Felt	Black Fibrous Homogeneous	80% Cellulose	20% Non-fibrous (Other)	None Detected
3-1-Roofing 1 <small>122300351-0003</small>	MPR Bldg Gravel Built-Up Roof	Black Fibrous Heterogeneous	5% Synthetic 20% Glass	75% Non-fibrous (Other)	None Detected
3-1-Tar <small>122300351-0003A</small>	MPR Bldg Gravel Built-Up Roof	Black Non-Fibrous Homogeneous	3% Cellulose	97% Non-fibrous (Other)	None Detected
3-1-Roofing 2 <small>122300351-0003B</small>	MPR Bldg Gravel Built-Up Roof	Black Fibrous Heterogeneous	20% Glass	80% Non-fibrous (Other)	None Detected
3-1-Insulation <small>122300351-0003C</small>	MPR Bldg Gravel Built-Up Roof	Brown Fibrous Homogeneous	99% Cellulose	1% Non-fibrous (Other)	None Detected
4-1-Shingle <small>122300351-0004</small>	Corridor Roof Gravel Built-Up Roof	Brown/Black Fibrous Heterogeneous	3% Cellulose 20% Glass	77% Non-fibrous (Other)	None Detected
4-1-Tar <small>122300351-0004A</small>	Corridor Roof Gravel Built-Up Roof	Black Non-Fibrous Homogeneous	5% Cellulose	95% Non-fibrous (Other)	None Detected
4-1-Felt <small>122300351-0004B</small>	Corridor Roof Gravel Built-Up Roof	Black Fibrous Homogeneous	80% Cellulose	20% Non-fibrous (Other)	None Detected
4-1-Insulation <small>122300351-0004C</small>	Corridor Roof Gravel Built-Up Roof	Brown Fibrous Homogeneous	99% Cellulose	1% Non-fibrous (Other)	None Detected
5-1-Shingle <small>122300351-0005</small>	Classroom Areas Asphalt Shingle W/ Felt	Various Fibrous Heterogeneous	20% Glass	80% Non-fibrous (Other)	None Detected

Initial report from: 01/19/2023 11:44:40



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EMSL Order: 122300351
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Project ID:

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
5-1-Felt <i>122300351-0005A</i>	Classroom Areas Asphalt Shingle W/ Felt	Black Fibrous Homogeneous	80% Cellulose	20% Non-fibrous (Other)	None Detected
6-1-Shingle <i>122300351-0006</i>	Library Bldg BU Gravel - Built-Up - Bult-Up Roof	Black Fibrous Heterogeneous	15% Glass	85% Non-fibrous (Other)	None Detected
6-1-Felt 1 <i>122300351-0006A</i>	Library Bldg BU Gravel - Built-Up - Bult-Up Roof	Black Fibrous Homogeneous	30% Glass	70% Non-fibrous (Other)	None Detected
6-1-Felt 2 <i>122300351-0006B</i>	Library Bldg BU Gravel - Built-Up - Bult-Up Roof	Black Fibrous Homogeneous	80% Cellulose	20% Non-fibrous (Other)	None Detected
6-1-Insulation <i>122300351-0006C</i>	Library Bldg BU Gravel - Built-Up - Bult-Up Roof	Brown Fibrous Homogeneous	99% Cellulose	1% Non-fibrous (Other)	None Detected

Analyst(s)

Erica Furphy (14)

Nathan Stancik (7)

Michelle Wilson, Laboratory Manager
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Phoenix, AZ NVLAP Lab Code 200811-0, AZ0937, CO AL-19027, CA 2761, TX 300484, HI L-14-004, LA 05113

Initial report from: 01/19/2023 11:44:40

#122300351

PAGE 1 OF 1

CHAIN OF CUSTODY RECORD

TURN-AROUND TIME

DATE 1/13/2023 TESTING LAB: EMS2

3 Hrs 6 Hrs 24 Hrs 48 Hrs

BILL TO:

PROJECT INFORMATION

EMAIL RESULTS TO: Lab@ppeng.com



T. BROOKS & ASSOCIATES

A Division of
PROVOST & PRITCHARD CONSULTING GROUP

PROJECT NAME: COLE ELEMENTARY SCHOOL
 ADDRESS: 615 W. STUART, CLONING
 PROJECT #
 CONTACT: TROY B. TIM T. TREVOR B. GREG F.
 MOBIL # (559) 287-8357 284-5573 301-2568 360-3694

T E M A H E R A
 T E M N I O S H
 L E A D W I P E
 L E A D A I R
 L E A D P A I N T

SAMPLE #	SAMPLE DESCRIPTION	TIME ON TIME OFF	TOTAL TIME	START	STOP	VOLUME	P C M	P L M	T E M A H E R A	T E M N I O S H	L E A D W I P E	L E A D A I R	L E A D P A I N T
1-1	MAT LOC.: MPR BLOB WALL CLG. FL. MAT DESC.: Built-up ROOF w/ coating							X					
2-1	MAT LOC.: MPR BLOB WALL CLG. FL. MAT DESC.: Asphalt Shingle w/ felt							X					
3-1	MAT LOC.: mpr BLOB WALL CLG. FL. MAT DESC.: GRAVEL Built-up ROOF							X					
4-1	MAT LOC.: CORRIDOR ROOF WALL CLG. FL. MAT DESC.: GRAVEL Built-up ROOF							X					
5-1	MAT LOC.: CLASSROOM AREAS WALL CLG. FL. MAT DESC.: Asphalt Shingle w/ felt							X					
6-1	MAT LOC.: LIBRARY BLOB WALL CLG. FL. MAT DESC.: 80 GRAVEL - Built-up ROOF							X					
	MAT LOC.: WALL CLG. FL. MAT DESC.												
	MAT LOC.: WALL CLG. FL. MAT DESC.												
	MAT LOC.: WALL CLG. FL. MAT DESC.												
	MAT LOC.: WALL CLG. FL. MAT DESC.												

TRANSACTIONS		TRANSACTIONS		SHIPPING PAID BY:	
(RELINQUISHED BY SIGNATURE)	DATE: 1-16-23	(RECEIVED BY SIGNATURE)	DATE: 1-17-23	LAB <input checked="" type="checkbox"/>	CLIENT _____
(RELINQUISHED BY SIGNATURE)	DATE:	(RECEIVED BY SIGNATURE)	DATE:	BROOKS _____	

(3) et - 796515194774

OrderID: 122300351