

PROJECT MANUAL
For

RSD – Roof Replacement at Encinita ES, Janson ES and Muscatel MS

Rosemead, CA

Prepared by



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For
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SECTION 01000

ABBREVIATIONS, SYMBOLS AND ACRONYMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. List of abbreviations, symbols, and acronyms of societies, institutes, and associations generally appearing in the Contract Documents.

1.02.1 RELATED SECTIONS

- A. Division 01: General Requirements

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.01 ABBREVIATIONS

ac	Alternating current
amp	ampere
BTU	British thermal unit
cfh	Cubic feet per hour
cfm	Cubic feet per minute
cm	Centimeter
Co.	Company
COP	Coefficient of performance
Corp.	Corporation
d	Penny
db.	Decibel
DB	Dry bulb
dc	Direct current
EER	Energy efficiency ratio
F	Degrees Fahrenheit
fpm	Feet per minute
ft	Foot or feet
gph	Gallons per hour
gpm	Gallons per minute
HP	Horsepower
HVAC	Heating, ventilating and air conditioning
Hz	Hertz
Inc.	Incorporated
KHz	Kilohertz
Kip	thousand pounds
Ksf	Thousand pounds per square foot
Ksi	Thousand pounds per square inch
Kv	Kilovolt

KVA	Kilovolt amperes
KW	Kilowatt
KWH	Kilowatt hour
LF	Linear foot
lb	Pound
LED	Light emitting diode
MBH	1000 BTUs per hour
MHz	Mega hertz
mil	Thousandth of an inch
mm	Millimeter
mph	Miles per hour
oz.	Ounce
PCF	Pounds per cubic foot
pH	Acidity-alkalinity balance
psf	Pounds per square foot
psi	Pounds per square inch
psig	Pounds per square inch, gage
RF	Radio frequency
rpm	Revolutions per minute
SF	Square foot
SY	Square yard
V	Volt
WB	Wet bulb

3.02 SYMBOLS

#	Number or pound
'	Foot or feet
"	Inch(es)
%	Percent

3.03 ACRONYMS

AA	The Aluminum Association, Inc
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists
ABMA	American Boiler Manufacturers Association
ACI	American Concrete Institute
ADA	Americans with Disabilities Act
ADAAG	Americans with Disabilities Act Accessibility Guidelines
AGA	American Gas Association
AGCIH	American Conference of Governmental Industrial Hygienists
AI	Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction

AMCA	Air Movement and Control Association, Inc.
ANSI	American National Standards Institute
APA	APA – The Engineered Wood Association
ARI	Air-Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATBCB	Architectural & Transportation Barriers Compliance Board
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Institute of America
CAL/OSHA	California Occupational Safety and Health Administration
CBC	California Building Code
CCR	California Code of Regulations
CEC	California Electrical Code
CFR	Code of Federal Regulations
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturers Institute
CMC	California Mechanical Code
CQC	California Quality Control (CMA Standards)
CPC	California Plumbing Code
CRA	California Redwood Association
CRI	Carpet and Rug Institute
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standards, U.S. Department of Commerce
CSFM	California State Fire Marshal
CSI	Construction Specifications Institute
CTIOA	Ceramic Tile Institute of America
CTI	Cooling Tower Institute
DHI	Door and Hardware Institute
DSA	Division of the State Architect
EPA	Environmental Protection Agency
ETL	ETL Testing Laboratories
FCC	Federal Communication Commission
FM	Factory Mutual
FS	Federal Specifications
GA	Gypsum Association
GANA	Glass Association of North America

HMMA	Hollow Metal Manufacturer's Association
HPVA	Hardwood Plywood & Veneer Association
IACS	International Annealed Copper Standards
IAMPO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical & Electronic Engineers, Inc.
IES	Illuminating Engineering Society
IMI	International Masonry Institute
IRI	Industrial Risk Insurers
ISO	International Organization for Standardization
MLSFA	Metal Lath/Steel Framing Association
MSS	Manufacturers Standardization Society of the Valve & Fittings Industry.
NAAMM	National Association of Architectural Metal Manufacturers
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association
NEBB	National Environmental Balancing Bureau
NEMA	National Electrical Manufacturers Association
NEC	National Electrical Code
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NOFMA	National Oak Flooring Manufacturers Association
NPCA	National Paint and Coatings Association
NPDES	National Pollutant Discharge Elimination System
NRCA	National Roofing Contractors Association
NSF	National Sanitation Foundation
NTMA	National Terrazzo & Mosaic Association
NUSIG	National Uniform Seismic Installation Guidelines
NWMA	National Woodwork Manufacturers Association
PCA	Portland Cement Association
PCI	Precast/Prestressed Concrete Institute
PDI	Plumbing and Drainage Institute
PEI	Porcelain Enamel Institute
PS	Product Standard, U.S. Department of Commerce
RIS	Redwood Inspection Service
RFCI	Resilient Floor Covering Institute
SCAQMD	South Coast Air Quality Management District
SDEI	Steel Deck Institute
SDI	Steel Door Institute

SFM	State Fire Marshal
SFPA	Southern Forest Products Association
SIGMA	Sealed Insulating Glass Manufacturers Association
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Steel Structures Painting Council
SWI	Steel Window Institute
TCA	Tile Council of America
UBPPA	Uni-Bell PVC Pipe Association
UCI	Uniform Construction Index
UFAS	Uniform Federal Accessibility Standards
UL	Underwriters' Laboratories, Inc.
WCLIB	West Coast Lumber Inspection Bureau
WDMA	Window and Door Manufacturers Association
WIC	Woodwork Institute of California
WWPA	Western Wood Products Association

END OF SECTION

SECTION 01050
SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Procedure for submission of a certified Schedule of Values for review and approval by the OAR.

1.02 RELATED SECTIONS

- A. Section 01080: Application for Payment
- B. Section 01300: Submittals
- C. Section 01365: Construction Schedule

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.01 PREPARATION

- A. Upon receipt of the Notice of Intent to Award, CONTRACTOR shall commence preparation of a certified Schedule of Values.
- B. CONTRACTOR shall coordinate the preparation of a certified Schedule of Values with preparation of the Construction Schedule as set forth in Section 01365.
- C. CONTRACTOR shall follow the table of contents as a Project specific guide to establish the format for a certified Schedule of Values. Provide at least one (1) line item for each Division and/or Specification Section item. Provide separate line items for labor and material when required by the OAR.
- D. Include the following Project school(s) identification on each certified Schedule of Values:
 - 1. Project name and location
 - 2. Project Number
 - 3. ARCHITECT name
 - 4. CONTRACTOR name
 - 5. Date of Submittal
- E. Round amounts to the nearest whole dollar; the total shall equal the Contract Amount.
- F. An approved certified Schedule of Values shall serve as the basis for the monthly certified Application for Payment.

ROOF REPLACEMENT AT ENCINITA ES, JANSON ES, AND MUSCATEL MS

ROSEMEAD SCHOOL DISTRICT

SCHEDULE OF VALUES
01050-1

3.02 90 DAY INTERIM SCHEDULE OF VALUES

- A. CONTRACTOR may prepare and submit, in accordance with sub-section 3.03, a 90 day interim Schedule of Values denoting Work to be completed during the first 90 days following the date established in the Notice to Proceed.
- B. CONTRACTOR shall coordinate the preparation of the 90 day interim Schedule of Values with preparation of the Construction Schedule as set forth in Section 01360.
- C. The 90 day interim Schedule of Values is subject to the same terms and conditions as set forth in sub-section 3.03.
- D. The 90 day interim Schedule of Values shall be incorporated into a final Schedule of Values.
- E. The OAR has the right to require subsequent revisions to an approved 90 day interim and/or a final Schedule of Values.

3.03 SUBMITTAL

- A. Within ten (10) days after the date established in the Notice to Proceed, CONTRACTOR shall submit five (5) certified copies of an interim and/or final Schedule of Values for review and approval by the OAR.
- B. OAR will review and if necessary, return the submitted Schedule of Values with summary comments noting items not in compliance with the requirements of the Contract Documents. CONTRACTOR shall revise the submitted Schedule of Values and return five (5) copies within three (3) days of receipt of summary comments.
- C. Signature by OAR shall constitute acceptance of the submitted Schedule of Values.
- D. A copy of the approved Schedule of Values will be transmitted to CONTRACTOR, IOR, and ARCHITECT.
- E. CONTRACTOR shall obtain OAR approval of a 90 day interim Schedule of Values prior to submittal of the first certified Application for Payment.
- F. CONTRACTOR shall obtain OAR approval of the final Schedule of Values prior to submittal of the fourth certified Application for Payment.

END OF SECTION

SECTION 01080

APPLICATION FOR PAYMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. This Section specifies administrative and procedural requirements relative to a certified Application for Payment.
 - 1. Coordinate the certified Schedule of Values and certified Application for Payment with, but not limited to, the Construction Schedule, submittal log, and list of Subcontractors.

1.02 RELATED SECTIONS:

- 1. Section 01050: Schedule of Values
- 2. Section 01365: Construction Schedule
- 3. Section 01700: Contract Closeout

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.01 APPLICATION FOR PAYMENT

- A. Each certified Application for Payment shall be consistent with previous applications and payments as reviewed by ARCHITECT and/or OAR, paid for by OWNER, and:
 - 1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
- B. Payment Application Times: The period of Work covered by each Application for Payment is the payment date for each progress payment as specified in the General Conditions. The period covered by each Application for Payment is the previous month.
- C. Payment Application Forms: Use OWNER provided forms for the Application for Payment.

- D. Application Preparation: Complete every entry on the form. Include execution by a person authorized to sign legal documents on behalf of CONTRACTOR. ARCHITECT will return incomplete applications without action.
- E. Transmittal: Submit a minimum of four (4) signed and original copies of each certified Application for Payment to the ARCHITECT. All copies shall be complete, including releases and similar attachments.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to ARCHITECT.
- F. Initial Application for Payment: Administrative actions and submittals, that must precede or coincide with submittal for the first certified Application for Payment include, but are not limited to, the following:
1. Certified Schedule of Values
 2. Performance and payment bonds. List of principal suppliers and fabricators.
 3. Worker Compensation certificates, if applicable.
 4. Auto Insurance, if applicable.
 5. Hazardous Material Insurance Certificates, if applicable.
 6. Construction Schedule
 7. Submittal Schedule
 8. Emergency Contact List
 9. Copies of authorizations and licenses from governing authorities for performance of the Work
- G. Application for Payment at Substantial Completion: Following OAR issuance of the certificate of Substantial Completion, submit an Application for Payment:
1. Administrative actions, submittals and/or Work that shall precede or coincide with this application include:
 - a. Occupancy permits and similar approvals by authorities having legal jurisdiction over the Work.
 - b. Removal of temporary facilities and services.
 - c. Testing, adjusting and balance records.
 - d. Removal of surplus materials, rubbish, and similar elements.
 - e. Meter readings.
 - f. Start-up performance reports.
 - g. OWNER training and orientations.
 - h. Change over information related to OWNER occupancy, use, operation, and maintenance.
 - i. Final cleaning.

- j. Ensure that incomplete Work is not accepted and will be completed without undue delay.
 - k. Advice on shifting insurance coverage.
 - l. List of defective Work, recognized as exceptions to certificate of Substantial Completion.
 - m. Change of door locks to OWNER system.
- H. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include, but are not limited to, the following:
- 1. Completion of Contract Closeout requirements.
 - 2. Project record documents.
 - 3. Completion of final punch list items.
 - 4. Delivery of extra materials, products and or stock.
 - 5. Identification of unsettled claims.
 - 6. Proof that taxes, fees, and similar obligations are paid.
 - 7. Operating and maintenance instruction manuals.
 - 8. Consent of surety to final payment.
 - 9. Waivers and releases.
 - 10. Warranties, guarantees and maintenance agreements.

END OF SECTION

SECTION 01100

COORDINATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. This Section specifies administrative and procedural requirements necessary for coordinating Work operations including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.

PART 2 – PRODUCTS (NONE)

PART 3 - EXECUTION

3.01 COORDINATION

- A. CONTRACTOR shall coordinate operations included in various sections of the Contract Documents to assure efficient and orderly installation of each part of the Work. Coordinate Work operations included under related sections of the Contract Documents that depend on each other for proper installation, connection, and operation of the Work, including but not limited to:
 - 1. Schedule construction operations in the sequence required where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
 - 3. Provide provisions to accommodate items scheduled for later installation.
 - 4. Prepare and administer provisions for coordination drawings.
- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required in notices, reports, attendance at meetings, and:
 - 1. Prepare similar memoranda for OAR and Separate Work Contract where coordination of their Work is required.

- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of schedules.
 - 2. Installation, relocation, and removal of temporary facilities.
 - 3. Delivery and processing of submittals.
 - 4. Progress meetings.
 - 5. Project closeout activities.
- D. Conservation: Coordinate Work operations to assure operations are carried out with consideration given to conservation of energy, water, materials, and:
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into the Work.

3.02 SUBMITTALS

- A. Coordination Drawings: CONTRACTOR shall prepare coordination drawings for coordination of installation of roofing and sheet metal products. Prepare coordination drawings for those areas where limited space availability necessitates maximum utilization of space for efficient installation of different components.
 - 1. All coordination meetings will be held in the Project field office of CONTRACTOR. CONTRACTOR is required to distribute Shop Drawings, cut sheets and submittals to Subcontractors where appropriate. Reviewed coordination drawings will be maintained in the Project field office of CONTRACTOR.

END OF SECTION

SECTION 01120

CUTTING AND PATCHING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section specifies administrative and procedural requirements for cutting and patching.

1.02 RELATED SECTIONS

- A. Section 01050: Schedule of Values
- B. Section 01100: Coordination
- C. Section 01300: Submittals
- D. Section 01740: Warranties

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.01 SUBMITTALS

- A. The word “cutting” as used in the Contract Documents includes, but is not limited to, cutting, drilling, chopping, and other similar operations and the word “patching” includes, but is not limited to, patching, rebuilding, reinforcing, repairing, refurbishing, restoring, replacing, or other similar operations.
- B. Cutting and Patching Proposal: CONTRACTOR shall submit a proposal describing procedures well in advance of the time cutting and patching will be performed if the Contract Documents requires approval of these procedures before proceeding. Include the following information, as applicable, in the proposal:
 - 1. Describe the extent of cutting and patching required. Denote how it will be performed and indicate why it cannot be avoided.
 - 2. Describe anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in the building’s appearance or other significant visual elements.
 - 3. List products to be used and firms or entities that will perform this Work.

4. Indicate dates when cutting and patching will be performed.
5. Utilities: List utilities that cutting and patching operations will disturb or affect. List utilities to be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
6. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the original structure.
7. Review by ARCHITECT and DSA prior to proceeding with cutting and patching does not waive ARCHITECT right to later require complete removal and replacement of defective Work.

3.02 QUALITY ASSURANCE

- A. Requirements for structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.
 1. Obtain approval from ARCHITECT of the cutting and patching proposal before cutting and patching the following structural elements:
 - a. Timber and primary wood framing
 - b. Miscellaneous structural metals
 - c. Equipment supports
 - d. Piping, ductwork, vessels, and equipment
- B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.
 1. Obtain review of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
 - a. Primary operational systems and equipment
 - b. Water, moisture, or vapor barriers
 - c. Membranes and flashings
 - d. Fire protection systems
 - e. Noise and vibration control elements and systems
 - f. Control systems
 - g. Communication and/or data systems
 - h. Electrical wiring systems

- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the opinion of ARCHITECT, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.

1. If possible, retain the original installer or fabricator to cut and patch the exposed Work listed below. If it is impossible to engage the original installer or fabricator, engage another recognized experienced and specialized firm.

- a. Firestopping
- b. Masonry (exterior and interior where exposed)

3.03 WARRANTY

- A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

3.04 INSPECTION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.

1. Before proceeding, meet at the Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.05 PREPARATION

- A. Temporary support: Provide adequate temporary support of existing improvements or Work to be cut.
- B. Protection: Protect existing improvements and Work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of existing improvements or Work that might be exposed during cutting and patching operations.
- C. Avoid interference with operation of adjoining areas or interruption of free passage to adjoining areas.
- D. Where the Work requires sandblasting of existing surfaces in order to receive new materials secured by cementitious, adhesive or chemical bond, completely remove

existing finishes, stains, oil, grease, bitumen, mastic and adhesives or other substances deleterious to the new bonding and/or fastening of new Work. Utilize wet sand blasting for interior surfaces and for exterior surfaces where necessary to prevent objectionable production of dust.

3.06 PERFORMANCE

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay. Carefully remove existing Work to be salvaged and/or reinstalled. Protect and store for reuse into the Work. Verify compatibility and suitability of existing substrates before starting the Work.
- B. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining Work. Where possible, review proposed procedures with the original installer; comply with the original installer's recommendations.
 - 1. In general, where cutting, provide hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Cut through concrete and masonry using a cutting machine, such as a carborundum saw or a diamond-core drill. Saw cut reinforcing bars and paint ends with bituminous paint except where bonded into new concrete or masonry.
 - 4. Comply with requirements of applicable Division 2 Sections where cutting and patching requires excavating, backfill, or re-compaction.
 - 5. Woodwork: Cut and or remove to a panel or joint line.
 - 6. Sheet Metal: Remove back to joint, lap, or connection. Secure loose or unfastened ends or edges and seal watertight.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with required tolerances.
 - 1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation. Verify conditions of existing substrates prior to executing Work.

2. Restore exposed finishes of patched areas and extend finish restoration into retaining adjoining construction in a manner that will eliminate all evidence of patching and refinishing.
3. Sheet Metal: Replace removed and/or damaged sheet metal items as required for new Work.
4. Lath and Plaster: Install new lath materials to match existing and fasten to supports at 6" centers. Provide a 6" lap where new lath to adjoins existing lath. Fasten new lath as required for new Work. Restore paper backings as required. Apply a bonding agent on cut edges of existing plaster. Apply three coat plaster of the type, thickness, finish, texture, and color to match existing.
5. Painting: Prepare areas to be patched, patch and paint as specified under related sections of the Contract Documents.

3.07 CLEANING

- A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged coverings to their original condition.

END OF SECTION

SECTION 01160

REQUEST FOR CLARIFICATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Procedure for requesting clarification of the intent of the Contract Documents.

1.02 RELATED SECTIONS

- A. Section 01005: Summary of the Work
- B. Section 01100: Coordination
- C. Section 01365: Construction Schedule
- D. Section 01700: Contract Closeout

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.01 PROCEDURE

- A. ARCHITECT response is a clarification of the intent of the Contract Documents and does not authorize changes in the Contract Amount, Milestones and/or Contract Time.
- B. A Request for Clarification may be returned with a stamp or notation "Not Reviewed," if:
 - 1. The requested clarification is ambiguous or unclear;
 - 2. The requested clarification is equally available to the requesting party by researching and/or examining the Contract Documents;
 - 3. CONTRACTOR has not reviewed the Request for Clarification prior to submittal.
- C. Allow a minimum of nine (8) days for review and response time, after receipt by ARCHITECT and OAR. CONTRACTOR shall verify and is responsible in verifying ARCHITECT and OAR receipt of a Request for Clarification.
- D. Changes or alterations to the approved drawings or specifications shall be made by means of addenda or change orders as per section 4-338 of the California Building Standards Administrative Code.

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section specifies administrative and procedural requirements for Project meetings, including but not limited to, the following:
 - 1. Job start meeting.
 - 2. Pre-installation conferences.
 - 3. Progress meetings.
 - 4. Meetings as required by the OAR.

1.02 RELATED SECTIONS

- A. Section 01010: Phasing of the Work
- B. Section 01100: Coordination
- C. Section 01300: Submittals
- D. Section 01365: Construction Schedule

PART 2 – PRODUCTS

PART 3 - EXECUTION

3.01 JOB START MEETING

- A. In accordance with General Condition Article 2.6, OAR will schedule a job start meeting before starting the Work, at a time and date determined by OAR. Meeting shall be held at the Project site or another location as determined by OAR. Meeting will be held in order to review responsibilities, procedures, and other administrative requirements contained within the Contract Documents.
- B. Authorized representatives of OWNER, IOR, ARCHITECT, CONTRACTOR and other parties shall attend the meeting. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work.
- C. Agenda items shall include significant items which could affect progress of the Work, including, but not limited to the following:
 - 1. Preliminary Construction Schedule
 - 2. Critical work sequencing

3. Designation of responsible personnel
4. Identification of OAR
5. Procedures for processing field decisions
6. Request for Proposal
7. Construction Directive and Change Order
8. Procedures for processing Applications for Payment
9. Prevailing wages
10. Submittal of Shop Drawings, Product Data, material lists, and Samples
11. Preparation of project record documents
12. Use of the Project site and/or premises
13. Parking availability
14. Office, work, and storage areas
15. Equipment deliveries and priorities
16. Safety procedures
17. First Aid
18. Security
19. Housekeeping
20. Working hours
21. Insurance Services including OCIP
22. Environmental Health & Safety

- D. OAR shall prepare and issue meeting minutes to attendees and interested parties no later than five (5) calendar days after the meeting date.

3.02 PRE-INSTALLATION CONFERENCES

- A. CONTRACTOR shall coordinate and conduct pre-installation conferences at the Project site as required by related Sections of the Contract Documents.
- B. CONTRACTOR, manufacturers, and fabricators involved in or affected by the installation and its coordination or integration with other pre-ceding and/or subsequent installations of Work shall attend the meeting. CONTRACTOR shall advise OAR, IOR, and ARCHITECT of scheduled meeting dates in order to secure their attendance.
 1. CONTRACTOR shall review the progress of construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for the following:
 - a. Contract Documents
 - b. Options
 - c. Related Construction Directives and Change Orders
 - d. Purchases
 - e. Deliveries
 - f. Shop Drawings, Product Data, and quality-control samples
 - g. Review of mockups

- h. Possible conflicts
- i. Compatibility problems
- j. Time schedules
- k. Weather limitations
- l. Manufacturer's recommendations
- m. Warranty requirements
- n. Compatibility of materials
- o. Acceptability of substrates
- p. Temporary facilities
- q. Space and access limitations
- r. Governing regulations
- s. Safety
- t. Inspecting and testing requirements
- u. Required performance results
- v. Recording requirements
- w. Protection

- 2. CONTRACTOR shall record significant discussions and directives received from each conference. CONTRACTOR shall, within three (3) calendar days after the meeting date, distribute the minutes of the meeting to all concerned parties, including but not limited to, OAR, IOR, and ARCHITECT.

3.03 PROGRESS MEETINGS

- A. Progress meetings will be held at the Project site at regular intervals, typically weekly, as determined by the OAR.
- B. In addition to representatives of CONTRACTOR, OWNER, and ARCHITECT, each Subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of the Work shall, if requested by OAR, be represented at these meetings. All participants at the conference shall be familiar with the Project and authorized to conclude all matters relating to the Work.
- C. Failure of the CONTRACTOR to be so represented at any progress meeting which is held at a mutually agreed time or for which a written notice is given, shall not relieve CONTRACTOR from abiding by any and all OAR or ARCHITECT determinations or directives issued at such meeting.
- D. OAR will review and correct or approve minutes of the previous progress meeting and will review other significant items affecting progress. Topics for discussion as appropriate to the status of the Project include but are not limited to:
 - 1. Interface requirements
 - 2. Construction Schedule

3. Sequence and coordination
4. Status of submittals / RFC's
5. Deliveries
6. Off-site fabrication
7. Access
8. Site utilization
9. Temporary Construction Facilities and Controls
10. Hours of work
11. Hazards and risks
12. Housekeeping
13. Quality and workmanship
14. Unforeseen conditions
15. Testing and Inspection
16. Defective Work
17. Construction Directive
18. Request for Proposal
19. Change Order Proposals and Change Orders
20. Documentation of information for payment requests
21. Application for Payment
22. Other items as required or as brought forth.

E. No later than three (3) calendar days after each progress meeting, OAR will prepare and distribute minutes of the meeting to each present and absent party. Include a brief summary, in narrative form, of progress, decisions, directives, actions taken, and all other issues since the previous meeting and report.

1. Schedule Updating: If required, CONTRACTOR shall revise the Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the next scheduled progress meeting.

3.04 ADDITIONAL MEETINGS

A. OAR, upon giving notice to the intended parties and without further obligation, may require additional meetings to discuss Work and/or Project related activities.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Administrative and procedural requirements for submittals required for the Work, including but not limited to; Shop Drawings, Product Data, Samples, material lists, and quality control items as required by the Contract Documents.
- B. Wherever possible, throughout the Contract Documents, the minimum acceptable quality of workmanship and products has been defined by the name and catalog number of a manufacturer and by reference of recognized industry standards.
- C. To ensure that specified products are furnished and installed in accordance with the design intent, procedures have been established for submittal of design data and for its review by ARCHITECT, OAR and/or others.

1.02 RELATED SECTIONS

- A. Section 01100: Coordination
- B. Section 01120: Cutting and Patching
- C. Section 01365: Construction Schedule
- D. Section 01640: Substitutions
- E. Section 01700: Contract Closeout
- F. Section 01740: Warranties

PART 2 – PRODUCTS

PART 3 - EXECUTION

3.01 PROCEDURES

- A. CONTRACTOR shall package each submittal appropriately for transmittal and handling. CONTRACTOR shall transmit each submittal to ARCHITECT with concurrent copy of the transmittal to the OAR. ARCHITECT and/or OAR will not accept submittals received from sources other than from CONTRACTOR.
- B. After ARCHITECT review, ARCHITECT will transmit submittals to OAR and OAR shall further distribute to CONTRACTOR, IOR and/or others as required. Work shall not commence, unless otherwise approved by OAR, until approved submittals are transmitted to CONTRACTOR.

- C. CONTRACTOR shall clearly identify any deviations from the Contract Documents on each submittal. Any deviation not so noted even though stamped reviewed is not acceptable.
- D. CONTRACTOR shall coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities requiring sequential activity.
- E. Timing of Submittals:
 - 1. In accordance with General Conditions, CONTRACTOR shall submit to ARCHITECT, with copy of transmittal to the OAR, those Shop Drawings, Product Data, diagrams, materials lists, Samples and other submittals required by the Contract Documents.
 - 2. The schedule of submittals shall provide adequate time between submittals in order to allow for proper review without negative impact to the Construction Schedule.
 - 3. Schedule of submittals shall be related to Work progress, and shall be so organized as to allow sufficient time for transmitting, reviewing, corrections, resubmission, and re-reviewing.
 - 4. CONTRACTOR shall coordinate submittal of related items and ARCHITECT reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received by ARCHITECT.
 - 5. CONTRACTOR shall revise, update and submit submittal schedule to ARCHITECT and OAR on the first of each month, or as required by OAR.
 - 6. CONTRACTOR shall allow in the Construction Schedule, at least sixteen (16) days for ARCHITECT review following ARCHITECT receipt of submittal. For mechanical, plumbing, electrical, and other submittals requiring joint review with OAR, CONTRACTOR shall allow a minimum of eighteen (18) days following ARCHITECT receipt of submittal.
 - 7. No adjustments to the Contract Time and/or Milestones will be authorized because of a failure to transmit submittals to ARCHITECT sufficiently in advance of the Work to permit review and processing.
 - 8. In case of product substitution, Shop Drawing preparation shall not commence until such time ARCHITECT and OAR reviews said submittal relative to the General Conditions.

- G. If required, resubmit submittals in a timely manner. Resubmit as specified for initial submittal but identify as such. Review times for re-submitted items shall be as per the time frames for initial submittal review.
- H. Shop Drawing preparation shall not commence until such time as CONTRACTOR receives Product Data approval.
- I. ARCHITECT, or authorized agent, will stamp each submittal with a uniform, action stamp. ARCHITECT, or authorized agent, will mark the stamp appropriately to indicate the action taken, as follows:
 - 1. Final Unrestricted Release: When ARCHITECT, or authorized agent, marks a submittal “ Reviewed, “ the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
 - 2. Final-But-Restricted Release: When ARCHITECT, or authorized agent, marks a submittal “ Reviewed as Noted,“ the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.
 - 3. Returned for Re-submittal: When ARCHITECT, or authorized agent, marks a submittal “ Rejected, Revise and Resubmit,” do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat as necessary to obtain different action mark. In case of multiple submittals covering same items of Work, CONTRACTOR is responsible for any time delays, schedule disruptions, out of sequence Work, or additional costs due to multiple submissions of the same submittal item. Do not use, or allow others to use, submittals marked “Rejected, Revise and Resubmit” at the Project site or elsewhere where Work is in progress.
 - 4. Other Action: Where a submittal is for information or record purposes or special processing or other activity, the ARCHITECT, or authorized agent, will return the submittal marked “Action Not Required “.

3.02 SHOP DRAWINGS

- A. Shop Drawings are original drawings prepared by CONTRACTOR, Subcontractor, supplier, or distributor illustrating some portion of Work by showing fabrication, layout, setting, or erection details. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings.

- B. Produce Shop Drawings to an accurate scale that is large enough to indicate all pertinent features and methods. Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 x 11 inches but no larger than 24 x 36 inches.
- C. Shop Drawings shall include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings. Include the following information:
 - 1. Dimensions
 - 2. Identification of products and materials included by sheet and detail number.
 - 3. Compliance with specified standards.
 - 4. Notation of coordination requirements.
 - 5. Notation of dimensions established by field measurement.
- D. Provide a space of approximately 4 by 5 inches on the label or beside the title block on Shop Drawings to record CONTRACTOR and ARCHITECT review, and the action taken. Include the following information on the label for processing and recording action taken:
 - 1. Project name.
 - 2. Date.
 - 3. Name and address of ARCHITECT.
 - 4. Name and address of CONTRACTOR.
 - 5. Name and address of Subcontractor.
 - 6. Name and address of supplier.
 - 7. Name and address of manufacturer.
 - 8. Name and title of appropriate Specification section.
 - 9. Drawing number and detail references, as appropriate.
- E. Unless otherwise agreed to or indicated in individual Specification sections, submit a sufficient number to allow for adequate CONTRACTOR, Subcontractor, supplier, manufacturer and fabricators distribution plus two sets to be retained by ARCHITECT, one set to IOR and one set to OAR. .

3.03 PRODUCT DATA

- A. Collect Product Data into a single submittal for each element of Work or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, wiring diagrams, schedules, illustrations, or performance curves.
 - 1. Mark each copy to show or delineate pertinent materials, products, models, applicable choices, or options. Where Product Data includes information

on several products that are not required, clearly mark copies to indicate the applicable information. Include the following information:

- a. Manufacturer's printed recommendations.
- b. Compliance with trade association standards.
- c. Compliance with recognized testing agency standards.
- d. Application of testing agency labels and seals.
- e. Notation of dimensions verified by field measurement.
- f. Notation of coordination requirements.
- g. Notation of dimensions and required clearances.
- h. Indicate performance characteristics and capacities.
- i. Indicate wiring diagrams and controls.

2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed. .

C. Required Copies and Distribution: Same as denoted in sub - section 3.02, E.

3.04 SAMPLES

A. Procedure:

1. Submit Samples of sufficient size, quantity, cured and finished and physically identical to the proposed product or material. Samples include partial or full sections or range of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches denoting color, texture, and/or pattern.
 - a. Mount or display Samples in the manner to facilitate review of qualities indicated. Include the following:
 1. Specification section number and reference.
 2. Generic description of the Sample.
 3. Sampling source.
 4. Product name or name of manufacturer.
 5. Compliance with recognized standards.
 6. Availability and delivery time.
2. Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
 - a. Where variations in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least three

- (3) multiple units that show the approximate limits of the variations.
 - b. Refer to other Specification sections for requirements for Samples that illustrate workmanship, fabrication techniques, assembly details, connections, operation, and similar construction characteristics.
 - c. Refer to other sections for Samples to be returned to CONTRACTOR for incorporation into the Work. Such Samples must be undamaged at time of installation. On the transmittal indicate special requests regarding disposition of Sample submittals.
 - d. Samples not incorporated into the Work, or otherwise not designated as OWNER property, remain the property of CONTRACTOR and shall be removed from the Project site prior to Substantial Completion.
 - 3. Color and Pattern: Whenever a choice of color or pattern is available in a specified product, submit accurate color chips and pattern charts to OAR for review and selection.
 - 4. Number Required: Submit 5 of each. Two will be returned to CONTRACTOR with one to ARCHITECT, OAR, and IOR.
 - B. When specified, erect field Samples and mock-ups at the Project site to illustrate products, materials, or workmanship and to establish standards by which completed Work shall be judged.
 - C. Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of the Work. Sample sets may be used to obtain final acceptance of the Work associated with each set.
- 3.05 QUALITY CONTROL SUBMITTALS
- A. Submit quality control submittals, including design data, certifications, manufacturer's field reports, and other quality control submittals as required under other sections of the Contract Documents.
 - B. When other sections of the Contract Documents require manufacturer's certification of a product, material, and/or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.

- C. Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the represented company.
- D. Requirements for submittal of inspection and test reports are specified in other sections of the Contract Documents.

END OF SECTION

SECTION 01340

CONSTRUCTION & DEMOLITION WASTE MANAGEMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Preparation and implementation, including reporting and documentation, of a Waste Management Plan for reusing, recycling, salvage or disposal of non-hazardous waste materials generated during demolition and/or new construction (Construction & Demolition (C&D) Waste), to foster material recovery and reuse and to minimize disposal in land fills.

B. Related Sections

1. Section 01300: Submittals
2. Section 01500: Construction Facilities and Temporary Controls
3. Section 01700: Contract Closeout

1.02 REFERENCES

- A. California Integrated Waste Management Act of 1989 (AB 939)
- B. California Code of Regulations Title 14, Section 18700 et seq.

1.03 SYSTEM DESCRIPTION

- A. Collection and separation of all C&D waste materials generated on-site, reuse or recycling on-site, transportation to approved recyclers or reuse organizations, or transportation to legally designated landfills, for the purpose of recycling salvaging and/or reusing a minimum of 75% of the C&D waste generated.

1.04 SUBMITTALS

- A. C&D Waste Management Plan (Exhibit 1): Within 10 calendar days after the Notice to Proceed and prior to any waste removal, submit the following to the OAR for review and approval. Update quarterly. Include:
 1. Materials to be recycled, reused, or salvaged, either onsite or offsite.
 2. Estimates of C&D waste quantity (in tons) by type of material. (If waste is measured by volume, give factors for conversion to weight in tons.)
 3. Procedures for recycling/ reuse program.
 4. Permit or license and location of Project waste-disposal areas.
 5. Site plan for placement of waste containers.

- B. C&D Waste Management Monthly Progress Report (Exhibit 2): Summary of waste generated by Project, monthly with Application for Payment. Include:
 - 1. Firms accepting the recovered or waste materials.
 - 2. Type and location of accepting facilities (landfill, recovery facility, used materials yard, etc.). If materials are reused or recycled on the Project site, location should be designated as “on-site reuse / recycling”.
 - 3. Type of materials and net weight (tons) of each.
 - 4. Value of the materials or disposal fee paid.
 - 5. Attach weigh bills and other documentation confirming amount and disposal location of waste materials.
- C. C&D Waste Management Final Compliance Report: Final update of Waste Management Plan to provide summary of total waste generated by Project.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.01 IMPLEMENTATION

- A. Implement approved Waste Management Plan including collecting, segregating, storing, transporting and documenting each type of waste material generated, recycled or reused, or disposed in landfills.
- B. Designate an on-site person to be responsible for instructing workers and overseeing the sorting and recording of waste/ recyclable materials.
- C. Include waste management and recycling in worker orientation and as an agenda item for regular Project meetings.
- D. Recyclable and waste bin areas shall be limited to areas approved on the Waste Management Plan. Keep recycling and waste bins neat and clearly marked to avoid contamination of materials.

3.02 ATTACHMENTS

- A. Exhibit 1: Waste Management Plan
- B. Exhibit 2: Waste Management Monthly Progress Report.

EXHIBIT 1

WASTE MANAGEMENT PLAN CONSTRUCTION/ MAINTENANCE/ALTERATION & DEMOLITION PROJECTS

PROJECT NAME:	«PROJECTTITLE» «CONTRACTTITLE»
PROJECT NO:	«Project Number»
NAME OF COMPANY:	
CONTACT PERSON:	
TELEPHONE:	
PROJECT SITE LOCATION:	
PROJECT TYPE:	<input type="checkbox"/> NEW CONSTRUCTION <input type="checkbox"/> DEMOLITION <input type="checkbox"/> MAINTENANCE/ALTERATION PROJECTS
PROJECT SIZE (SQ. FT.):	
DATE & ESTIMATED PERIOD	

(1) Material Type	(2) Tons Estimated Recycle	(3) Tons Estimated Reuse	(4) Tons Estimated Salvage	(5) Tons Estimated Landfill	(6) Proposed Disposal or Recycling Facility (e.g., Onsite, Name of Facility)
Total					
Diversion Rate: Columns [(2)+(3)+(4)] / [(2)+(3)+(4)+(5)]					=

Signature	Title	Date
-----------	-------	------

- Column 1 "Material Types" – Enter type of materials targeted for recycling, reuse, and/or salvage, either on- or off-site, and include a category for waste materials requiring disposal.
- Columns 2 thru 4 "Estimated Generation" - Enter estimated quantities (tons) of recyclable, reusable, or salvageable waste materials anticipated to be generated and state number of salvageable items.
- Column 5 "Estimated Landfill" - Enter quantities (tons) of materials to be disposed in landfill.
- Column 4 "Disposal Location" - Enter end-destination of recycled, salvaged, and disposed materials.
- General : (1) Attach proposed Recycling & Waste Bin Location Plan.
 (2) Attach name and contact data for each recycling or disposal destination to be used.

EXHIBIT 2

WASTE MANAGEMENT PROGRESS REPORT CONSTRUCTION/ MAINTENANCE/ALTERATION & DEMOLITION PROJECTS

PROJECT NAME:	«PROJECTTITLE» «CONTRACTTITLE»
PROJECT NO:	«Project Number»
NAME OF COMPANY:	
CONTACT PERSON:	
TELEPHONE:	
PROJECT SITE LOCATION:	
PROJECT TYPE:	<input type="checkbox"/> NEW CONSTRUCTION <input type="checkbox"/> DEMOLITION <input type="checkbox"/> MAINTENANCE/ALTERATION PROJECTS
PROJECT SIZE (SQ. FT.):	
PERIOD	to

(1) Material Type	(2) Tons Actual Recycle	(3) Tons Actual Reuse	(4) Tons Actual Salvage	(5) Tons Actual Landfill	(6) Disposal or Recycling Facility (e.g., Onsite, Name of Facility)
Total					
Diversion Rate: Columns [(2)+(3)+(4)] / [(2)+(3)+(4)+(5)]					=

Signature	Title	Date
-----------	-------	------

- Column 1 "Material Types" – Enter type of materials targeted for recycling, reuse, and/or salvage, either on- or off-site, and include a category for waste materials requiring disposal.
- Columns 2 thru 4 "Estimated Generation" - Enter estimated quantities (tons) of recyclable, reusable, or salvageable waste materials anticipated to be generated and state number of salvageable items.
- Column 5 "Estimated Landfill" - Enter quantities (tons) of materials disposed.
- Column 4 "Disposal Location" - Enter end-destination of recycled, salvaged, and disposed materials.
- General : (1) Attach proposed Recycling & Waste Bin Location Plan.
 (2) Attach name and contact data for each recycling or disposal destination to be used.

END OF SECTION

SECTION 01365

CONSTRUCTION SCHEDULE

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Construction Schedule procedures, preparation, submittal, updates, and revisions.

1.02 RELATED SECTIONS

- A. Section 01005: Summary of the Work
- B. Section 01300: Submittals.
- C. Section 01700: Contract Closeout.

1.03 PROCEDURES

- A. Within 7 calendar days after date of Notice to Proceed, CONTRACTOR shall submit to OWNER for review, a detailed Construction Schedule setting forth all requirements for complete execution of the Work.
- B. Seven (7) calendar days after receipt of the OWNER'S review comments, submit a final Construction Schedule acceptable to OWNER.
- C. If a Construction Schedule is considered by OWNER to not be in compliance with any requirement of the Contract, CONTRACTOR will be notified to review and revise the Construction Schedule and bring it into compliance. Failure of CONTRACTOR to submit a Construction Schedule in full compliance with the Contract Documents will result in a delay in progress payment processing. The Construction Schedule is to be used in evaluating progress for payment approval.
- D. Subsequently with each Progress Payment Request, CONTRACTOR shall deliver to OWNER an updated Construction Schedule reflecting Work progress to the end of the Progress Payment Request period. Each such Construction Schedule shall indicate actual progress to date in execution of the Work, together with a projected schedule for completion of all the Work.
- E. All schedule submittals are subject to review and acceptance by OWNER. OWNER retains the right to withhold progress payments until CONTRACTOR submits a Construction Schedule acceptable to OWNER.

- F. Concurrent with OWNER'S acceptance of CONTRACTOR'S submitted Construction Schedule, shall be CONTRACTOR'S signature of acceptance.

1.04 SCHEDULE SUBMITTAL PREPARATION GUIDELINES

- A. The Contract Work shall be scheduled and progress monitored using a Critical Path Method (CPM) network type scheduling system. Schedule shall be broken into sub-activities which shall, as a minimum, include major suppliers, all submittal approvals, all major trades, plumbing, mechanical, electrical, security, fire, and elevators/escalators. Scheduling system shall indicate all inter-relationships between trades and suppliers.
- B. Construction Schedule shall represent a practical plan to complete the Work within the Contract time requirement.
 - 1. A schedule extending beyond Contract time or less than Contract time will not be acceptable.
 - 2. A schedule found unacceptable by OWNER shall be revised by CONTRACTOR and resubmitted.
- C. Construction schedule shall clearly indicate sequence of construction activities, grouped by applicable phase and sorted by areas, buildings, or facilities within phase, and shall specifically indicate:
 - 1. Start and completion of all Work items, their major components, and interim milestone completion dates, as determined by CONTRACTOR and OWNER.
 - 2. Activities for procurement, delivery, installation of equipment, materials, and other supplies, including:
 - a. Time for submittals, resubmittals, and reviews. Include decision dates for selection of finishes.
 - b. Time for manufactured products for the Work fabrication and delivery.
 - c. Interdependence of procurement and construction activities.
 - d. As applicable, dates for testing, balancing equipment, and final inspection.

- D. Schedule shall be in sufficient detail to assure adequate planning and execution of the Work.
1. Each task activity shall range in duration from a 1 workday minimum to a 15 workday maximum and shall be total of actual days required for completion. The activity duration shall not include consideration of weather impact on completion of that activity.
 2. Schedule shall be suitable, in judgment of OWNER, to allow monitoring and evaluation of progress in performance of the Work; it shall be calendar time-scaled.
 3. Activities shall include:
 - a. Description; what is to be accomplished and where.
 - b. Workday duration.
 - c. Scheduled activities shall indicate continuous flow, from left to right.
 4. CONTRACTOR shall setup up the schedule calendar to identify workdays per week and shifts per day worked, non-work days, weekends and holidays.
- E. Failure to include any element of Work required for performance of this Contract shall not excuse CONTRACTOR from completing Work required to comply with the Contract Documents, notwithstanding acceptance of Construction Schedule.
- F. Submittal of Construction Schedule shall be understood to be CONTRACTOR'S confirmation that the schedule meets requirements of the Contract Documents, and that the Work will be executed in sequence indicated in schedule.

1.05 REVIEWS, UPDATES, AND REVISIONS

- A. OWNER will review and return the initial submittal of CONTRACTOR'S Construction Schedule, with summary comments, within 7 calendar days. If revisions are required, CONTRACTOR shall resubmit Schedule within 7 calendar days following receipt of OWNER'S comments.

B. CONTRACTOR shall analyze and update the Project Construction Schedule:

1. As part of monthly payment application, CONTRACTOR shall submit to and participate with OWNER in a schedule review to include:
 - a. Actual start dates for Work items started during report period.
 - b. The percent (%) complete on activities that have actual start dates.
 - c. Actual completion dates for Work items completed during report period.
 - d. Estimated remaining duration for Work items in progress, which will not exceed original duration for activity.
 - e. Estimated start dates for Work items scheduled to start during month following report period, if applicable.
 - f. Changes in duration of Work items.
2. In case of a change to CONTRACTOR'S planned sequence of Work, CONTRACTOR shall include a narrative report with updated progress schedule which shall include, but not be limited to, a description of problem areas, current and anticipated delaying factors, and any proposed revisions for a recovery plan.
3. All Change Orders affecting the schedule shall be clearly identified as separate and new activities integrated into the schedule at the appropriate time and in the appropriate sequence as reviewed and approved by OWNER.
4. The Project Construction Schedule Review will not relieve CONTRACTOR of responsibility for accomplishing all Work in accordance with the Contract Documents.

D. Updates: CONTRACTOR shall submit to OWNER, with each payment application, an up-to-date Project Construction Schedule to include following:

1. Work Item Report: Detailing Work items and dependencies as indicated on the Schedule.
2. Separate listing of activities completed during reporting period.
3. Separate listing of activities which are currently in progress, indicating their remaining duration and percentages completed.

4. Separate listing of activities which are causing delay in Work progress.
- E. Scheduling of change or extra Work orders is responsibility of CONTRACTOR.
 1. CONTRACTOR shall revise the Project Construction Schedule to incorporate all activities involved in completing change orders or extra Work orders and submit it to OWNER for review.
- F. If OWNER finds CONTRACTOR is entitled to extension of any completion date, under provisions of the Contract, OWNER'S determination of total number of days of extension will be based upon an analysis of the current Project Construction Schedule, and upon data relevant to the extension.
- G. CONTRACTOR acknowledges and agrees that delays to non-critical activities will not be considered a basis for a time extension unless activities become critical. Non-critical activities are those activities which, when delayed, do not affect an interim or Substantial Completion date.
- H. Any claim for extension of time shall be made in writing to OWNER not more than 7 days after commencement of delay; otherwise, it shall be deemed waived for all purposes. CONTRACTOR shall provide an estimate of the probable effect of such a delay on progress of Work as part of claim.

1.06 CONTRACTOR'S RESPONSIBILITY

- A. Nothing in these requirements shall be deemed to be an usurpation of CONTRACTOR'S authority and responsibility to plan and schedule Work as CONTRACTOR sees fit, subject to all other requirements of Contract Documents.
- B. CONTRACTOR shall provide at all times sufficient competent labor, materials, and equipment to properly carry on Work and to insure completion of each part in accordance with Construction Schedule and within time agreed.
- C. CONTRACTOR shall be responsible for ensuring that all submittals to the OWNER are accurate and consistent. Damage, including extra time and cost, caused by inaccuracies from CONTRACTOR will be compensated by CONTRACTOR.

1.07 SUSPENSION OF PAYMENTS

- A. Initial Submittal: If CONTRACTOR fails to comply with the specified requirements, OWNER reserves the right to engage an independent scheduling consultant to fulfill these requirements. Upon additional notice to

CONTRACTOR, OWNER shall retain against CONTRACTOR all incurred costs for additional services.

- B. Update Submittals: OWNER has the right to withhold progress payments if CONTRACTOR fails to update and submit the Project Construction Schedule and reports as required by OWNER.

1.08 RECORD COPY

- A. Prior to the Contract Completion, CONTRACTOR shall submit the Project Construction Schedule showing the as-built sequence. The as-built schedule shall have all activities with actual start and end dates.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

SECTION 01600

MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. This Section includes administrative and procedural requirements governing selection of products for incorporation into the Work.

1.2 RELATED SECTIONS

- A. Section 01100: Coordination
- B. Section 01300: Submittals
- C. Section 01640: Substitutions
- D. Section 01740: Warranties

1.3 DEFINITIONS

- A. Definitions used in this Section are not intended to change the meaning of other terms used in the Contract Documents, such as “specialties,” “systems,” “structure,” “finishes,” “accessories,” and other similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.
 - 1. “Products” are items purchased for incorporation into the Work, whether purchased for the Work or taken from previously purchased stock. The term “product” includes the terms “material” and “equipment” and terms of similar intent.
 - a. “Named Products,” are items identified by the manufacturer’s product name, including make, model number or other designation, shown or listed in the manufacturer’s published product literature, current as of the date of the Contract.
 - b. “Foreign Products,” as distinguished from “domestic products,” are items substantially manufactured (50 percent or more of value) outside the United States and its possessions. Products produced or supplied by entities substantially owned (more than 50 percent) by persons who are not citizens of, nor living within, the United States and its possessions are also considered to be foreign products.

2. “Materials,” are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
3. “Equipment,” is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

1.4 SUBMITTALS

- A. Material list: Prepare a list in tabular form acceptable to ARCHITECT and/or OAR showing proposed products. Include generic names. Include the manufacturer’s name and proprietary names for each item listed.
 1. Coordinate material list with the Construction Schedule and the submittal schedule.
 2. Form: Prepare material list with information on each item tabulated under the following column headings.
 - a. Related Specification Section number
 - b. Generic name used in Contract Documents
 - c. Proprietary name, model number, and similar designations
 - d. Manufacturer’s name and address
 - e. Supplier’s name and address
 - f. Installer’s name and address
 - g. Projected delivery date or time span of delivery period
 3. Initial Submittal: Within ten (10) days after execution of each subcontract agreement, as set forth in General Condition Article 6.25, submit three (3) copies of an initial material list to the ARCHITECT with a copy to the OAR. Provide a written explanation for omissions of data and for known variations from the Contract Documents.
 4. ARCHITECT Action: ARCHITECT will respond in writing to OAR within fourteen (14) days and OAR will forward response to CONTRACTOR within sixteen (16) days of receipt of the completed material list. No response outside this period constitutes no objection to listed items but does not constitute a waiver of the requirement that selected items comply with the Contract Documents. ARCHITECT response will include a list of unacceptable item selections, containing a brief explanation of reasons for this action.

1.5 QUALITY ASSURANCE

- A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.
 - 1. CONTRACTOR is to verify necessary lead times for all materials; however, when specified products are available only from sources that do not, or cannot, produce a quality adequate to complete Work in a timely manner, consult with the ARCHITECT to determine the most important product qualities before proceeding. Qualities may include attributes, such as visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources producing these qualities, to the fullest extent possible.
- B. Compatibility of Options: When the CONTRACTOR is given the option of selecting between two or more products for use in the Work, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
- C. Foreign Product Limitations: Except under one or more of the following conditions, provide domestic products, not foreign products, for inclusion into the Work:
 - 1. No available domestic product complies with the Contract Documents.
 - 2. Domestic products that comply with the Contract Documents are available only at prices or terms substantially higher than foreign products that comply with the Contract Documents.
- D. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed in view in occupied spaces or on the exterior.
 - 1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
 - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
 - a. Name of product and manufacturer
 - b. Model and serial number
 - c. Capacity

- d. Speed
- e. Ratings

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
 - 1. Schedule delivery to minimize long-term storage at the Project site and to prevent overcrowding of Work spaces.
 - 2. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to the Project site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
 - 5. Store products at the Project site in a manner that will facilitate inspection and measurement of quantity or counting of units.
 - 6. Store heavy materials away from structures in a manner that will not endanger the structure's supporting construction.
 - 7. Store products subject to damage by the elements above ground, under cover in a weather-tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 - PRODUCTS

2.1 MATERIAL SELECTION

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.

1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
 2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other Projects.
- B. Product Selection Procedures: The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:
1. Proprietary Specification Requirements: Where Specifications name only a single material or manufacturer, provide the product indicated. No substitutions will be permitted.
 2. Semi-proprietary Specification Requirements: Where Specifications name two or more products or manufacturers, provide one of the products indicated. No substitutions will be permitted.
 - a. Where Specifications specify products or manufacturers by name, accompanied by the term “or equal” comply with General Condition Article 6.14 to obtain approval for use of an unnamed product.
 3. Descriptive Specification Requirements: Where Specifications describe a product or assembly, list exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with the Contract Documents.
 4. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated.
 - a. Manufacturer’s recommendations may be contained in published material literature or by the manufacturer’s certification of performance.
 5. Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes, or regulations specified.

6. Visual Matching: Where Specifications require matching an established Sample, decision of the ARCHITECT will be final on whether a proposed product matches satisfactorily.
7. Visual Selection: Where specified product requirements include the phrase "... as selected from manufacturer's standard or premium colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The ARCHITECT will select the color, pattern, and texture from the product line selected.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS

- A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located, and aligned with other Work.
 1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration until Substantial Completion.

END OF SECTION

SECTION 01640

SUBSTITUTIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. This Section includes administrative and procedural requirements for handling requests for substitutions submitted eleven (11) days or more after the date established in the Notice to Proceed.

1.2 RELATED SECTIONS

- A. Section 01300: Submittals
- B. Section 01600: Materials and Equipment

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 APPLICATION

- A. CONTRACTOR proposed changes in products or materials required by the Contract Documents eleven (11) days or more after the date established in the Notice to Proceed, are considered to be requests for substitutions. OAR will consider requests for substitution if a product is no longer manufactured and/or cannot be acquired from existing inventories. The following are not considered to be valid requests for substitutions:
 - 1. Revisions to the Contract Documents requested by OAR or ARCHITECT.
 - 2. Specified options of products included in the Contract Documents.
 - 3. Substitutions requested on a “or equal” basis.

3.2 SUBMITTALS

- A. Transmit submittals as described in related Sections for each request for substitution.
 - 1. Identify the product to be replaced in each request. Include related Specification Section and Drawing number.

2. Provide complete documentation denoting compliance with the requirements for substitutions, and the following information, as appropriate.
 - a. A detailed comparison of significant qualities of the proposed substitution with those specified in the Contract Documents. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.
 - b. Product Data, including Drawings, descriptions of products, fabrication, and installation procedures.
 - c. Samples, where applicable or requested.
 - d. CONTRACTOR certification the proposed substitution conforms to requirements of the Contract Documents in every respect and is appropriate for the applications indicated.
 - e. CONTRACTOR waiver of rights to an increase in the Contract Amount, Milestones and/or Contract Time that may subsequently become necessary because of the failure of the substitution to adequately perform.
3. If required, ARCHITECT will request additional information or documentation for evaluation. OAR will notify CONTRACTOR of acceptance or rejection of the substitution.
4. ARCHITECT will review and consider request for substitution and provide a recommendation to OAR
5. Where a proposed substitution involves and/or effects more than one Subcontractor, CONTRACTOR shall ensure each Subcontractor cooperates with the other Subcontractor involved to coordinate the Work, provide uniformity and consistency, and assure compatibility of all products.
6. CONTRACTOR submittal and ARCHITECT review of Shop Drawings, Product Data, material lists or Samples do not constitute an acceptable or valid request for substitution.

END OF SECTION

SECTION 01700
CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section includes administrative and procedural requirements for Contract Closeout, including but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project record documents submittal.
 - 3. Operation and maintenance manual submittal.
 - 4. OWNER orientation and instruction.
 - 5. Final cleaning.
- B. Closeout requirements for specific Work activities are included in the appropriate Sections in Divisions 01 through 16.

1.02 RELATED SECTIONS

- A. Section 01080: Application for Payment
- B. Section 01300: Submittals
- C. Section 01365: Construction Schedule
- D. Section 01500: Construction Facilities and Temporary Controls
- E. Section 01740: Warranties

PART 2 – PRODUCTS

PART 3 - EXECUTION

3.01 SUBSTANTIAL COMPLETION

- A. Inspection Procedures: On receipt of a request for a certificate of Substantial Completion, OAR will either authorize commencement of inspection or advise CONTRACTOR of unfilled requirements. IOR, OAR, CONTRACTOR and ARCHITECT will inspect the Work and IOR shall prepare a comprehensive punch list of items to be completed.
 - 1. IOR will repeat inspection when requested and assure the Work is complete.
 - 2. Results of the completed inspection will form a partial basis of the requirements for Final Completion.

- B. Re-inspection Procedures: IOR, OAR, CONTRACTOR and ARCHITECT will inspect the Work upon notice the Work, including final inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to OAR.
1. Upon completion of inspection, OAR will recommend Final Completion. If the Work is incomplete, OAR will advise CONTRACTOR of Work that is incomplete or of obligations that have not been fulfilled but are required for Final Completion.
 2. If necessary, re-inspection will be repeated, but may be assessed against CONTRACTOR if OWNER is subject to additional professional service and or additional costs of inspection.

3.02 PROJECT RECORD DOCUMENT SUBMITTAL

- A. General: Do not use project record documents for construction purposes. Protect record documents from deterioration and loss. Provide access to record documents for ARCHITECT, IOR and OAR reference during normal working hours. Project record document shall be updated on a weekly basis. Prior to submitting each application for payment, secure IOR and ARCHITECT approval of project record documents.
- B. Record Drawings: Maintain a clean, undamaged set of blue or black line white prints of Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which Drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Drawings. Provide detailed and accurate field dimensions for concealed elements that would be difficult to measure and record at a later date.
1. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work. Date and number entries in the same format as submitted. Call attention to entry by a “cloud” around the affected areas.
 2. Mark new information important to OWNER but was not shown on Drawings or Shop Drawings.
 3. Utility location and depth below finished grade and/or above ceilings and attic spaces shall be fully dimensioned and indicated on record drawings. Dimensions shall be measured from building lines or permanent landmarks and shall be triangulated to those features.

4. Note related Change Order or Construction Directive numbers where applicable. RFC submissions shall be referenced on each affected sheet, Drawing and/or Shop Drawing.
 5. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
 6. Prior to Final Completion of the Work, and review of the project record drawings by ARCHITECT, prepare a final set of project record drawings incorporating all mark ups and information noted. Provide a hardline drawing set of record drawings printed on reproducible white bond paper. Submit final set of Record Drawings to ARCHITECT.
- C. Record Specifications: Maintain two complete copies of the Specifications, including Addenda. Include with the Specifications two copies of other written Contract Documents, such as Change Orders and/or Construction Directives issued during construction.
1. Mark these record documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
 2. Give particular attention to substitutions and selection of options and information on concealed Work that cannot otherwise be readily discerned later by direct observation.
 3. Note related record document information with Product Data.
 4. Prior to Final Completion of the Work, submit record Specifications to ARCHITECT for OWNER records.
- D. Record Product Data: Maintain two copies of each Product Data submittal. Note related Change Orders and Construction Directives and mark-up of record drawings and Specifications.
1. Mark these documents to illustrate significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the Project site and from the manufacturer's installation instructions and recommendations.
 2. Provide detailed and accurate information regarding concealed products and portions of Work that cannot otherwise be readily discerned later by direct observation.

3. Prior to Final Completion of the Work, submit complete set of record Product Data to the ARCHITECT for OWNER records.
- E. Record Samples: Immediately prior to Substantial Completion, CONTRACTOR shall meet with ARCHITECT and OAR at the Project site to determine which Samples are to be transmitted to OWNER for record purposes. Comply with OAR instructions regarding delivery to OWNER storage area.
- F. Miscellaneous Records: Refer to other Specification sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date of Final Completion, complete and compile miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to ARCHITECT for OWNER records.
- G. Maintenance Manuals: Prior to Substantial Completion, organize operation and maintenance data into suitable two sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-3", 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Submit to OAR for ARCHITECT and for OWNER records. Include the following types of information.
 1. Spare parts list of warranties
 2. Inspection procedures
 3. Shop Drawings and Product Data
- H. Verified Reports: Construction progress of the Work shall be reported to DSA via a duly verified report as per Sections 4-336 and 4-343 of the California Building Standards Administrative Code.

3.03 CLOSEOUT PROCEDURES:

- A. Operation and Maintenance Instructions: Prior to Substantial Completion, arrange for each installer of equipment that requires regular operation and maintenance to meet with designated OWNER personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:
 1. Maintenance manuals
 2. Record documents
 3. Cleaning
 4. Warranties and bonds
 5. Maintenance agreements and similar continuing commitments

3.04 FINAL CLEANING

- A. General: Related sections of the Contract Documents specify general cleaning during performance of the Work. General cleaning is included in Division 01 Section “Construction Facilities and Temporary Controls”.
 - B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer’s instructions.
- 1. Complete the following cleaning operations before requesting inspection for a certificate of Substantial Completion.
 - a. Remove labels that are not permanent labels.
 - b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
 - c. Clean exposed exterior and interior hard-surfaced finished to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
 - d. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
 - e. Clean the Project site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.

END OF SECTION PART 1 - GENERAL

1.03 SECTION INCLUDES

- C. This Section includes administrative and procedural requirements for Contract Closeout, including but not limited to, the following:
 - 6. Inspection procedures.
 - 7. Project record documents submittal.
 - 8. Operation and maintenance manual submittal.

9. OWNER orientation and instruction.
 10. Final cleaning.
- D. Closeout requirements for specific Work activities are included in the appropriate Sections in Divisions 01 through 16.

1.04 RELATED SECTIONS

- | | | |
|----|----------------|--|
| A. | Section 01080: | Application for Payment |
| B. | Section 01300: | Submittals |
| C. | Section 01360: | Construction Schedule |
| D. | Section 01450: | Test and Balance |
| E. | Section 01500: | Construction Facilities and Temporary Controls |
| F. | Section 01740: | Warranties |

PART 2 – PRODUCTS

PART 3 - EXECUTION

3.01 SUBSTANTIAL COMPLETION

- C. Inspection Procedures: On receipt of a request for a certificate of Substantial Completion, OAR will either authorize commencement of inspection or advise CONTRACTOR of unfilled requirements. IOR, OAR, CONTRACTOR and ARCHITECT will inspect the Work and IOR shall prepare a comprehensive punch list of items to be completed.
3. IOR will repeat inspection when requested and assure the Work is complete.
 4. Results of the completed inspection will form a partial basis of the requirements for Final Completion.
- D. Re-inspection Procedures: IOR, OAR, CONTRACTOR and ARCHITECT will inspect the Work upon notice the Work, including final inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to OAR.
3. Upon completion of inspection, OAR will recommend Final Completion. If the Work is incomplete, OAR will advise CONTRACTOR of Work that is incomplete or of obligations that have not been fulfilled but are required for Final Completion.
 4. If necessary, re-inspection will be repeated, but may be assessed against CONTRACTOR if OWNER is subject to additional professional service and or additional costs of inspection.

- H. General: Do not use project record documents for construction purposes. Protect record documents from deterioration and loss. Provide access to record documents for ARCHITECT, IOR and OAR reference during normal working hours. Project record document shall be updated on a weekly basis. Prior to submitting each application for payment, secure IOR and ARCHITECT approval of project record documents.
- I. Record Drawings: Maintain a clean, undamaged set of blue or black line white prints of Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which Drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Drawings. Provide detailed and accurate field dimensions for concealed elements that would be difficult to measure and record at a later date.
7. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work. Date and number entries in the same format as submitted. Call attention to entry by a “cloud” around the affected areas.
 8. Mark new information important to OWNER but was not shown on Drawings or Shop Drawings.
 9. Note related Change Order or Construction Directive numbers where applicable. RFC submissions shall be referenced on each affected sheet, Drawing and/or Shop Drawing.
 10. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
 11. Prior to Final Completion of the Work, and review of the project record drawings by ARCHITECT, prepare a final set of project record drawings incorporating all mark ups and information noted. Provide a hardline drawing set of record drawings printed on reproducible white bond paper. Submit final set of Record Drawings to ARCHITECT.
- J. Record Specifications: Maintain two complete copies of the Specifications, including Addenda. Include with the Specifications two copies of other written Contract Documents, such as Change Orders and/or Construction Directives issued during construction.

5. Mark these record documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
 6. Give particular attention to substitutions and selection of options and information on concealed Work that cannot otherwise be readily discerned later by direct observation.
 7. Note related record document information with Product Data.
 8. Prior to Final Completion of the Work, submit record Specifications to ARCHITECT for OWNER records.
- K. Record Product Data: Maintain two copies of each Product Data submittal. Note related Change Orders and Construction Directives and mark-up of record drawings and Specifications.
4. Mark these documents to illustrate significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the Project site and from the manufacturer's installation instructions and recommendations.
 5. Provide detailed and accurate information regarding concealed products and portions of Work that cannot otherwise be readily discerned later by direct observation.
 6. Prior to Final Completion of the Work, submit complete set of record Product Data to the ARCHITECT for OWNER records.
- L. Record Samples: Immediately prior to Substantial Completion, CONTRACTOR shall meet with ARCHITECT and OAR at the Project site to determine which Samples are to be transmitted to OWNER for record purposes. Comply with OAR instructions regarding delivery to OWNER storage area.
- M. Miscellaneous Records: Refer to other Specification sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date of Final Completion, complete and compile miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to ARCHITECT for OWNER records.
- N. Maintenance Manuals: Prior to Substantial Completion, organize operation and maintenance data into suitable two sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-3", 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on

front and spine of each binder. Submit to OAR for ARCHITECT and for OWNER records. Include the following types of information.

4. Shop Drawings and Product Data

- H. Verified Reports: Construction progress of the Work shall be reported to DSA via a duly verified report as per Sections 4-336 and 4-343 of the California Building Standards Administrative Code.

3.03 CLOSEOUT PROCEDURES:

- B. Operation and Maintenance Instructions: Prior to Substantial Completion, arrange for each installer of equipment that requires regular operation and maintenance to meet with designated OWNER personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:

6. Maintenance manuals
7. Record documents
8. Identification systems Hazards
9. Cleaning
10. Warranties and bonds
11. Maintenance agreements and similar continuing commitments

3.04 FINAL CLEANING

- C. General: Related sections of the Contract Documents specify general cleaning during performance of the Work. General cleaning is included in Division 01 Section "Construction Facilities and Temporary Controls".

- D. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

2. Complete the following cleaning operations before requesting inspection for a certificate of Substantial Completion.

- f. Remove labels that are not permanent labels.
- g. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances

that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.

- h. Clean exposed exterior and interior hard-surfaced finished to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
- i. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
- j. Clean the Project site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.

END OF SECTION

SECTION 01740

WARRANTIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers and/or installer's standard warranties on products and special product warranties.
 - 1. Refer to the General Conditions for terms of the guarantee period for the Work.

1.2 RELATED SECTIONS

- A. Section 01600: Materials and Equipment
- B. Section 01700: Contract Closeout
- C. All Necessary work related sections division 2-16

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 WARRANTY REQUIREMENTS

- A. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties shall not relieve CONTACTOR of the warranty of the Work incorporating such materials, products, and/or equipment. Manufacturer's disclaimers and limitations on warranties do not relieve suppliers, manufacturers, installers, and Subcontractors of the requirement to countersign special warranties with CONTRACTOR.
- B. Standard warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to OWNER.
- C. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for OWNER.
- D. Related Damages and Losses: When correcting failed or defective warranted Work, remove and replace Work that has been damaged as a result of such failure

or which must be removed and replaced to provide access for correction of warranted Work.

- E. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement with the reinstated warranty equal to the original warranty.
- F. Replacement Cost: Upon determination the Work covered by a warranty has failed and/or is defective, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. CONTRACTOR is responsible for the cost of replacing or rebuilding defective Work regardless of whether OWNER has benefited from use of the Work through a portion of its anticipated useful service life.
- G. OWNER Recourse: Expressed warranties made to OWNER are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which OWNER can enforce such other duties, obligations, rights, or remedies.
- H. Rejection of Warranties: OAR reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- I. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, OAR reserves the right to refuse to accept the Work until CONTRACTOR presents evidence the entities required to countersign such commitments have done so.

3.2 SUBMITTALS

- A. Submit written warranties to ARCHITECT prior to Final Completion of the Work. If the certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, submit written warranties as set forth in the certificate of Substantial Completion.
 - 1. When a designated portion of the Work is partially used and/or occupied by OWNER, submit properly executed warranties to ARCHITECT within fifteen (15) days of the Partial Use or Occupancy of the designated portion of the Work.
- B. When the Contract Documents require CONTRACTOR, or CONTRACTOR and a Subcontractor, installer, supplier or manufacturer to execute a special warranty, prepare a written document containing appropriate terms and identification, ready for execution by the required parties. Submit a draft to OAR, through the ARCHITECT, for approval prior to final execution.

1. Refer to Divisions 02 through 16 for specific content requirements and particular requirements for submitting special warranties.
- C. Form of Submittal: Prior to Final Completion of the Work, compile two copies of each required warranty properly executed by CONTRACTOR, or by CONTRACTOR and Subcontractor, installer, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the Specifications.
- D. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8½ by 11” (115 by 280 mm) paper.
1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the item or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the installer.
 2. Identify each binder on the front and spine with the typed or printed title “WARRANTIES,” Project title and/or name, and name of CONTRACTOR.
 3. When warranted Work requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

END OF SECTION

SECTION 070150 - PREPARATION FOR RE-ROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Roof tear-off.
 - 2. Temporary roofing membrane.
 - 3. Temporary roof drainage.

1.2 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

1.3 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
- B. Existing Membrane Roofing System: Roofing system identified above, including roofing membrane, roof insulation, surfacing, and components and accessories between deck and roofing membrane.
- C. Roof Tear-Off: Removal of existing membrane roofing system from deck.
- D. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and reinstalled.
- E. Existing to Remain: Existing items of construction that are not indicated to be removed.
- F. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- G. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- H. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Temporary Roofing: Include Product Data and description of temporary roofing system. If temporary roof will remain in place, submit surface preparation requirements needed to receive permanent roof, and submit a letter from roofing membrane manufacturer stating acceptance of the temporary membrane and that its inclusion will not adversely affect the roofing system's resistance to fire and wind.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer
- B. Digital Images or Videos: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, which might be misconstrued as having been damaged by reroofing operations. Submit before Work begins.
- C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property for environmental protection, for dust control and for noise control. Indicate proposed locations and construction of barriers.
- D. Schedule of Re-Roofing Preparation Activities: Indicate the following:
 - 1. Detailed sequence of re-roofing preparation work, with starting and ending dates for each activity. Ensure occupants' on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Installer of new membrane roofing system.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning membrane roofing removal. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Reroofing Conference: Conduct conference at Project site.
 - 1. Meet with Owner; roofing system manufacturer's representative; roofing Installer including project manager, superintendent, and foreman; and installers whose work interfaces with or affects reroofing including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing system tear-off and replacement including, but not limited to, the following:
 - a. Reroofing preparation, including membrane roofing system manufacturer's written instructions.
 - b. Temporary protection requirements for existing roofing system that is to remain during and after installation.
 - c. Construction schedule and availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - d. Existing deck removal procedures and Owner notifications.
 - e. Condition and acceptance of existing roof deck and base flashing substrate for reuse.
 - f. Structural loading limitations of deck during reroofing.

- g. Base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that will affect reroofing.
- h. Existing conditions that may require notification of Owner before proceeding.

1.7 PROJECT CONDITIONS

- A. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.
- B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
- C. Limit construction loads on roof to rooftop equipment wheel loads and uniformly distributed loads not exceeding recommendations of Contractor's professional engineer based upon site inspection and analysis.
- D. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.
- E. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

PART 2 - PRODUCTS

2.1 TEMPORARY ROOFING MATERIALS

- A. Design and selection of materials for temporary roofing are responsibilities of Contractor.

2.2 TEMPORARY ROOF DRAINAGE

- A. Design and selection of materials for temporary roof drainage are responsibilities of the Contractor.

PART 3 - EXECUTION

3.1 PREPARATION, GENERAL

- A. Pollution Control: Comply with environmental regulations of authorities having jurisdiction. Limit spread of dust and debris.
 - 1. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 2. Remove debris from building roof by chute, hoist, or other device that will convey debris to grade level.
- B. Air Intake Shutdown: Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.
- C. Temporary Weather Protection: During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

3.2 ROOF TEAR-OFF

- A. General: Notify Owner each day of extent of roof tear-off proposed for that day and obtain authorization to proceed.
- B. Roof Tear-Off:
 - 1. Remove existing roofing membrane and other membrane roofing system components, insulation, cover boards, and flashings down to the decking.
 - 2. Remove copings and non-through wall counterflashings.
 - 3. Remove obsolete equipment identified by Owner.

3.3 DECK PREPARATION

- A. Inspect deck after tear-off of membrane roofing system.
- B. Verify that deck is sound and dry.
- C. If broken or loose fasteners that secure deck panels to one another or to structure are observed or if deck appears or feels inadequately attached, immediately notify Architect. Do not proceed with installation until directed by Architect.
- D. Unsuitable Deck: If deck surface is not suitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Architect. Do not proceed with installation until directed by Owner.

3.4 TEMPORARY ROOFING MEMBRANE

- A. Install approved temporary roofing membrane over area to be reroofed.
- B. Remove temporary roofing membrane before installing new roofing membrane.

3.5 DISPOSAL

- A. Collect demolished materials and place in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
 - 1. Storage or sale of demolished items or materials on-site is not permitted.
- B. Transport and legally dispose of demolished materials off Owner's property.

3.6 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by preparation for re-roofing operations. Return adjacent areas to condition existing before operations began.

END OF SECTION 070150

SECTION 070150.71 - REHABILITATION OF METAL ROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Products in bold italics, listed in Part 2 – Products, and on “Attachment A”, will be furnished by Rosemead School District using its authority under the CMAS Contract. All remaining products listed within the Part 2 section, and any additional needed quantities of the products listed on “Attachment A”, shall be furnished by the Roofing Contractor.
- B. CMAS Contract #: 4-21-03-1001
- C. This Section includes the following:
 - 1. Roof coating preparation including rehabilitation of metal roof panel joints, fasteners, and flashing, and cleaning preparation for coating.
 - 2. Application of coating on metal roofing.

1.2 MATERIALS OWNERSHIP

- A. Demolished materials shall become Contractor's property and shall be removed from Project site.

1.3 DEFINITIONS

- A. Roofing Terminology: Refer to glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
- B. Existing Roofing System: Metal roofing, and components and accessories between deck and metal roofing.
- C. Roofing Coating Preparation: Existing roofing that is to remain and be prepared to accept restorative coating application.
- D. Patching: Removal of a portion of existing metal roofing system from deck or removal of selected components and accessories from existing metal roofing system and replacement with similar materials.
- E. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and reinstalled.
- F. Existing to Remain: Existing items of construction that are not indicated to be removed.
- G. Manufacturer/Roofing Manufacturer: Manufacturer of roofing rehabilitation products, unless otherwise indicated.

1.4 ROOFING CONFERENCES

- A. Roofing Rehabilitation Preinstallation Conference: Conduct conference at Project site to review methods and procedures related to roofing system.
 - 1. Meet with Owner, Architect, roofing coating materials manufacturer's representative; roofing coating Installer including project manager and foreman; and installers whose work interfaces with

or affects rehabilitation including installers of roof accessories and roof-mounted equipment requiring removal and replacement as part of the Work.

2. Review methods and procedures related to coating preparation, including metal roofing coating system manufacturer's written instructions.
3. Review temporary protection requirements for existing roofing system that is to remain uncoated, during and after installation.
4. Review roof drainage during each stage of coating and review roof drain plugging and plug removal procedures.
5. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
6. Review base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that will affect coating.
7. Review existing conditions that may require notification of Owner before proceeding.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product specified.

1. Indicate CRRC Compliance.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and Manufacturer.
- B. Contractor's Product Certificate: Submit certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing rehabilitation system.
- D. Warranties: Unexecuted sample copies of special warranties.
- E. Photographs or Video Recordings: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, which might be misconstrued as having been damaged by coating operations. Submit before Work begins.
- F. Inspection Reports: Daily reports of Roofing Inspector. Include weather conditions, description of work performed, tests performed, defective work observed, and corrective actions required and carried out.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: To include in maintenance manuals.
- B. Warranties: Executed copies of approved warranty forms.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of five years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Architect, and employees, and the following:
 - 1. Qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.
- B. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:
 - 1. An authorized full-time technical employee of the manufacturer.
 - 2. An independent party certified as a Registered Roof Observer by the Roof Consultants Institute, retained by the Contractor or the Manufacturer and approved by the Manufacturer.

1.9 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with rehabilitation work only when existing and forecasted weather conditions permit Work to proceed without water entering into existing roofing system or building.
 - 1. Store all materials prior to application at temperatures recommended by manufacturer.
 - 2. Apply coatings within range of ambient and substrate temperatures recommended by manufacturer.
 - 3. Do not apply roofing in rain, fog, or mist.
- B. Protect building to be rehabilitated, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from rehabilitation operations.
- C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
- D. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

1.10 WARRANTY

- A. Manufacturer's standard warranty form, covering work of this Section and extended system components indicated, in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within warranty period. Failure includes roof leaks.
 - 1. Warranty Period: 10 years from date of completion.
- B. Installer's warranty signed by Installer, covering the Work of this Section and extended system components indicated, on form acceptable to Roofing Manufacturer and Owner.
 - 1. Warranty Period: 2 years from date of completion.

- C. Manufacturer Inspection Services: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's inspections is included in the Contract Sum.

- 1. Inspections to occur in following years: 2 and 5 following completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The roof system specified in this Section is based upon products of Tremco, Incorporated. Provide specified products.
- B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Provide coated metal roofing system that remains weathertight; does not permit the passage of water; and resists specified uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
- C. Energy Performance: Provide roof panels with initial solar reflectance not less than 0.70 and emissivity not less than 0.75 when tested according to CRRC-1.

2.3 MATERIALS, GENERAL

- A. General: Rehabilitation materials recommended by roof coating manufacturer for intended use and compatible with components of existing metal roofing system.

2.4 METAL COATING MATERIALS

- A. Metal Rehabilitation Coating:
 - 1. Acrylic Roof Coating, Highly-Reflective Elastomeric: ASTM D 6083, applied as base coat plus finish coat over prepared and primed roof surfaces.
 - a. **Solargard 6083 Base and Finish Coat.**
 - b. Solar Reflectance Index (SRI), white, ASTM E 1980: 105 initial; 100 aged.
 - c. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: Less than 50 g/L.
 - d. Tensile Strength at 73 deg. F (23 deg. C), minimum, ASTM D 2370: Not less than 250 psi (1700 kPa).
 - e. Elongation at 73 deg. F (23 deg. C), minimum, ASTM D 2370: Not less than 350 percent.
 - f. Flexibility at -15 deg F (-26 deg C), ASTM D 522: Pass 1/2 inch mandrel after 1000 hrs. accelerated weathering.

- g. Solids by weight, ASTM D 1644: Not less than 60 percent.
- h. Solids by volume, ASTM D 2697: Not less than 50 percent.
- i. Color, Top Coat: White.
- j. Minimum Thickness over Metal: 24 wet mils each coat for base and finish coats.

B. Metal Primer:

- 1. Acrylic corrosion-resistant primer formulated for use with acrylic emulsion metal coatings.
 - a. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 3 g/L.
 - b. Solids, by weight: 50 percent.
 - c. Application: 8 to 16 mils wet.

2.5 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with existing roofing system and roofing coating system.

B. Seam Reinforcing Fabric:

- 1. Polyester Reinforcing Fabric: 100 percent stitch-bonded mildew-resistant polyester fabric intended for reinforcement of compatible fluid-applied membranes and flashings.
 - a. Tensile Strength, ASTM D 1682: Not less than 50 lbf. (222 N).
 - b. Elongation, ASTM D 1682: Not less than 60 percent.
 - c. Tear Strength, ASTM D 1117: Not less than 16 lbf. (70 N).
 - d. Weight: 3 oz./sq. yd (102 g/sq. m).

C. Seam Sealer Mastic: Waterproof seam and fastener patching material.

- 1. Acrylic Patching and Seam Sealer: White, single-component high solids acrylic sealant, low-VOC, formulated for compatibility and use with specified roofing and wall substrates.
 - a. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 50 g/L.
 - b. Tensile Strength, ASTM D 412: 500 psi.
 - c. Hardness, Shore A: 45.
 - d. Elongation, ASTM D 412: 260 percent.
 - e. Impact Resistance: 160 in/lb.

- D. Joint Sealant: Elastomeric joint sealant compatible with applied coating, with movement capability appropriate for application.

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1. Joint Sealant, Polyurethane: ASTM C 920, Type S, Grade NS, Class 50 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints; paintable.
 - a. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 40 g/L.
 - b. Hardness, Shore A, ASTM C 661: 40.
 - c. Adhesion to Concrete, ASTM C 794: 35 pli.
 - d. Tensile Strength, ASTM D 412: 350 psi.
 - e. Color: White.
- E. Fasteners: Factory-coated steel fasteners and metal plates meeting corrosion-resistance provisions in FM 4470; designed for fastening metal roofing components to substrate; tested by fastener manufacturer for required pullout strength; and acceptable to roofing system manufacturer.
- F. Metal Flashings:
 1. Gutter Metal: Gutter Metal: Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 50 (Class AZM150 coating designation, Grade 340) preprinted by the coil-coating process to comply with ASTM A 755/A 755M; structural quality.
 - a. Thickness: 0.0236-inch/24 ga.(0.60-mm) minimum thickness.
 - b. Color to be selected by Owner.
 2. Outlet Tubes: Match gutter material.
 3. Downspouts: 3" round 16 gauge galvanized steel. Paint to match existing.
 - a. Match existing layout.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine existing roofing substrates, with Installer present, for compliance with requirements and for other conditions affecting application and performance of roof coatings.
 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.
 2. Verify compatibility with and suitability of substrates.
 3. Verify that substrates are visibly dry and free of moisture.
 4. Verify that metal roofing is free of rust affecting structural integrity of roofing, or other indications of impending metal roof system failure.
 5. Application of coatings indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Protect existing roofing system that is indicated not to be coated, and adjacent portions of building and building equipment.
 - 1. Comply with warranty requirements of existing roofing manufacturer.
 - 2. Maintain temporary protection and leave in place until roofing rehabilitation has been completed.
- B. Shut down air intake equipment in the vicinity of the Work in coordination with the Owner. Cover air intake louvers before proceeding with rehabilitation work that could affect indoor air quality or activate smoke detectors in the ductwork.
 - 1. Verify that rooftop utilities and service piping affected by the Work have been shut off before commencing Work.
- C. Maintain roof drainage in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors.
 - 1. Do not permit water to enter into or under existing metal roofing system components that are to remain.

3.3 ROOFING COATING PREPARATION

- A. Metal Roofing Surface Preparation:
 - 1. Remove loose roofing fasteners and other substrate irregularities from existing metal roofing that would inhibit application of uniform, weathertight coating.
 - 2. Repair metal roofing at locations where irregularities have been removed.
 - 3. Provide replacement fasteners where missing.
 - 4. Clean roof substrate, gutter, and downspouts of contaminants such as dirt, debris, oil, and grease that can affect adhesion of coating by power washing at minimum 2000 psi. Remove existing coatings if any. Allow to dry thoroughly.
 - 5. Verify that existing substrate is dry before proceeding with application of coating.
 - 6. Perform adhesion testing before proceeding with application of coating.
- B. Gutter:
 - 1. Install new gutter systems at existing locations.
 - 2. Install new outlet tubes and downspouts. Secure downspout at top and bottom of wall.

3.4 ROOF COATING APPLICATION

- A. Primer: Spot prime cleaned rusted or bare areas with metal primer at manufacturer's recommended application rate and allow to dry.

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- B. Metal Roofing Seam Reinforcement Plies: Coat horizontal and vertical seams with detail course of seam sealer according to manufacturer's written instructions. Embed polyester reinforcement fabric in seam sealer.
- C. Fasteners: Remove repairs over existing fasteners. Prime all fasteners and seal with polyurethane sealant.
- D. Coating: Apply number of coats and thickness of coats recommended in writing by manufacturer for application over the roof system, all flashings, gutters to remain, whirly birds and vents. Apply minimum of two coats.
- E. Joint Sealant: Apply joint sealant at exposed movement joints, terminations, and where required for complete weathertight application.

3.5 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period.
- B. Correct deficiencies in or remove coating that does not comply with requirements, repair substrates, and reapply coating.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 070150.71

SECTION 070150.74 - REHABILITATION OF SINGLE PLY ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Roof membrane coating preparation.
2. Application of reinforced fluid-applied roof membrane and flashings over existing fully adhered PVC membrane roof.

1.2 ROOFING CONFERENCES

A. Roofing Rehabilitation Preinstallation Conference: Conduct conference at Project site to review methods and procedures related to roofing system.

1. Meet with Owner; Architect; roofing coating materials manufacturer's representative; roofing rehabilitation Installer including project manager and foreman; and installers whose work interfaces with or affects rehabilitation including installers of roof accessories and roof-mounted equipment requiring removal and replacement as part of the Work.
2. Review temporary protection requirements for existing roofing system that is to remain uncoated, during and after installation.
3. Review methods and procedures related to re-coating preparation, including coating manufacturer's written instructions.
4. Review roof drainage during each stage of coating and review roof drain plugging and plug removal procedures.
5. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
6. Review base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that will affect coating.
7. Review existing conditions that may require notification of Owner before proceeding.

1.3 MATERIALS OWNERSHIP

A. Demolished materials shall become Contractor's property and shall be removed from Project site.

1.4 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D1079 "Standard Terminology Relating to Roofing and Waterproofing" and glossary in NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" for definition of terms related to roofing work in this Section.
- B. Roofing Coating Preparation: Existing roofing that is to remain and be prepared to accept restorative coating application.

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- C. Patching: Removal of a portion of existing membrane roofing system from deck or removal of selected components and accessories from existing membrane roofing system and replacement with similar materials.
- D. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and reinstalled.
- E. Existing to Remain: Existing items of construction that are not indicated to be removed.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product specified.
- B. Sustainable Design Submittals:
 - 1. Product Test Reports: For roof coating, indicating that coated roof will comply with solar reflectance index requirement.
 - 2. Indicate Food, Conservation, and Energy Act of 2008 Bio-based material requirement compliance.
 - a. Indicate type of bio-based material in product.
 - b. Indicate the percentage of bio-based content per unit of product.
 - c. Indicate relative dollar value of bio-based content product to total dollar value of product included in project.

1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Product Certificate: Submit notarized certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.
 - 1. Provide manufacturer's UL listing certificate for roofing system.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing rehabilitation system.
- C. Qualification Data: For Installer, Manufacturer, and Roofing Inspector.
 - 1. Letter written for this Project indicating manufacturer approval of Installer to apply specified products and provide specified warranty.
- D. Warranties: Unexecuted sample copies of special warranties.
- E. Photographs or Video Recordings: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, which might be misconstrued as having been damaged by rehabilitation operations. Submit before Work begins.
- F. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, and for dust control. Indicate proposed locations and construction of barriers.

- G. Inspection Reports: Reports of Roofing Inspector. Include weather conditions, description of work performed, tests performed, defective work observed, and corrective actions required and carried out.

- 1. Submit report within 48 hours after inspection.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: To include in maintenance manuals.
- B. Warranties: Executed copies of approved warranty forms.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of three years' experience installing products similar to those specified, able to communicate verbally with Contractor, Architect, and employees, and the following:
 - 1. Qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.
- B. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:
 - 1. An authorized full-time technical employee of the manufacturer.
 - 2. An independent party certified as a Registered Roof Observer by the International Institute of Building Enclosure Consultants (formerly the Roof Consultants Institute) retained by the Contractor or the Manufacturer and approved by the Manufacturer.

1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with rehabilitation work only when existing and forecasted weather conditions permit Work to proceed without water entering into existing roofing system or building.
 - 1. Store all materials prior to application at temperatures recommended by manufacturer.
 - 2. Apply coatings within range of ambient and substrate temperatures recommended by manufacturer.
 - 3. Do not apply roofing in snow, rain, fog, or mist.
- B. Protect building to be rehabilitated, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from rehabilitation operations.
- C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
- D. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

- E. Owner will occupy portions of building immediately below re-coating area. Conduct re-coating so Owner's operations will not be disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.

1.10 WARRANTY

- A. Manufacturer's Warranty: Roof System Manufacturer's standard form in which Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within warranty period, as follows.
 - 1. Form of Warranty: Manufacturer's standard warranty form.
 - 2. Scope of Warranty: Work of this Section and including sheet metal details and termination details installed by the roof system Installer and approved by the Roof System Manufacturer.
 - 3. Warranty Period: 20 years from date of completion.
- B. Manufacturer Inspection Services: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's inspections is included in the Contract Sum.
 - 1. Inspections to occur in following years: 2, 5, 10, 15 following completion.
- C. Installer Warranty: Installer's warranty signed by Installer, as follows.
 - 1. Form of Warranty: Form acceptable to Roofing Manufacturer and Owner.
 - 2. Scope of Warranty: Work of this Section.
 - 3. Warranty Period: 2 years from date of completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The roof system specified in this Section is based upon products of Tremco, Incorporated. Provide specified products.
- B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Rehabilitated roofing shall withstand exposure to weather without failure or leaks due to defective manufacture or installation.
 - 1. Accelerated Weathering: Roofing system shall withstand 5000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

- C. Exterior Fire-Test Exposure: Roofing system exterior fire-test exposure performance following application of rehabilitation coating shall be not be less than that of the pre-rehabilitated roof performance when tested in accordance with ASTM E108, based upon manufacturer's tests of identical applications.
- D. Energy Performance: Provide rehabilitated roofing according to the following when tested according to CRRC-1:
 - 1. Three-year, aged solar reflectance of not less than 0.55 and emissivity of not less than 0.75.
- E. Bio-Based Content: Provide roofing rehabilitation coating materials meeting requirements of USDA Bio-based Affirmative Procurement Program, with not less than 20 percent bio-based content.

2.3 MATERIALS, GENERAL

- A. General: Rehabilitation materials recommended by roofing system manufacturer for intended use and compatible with components of existing membrane roofing system.
- B. Infill Materials: Where required to replace test cores and to patch existing roofing, use infill materials matching existing membrane roofing system materials, unless otherwise indicated.
- C. Temporary Roof Drainage: Design and selection of materials for temporary roof drainage are responsibilities of the Contractor.

2.4 FLUID-APPLIED ROOFING MEMBRANE COATING

- A. Polyurethane Elastomeric Fluid-Applied System: Two-coat fluid-applied roofing membrane formulated for application over prepared existing roofing substrate.
 - 1. Polyurethane Roof Coating System Base Coat: Bio-based, low-odor low-VOC two-part, for use with a compatible top coat.
 - a. Combustion Characteristics, UL 790: Maintains combustion characteristics of existing roof system.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 1 g/L.
 - c. Accelerated Weathering, 5000 hours, ASTM G154: Pass.
 - d. Hardness, Shore A, minimum, ASTM D2240: 80.
 - e. Solids, by volume, ASTM D2697: 100 percent.
 - f. Bio-Based Content, Minimum: 70 percent.
 - g. Minimum Thickness, Base Coat reinforced over Single-Ply: 48 mils (1.22 mm) wet.
 - 2. Polyurethane roof coating system top coat, bio-based low-odor low-VOC two-part, for application over compatible base coat.
 - a. Combustion Characteristics, UL790: Maintains combustion characteristics of existing roof system.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 6 g/L.

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- c. Solar Reflectance Index (SRI), ASTM E1980: For white, not less than 103.
- d. Accelerated Weathering, 5000 hours, ASTM G 154: Pass.
- e. Hardness, Shore A, minimum, ASTM D2240: 81.
- f. Solids, by volume, ASTM D2697: 100 percent.
- g. Bio-Based Content, Minimum: 60 percent.
- h. Minimum Thickness, reinforced system: 32 mils (0.81 mm) wet.
- i. Color: White.

B. Primers:

- 1. Primer for Asphaltic and Single-Ply Membranes: Water-based, polymer-modified quick-dry low odor primer.
 - a. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 1 g/L.
 - b. Solids, by weight: 70 percent.
- 2. Primer for Non-Porous Surfaces: Single-part, water-based primer to promote adhesion of urethanes to metals, PVC and other non-porous surfaces.
 - a. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 22 g/L.
 - b. Nonvolatile Content, minimum, ASTM D2369: 5 percent.
 - c. Density at 77 deg F (25 deg C): 8.3 lb/gal (1kg/L).
- 3. Primer for Intercoat and Substrate Adhesion: Single-part, quick-drying primer to promote adhesion of urethane products to previous urethane coats and to other approved surfaces.
 - a. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 100 g/L.
 - b. Coverage Rate, 400 sq. ft/ gal. (10 m²/ L): 4 mils (0.10 mm) wet.

C. Fluid-Applied Roofing Reinforcing Fabric:

- 1. Polyester Reinforcing and Protection Fabric: 100 percent stitch-bonded mildew-resistant polyester fabric intended for reinforcement of compatible fluid-applied membranes and flashings and as a protection layer under pavers or stone aggregates.
 - a. Tensile Strength, Minimum, ASTM D1682: 50 lbf (23 kg) avg..
 - b. Elongation, Minimum, ASTM D1682: 60 percent.
 - c. Tear Strength, Minimum, ASTM D1117: 16 lbf (7.3 kg) avg..
 - d. Weight: 3 oz./sq. yd (102 g/sq. m).

2.5 AUXILIARY ROOFING REHABILITATION MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with existing roofing system and roofing coating system.
- B. Seam Sealer: Waterproof seam and patching material compatible with applied coating.
 - 1. Seam Sealer: Aliphatic polyurethane sealer, single-component, moisture curing, high solids, low-VOC, formulated for compatibility and use with specified roofing substrates.
 - a. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 75 g/L.
 - b. Tensile Strength, ASTM D412: 270 psi (1860 kPa).
 - c. Tear Strength, ASTM D412: 35 pli (6 kN/m).
 - d. Elongation, ASTM D412: 700 percent.
 - e. Color: White.
- C. Seam and Detail Reinforcing Fabric:
 - 1. Polyester Reinforcing and Protection Fabric: 100 percent stitch-bonded mildew-resistant polyester fabric intended for reinforcement of compatible fluid-applied membranes and flashings and as a protection layer under pavers or stone aggregates.
 - a. Tensile Strength, Minimum, ASTM D1682: 50 lbf (23 kg) avg..
 - b. Elongation, Minimum, ASTM D1682: 60 percent.
 - c. Tear Strength, Minimum, ASTM D1117: 16 lbf (7.3 kg) avg..
 - d. Weight: 3 oz./sq. yd (102 g/sq. m).
- D. Joint Sealant: Elastomeric joint sealant compatible with applied coating, with movement capability appropriate for application.
 - 1. Joint Sealant, Polyurethane: ASTM C920, Type S, Grade NS, Class 50 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints; paintable.
 - a. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 40 g/L.
 - b. Hardness, Shore A, ASTM C661: 40.
 - c. Adhesion to Concrete, ASTM C794: 35 pli.
 - d. Tensile Strength, ASTM D412: 350 psi (2410 kPa).
 - e. Color: White.
- E. Metal Flashings:

1. Gutter Metal: Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 50 (Class AZM150 coating designation, Grade 340) prepainted by the coil-coating process to comply with ASTM A 755/A 755M; structural quality.
 - a. Thickness: 0.0236-inch/24 ga.(0.60-mm) minimum thickness.
 - b. Color to be selected by Owner.
2. Outlet Tubes: Match gutter material.
3. Downspouts: 3" round 16 gauge galvanized steel. Paint to match existing.
 - a. Match existing layout.

F.

- G. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine existing roofing substrates, with Installer present, for compliance with requirements and for other conditions affecting application and performance of roof coatings
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.
 2. Verify compatibility with and suitability of substrates.
 3. Verify that substrates are visibly dry and free of moisture.
 4. Verify that roofing membrane surfaces have adequately aged to enable proper bond with base coat.
 5. Verify that roofing membrane is free of blisters, splits, open laps, indications of shrinkage, and puncture damage or other indications of impending roof system failure.
 6. Commencing application of coatings indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Protect existing roofing system that is indicated not to be rehabilitated, and adjacent portions of building and building equipment.
1. Mask surfaces to be protected. Seal joints subject to infiltration by coating materials.
 2. Limit traffic and material storage to areas of existing roofing membrane that have been protected.
 3. Maintain temporary protection and leave in place until replacement roofing has been completed.

3.3 ROOFING COATING PREPARATION

A. Membrane Surface Preparation:

1. Remove buckles and roofing membrane fastener buttons projecting above the membrane, and other substrate irregularities from existing roofing membrane that would inhibit application of uniform, waterproof coating.
2. Broom clean existing substrate.
3. Substrate Cleaning: Clean substrate of contaminants such as dirt, debris, oil, and grease that can affect adhesion of coating by power washing at maximum 2,000 psi (13,800 kPa).
 - a. Dispose of waste water in accordance with requirements of authorities having jurisdiction.
4. Verify that existing substrate is dry before proceeding with application of coating. Spot check substrates with an electrical capacitance moisture-detection meter.
5. Verify adhesion of new products.

B. Existing Flashing and Detail Preparation: Repair flashings, gravel stops, copings, and other roof-related sheet metal and trim elements. Reseal joints, replace loose or missing fasteners, and replace components where required to leave in a watertight condition.

1. Do not damage metal counterflashings that are to remain. Replace metal counterflashings damaged during removal with counterflashings of same metal, weight or thickness, and finish.
2. Resecure perimeter metal where loose or pulled away.

C. Surface Priming: Prime surfaces to receive fluid-applied coating using coating manufacturer's recommended product for surface material. Apply at application rate recommended by manufacturer.

1. Ensure primer does not puddle and substrate has complete coverage.
2. Allow to cure completely prior to application of coating.

3.4 FLUID-APPLIED FLASHING APPLICATION

A. Fluid-Applied Flashing and Detail Base Coat Application: Complete base coat and fabric reinforcement at parapets, curbs, penetrations, and drains prior to application of field of fluid-applied membrane. Apply base coat in accordance with manufacturer's written instructions.

1. Apply base coat on prepared and primed surfaces and spread coating evenly. Extend coating minimum of 8 inches (200 mm) up vertical surfaces and 4 inches (100 mm) onto horizontal surfaces.
2. Back roll to achieve minimum coating thickness indicated on Part 2 product listing, unless greater thickness is recommended by manufacturer; verify thickness of base coat as work progresses.
3. Reinforcing Fabric: Embed fabric reinforcement into wet base coat. Lap adjacent flashing pieces of fabric minimum 3 inches (75 mm) along edges and 6 inches (150 mm) at end laps.
 - a. Roll surface of fabric reinforcing to completely embed and saturate fabric. Leave finished base coat with fabric free of pin holes, voids, or openings.

3.5 FLUID-APPLIED MEMBRANE APPLICATION

- A. Fluid-Applied Membrane Base Coat: Apply base coat to field of membrane in accordance with manufacturer's written instructions.
 - 1. Apply base coat on prepared and primed surfaces and spread coating evenly.
 - 2. Back roll to achieve minimum coating thickness indicated on Part 2 product listing, unless greater thickness is recommended by manufacturer; verify thickness of base coat as work progresses.
 - 3. Fabric Reinforcement: Embed fabric reinforcement into wet base coat. Lap adjacent pieces of fabric minimum 3 inches (75 mm) along edges and 6 inches (150 mm) at end laps.
 - a. Roll surface of fabric reinforcing to completely embed and saturate fabric. Leave finished base coat with fabric free of pin holes, voids, or openings.
- B. Fluid-Applied Membrane Top Coat: Apply top coat to field of membrane and flashings uniformly in a complete, continuous installation.
 - 1. Allow base coat to cure prior to application of top coat.
 - 2. Following curing of base coat and prior to application of top coat, sand raised or exposed edges of fabric reinforcement.
 - 3. Prime base coat prior to application of top coat if top coat is not applied within 72 hours of the base coat application, using manufacturer's recommended primer.
 - 4. Apply top coat extending coating up vertical surfaces and out onto horizontal surfaces. Install top coat over field base coat and spread coating evenly.
 - 5. Back roll to achieve minimum coating thickness indicated on Part 2 product listing, unless greater thickness is recommended by manufacturer; verify thickness of base coat as work progresses.
 - 6. Avoid foot traffic on new fluid-applied membrane for a minimum of 24 hours.

3.6 GUTTER INSTALLATION

- A. Gutter:
 - 1. Install new gutter systems at existing locations.
 - 2. Install new outlet tubes and downspouts. Secure downspout at top and bottom of wall.

3.7 FIELD QUALITY CONTROL

- A. Roofing Inspector: Contractor shall engage a qualified roofing inspector to perform roof tests and inspections and to prepare start up, interim, and final reports. Roofing Inspector's quality assurance inspections shall comply with criteria established in Quality Control and Quality-assurance Guidelines for the Application of Membrane Roof Systems."
- B. Repair fluid-applied membrane where test inspections indicate that they do not comply with specified requirements.

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- C. Arrange for additional inspections, at Contractor's expense, to verify compliance of replaced or additional work with specified requirements.

3.8 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period.
- B. Correct deficiencies in or remove coating that does not comply with requirements, repair substrates, and reapply coating.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 070150.74

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SECTION 075216.15 - SBS MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. All products in bold italics, listed in Part 2 – Products, and on “Attachment A”, will be furnished by Rosemead School District using its authority under the CMAS Contract. All remaining products listed within the Part 2 section, and any additional needed quantities of the products listed on “Attachment A”, shall be furnished by the Roofing Contractor.
- B. CMAS Contract #: 4-21-03-1001
- C. Section Includes:
 - 1. Section Includes: Styrene-butadiene-styrene (SBS) modified bituminous membrane roofing system on wood deck, including:
 - a. Cover board.
 - b. Mechanically-attached base-ply sheet.
 - c. Smooth ply sheet.
 - d. Mineral granulated cap sheet.
 - e. Membrane flashing sheets.
 - f. Roof surfacing consisting of acrylic coating system.
- D. Related Sections:
 - 1. Division 07 Section "Preparation for Re-Roofing".

1.2 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 "Standard Terminology Relating to Roofing and Waterproofing" and glossary in applicable edition of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" for definition of terms related to roofing work in this Section.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Roofing Conference: Conduct conference at Project site
 - 1. Meet with Owner, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 - 2. Review drawings and specifications.
 - 3. Review methods and procedures related to roofing installation, including manufacturer's written instructions.

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4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
5. Examine substrate conditions and finishes for compliance with requirements, including flatness and fastening.
6. Review structural loading limitations of roof deck during and after roofing.
7. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
 1. Product Test Reports for Solar Reflectance: For roof materials, indicating that roof materials comply with Solar Reflectance Index requirement.
 2. Product Data and Laboratory Test Reports: For adhesives and sealants, indicating compliance with requirements for low-VOC/low-emitting materials.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work. Provide roof plan showing orientation and types of roof deck, orientation of membrane roofing, and fastening spacings and patterns for mechanically fastened components.
 1. Base flashings and built-up terminations.
 - a. Indicate details meet requirements of NRCA required by this Section.
 2. Crickets, saddles, and tapered edge strips, including slopes.
- C. Samples for Verification: For the following products:
 1. Sheet roofing materials.

1.5 INFORMATIONAL SUBMITTALS

- A. Contractor's Product Certificate: Submit certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers names, with statement indicating that products to be provided meet the requirements of the Contract Documents.
- B. Qualification Data: For Installer, Manufacturer, and Roofing Inspector.
 1. Include letter from Manufacturer written for this Project indicating approval of Installer.
- C. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

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1. Submit evidence of compliance with performance requirements, including UL listing certificate and Energy Performance.
2. Product Compatibility: Indicate manufacturer has verified compatibility of roofing system components, including but not limited to: Roofing membrane, flashing sheets, adhesives and sealants.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of built-up roofing.
- E. Warranties: Unexecuted sample copies of special warranties.
- F. Field Quality Control Reports: Reports of Roofing Inspector. Include weather conditions, description of work performed, tests performed, defective work observed, and corrective actions taken to correct defective work.
 1. Submit reports within 24 hours after inspection.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: To include in maintenance manuals.
- B. Warranties: Executed copies of warranties.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of five years' experience installing products comparable to those specified, able to communicate verbally with Contractor and employees, and qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.
- B. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:
 1. An authorized full-time technical employee of the manufacturer.
 2. An independent party certified as a Registered Roof Observer by the Roof Consultants Institute, retained by the Contractor or the Manufacturer and approved by the Manufacturer.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

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- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.9 PROJECT / FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
- B. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
 - 1. Provide tie-offs at end of each day's work to cover exposed roofing and insulation with a course of roofing sheet securely in place with joints and edges sealed.
 - 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
 - 3. Remove temporary plugs from roof drains at end of each day.
 - 4. Remove and discard temporary seals before beginning work on adjoining roofing.

1.10 WARRANTY

- A. Manufacturer's Warranty: Roof System Manufacturer's standard form in which Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within warranty period, as follows.
 - 1. Form of Warranty: Manufacturer's standard warranty form.
 - 2. Scope of Warranty: Work of this Section and including sheet metal details and termination details installed by the roof system Installer and approved by the Roof System Manufacturer.
 - 3. Warranty Period: 20 years from date of completion.
- B. Manufacturer Inspection Services: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's inspections is included in the Contract Sum.
 - 1. Inspections to occur in following years: 2, 5, 10, and 15 following completion.
- C. Installer Warranty: Installer's warranty signed by Installer, as follows.

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1. Form of Warranty: Form acceptable to Roofing Manufacturer and Owner.
2. Scope of Warranty: Work of this Section.
3. Warranty Period: 2 years from date of completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The roof system specified in this Section is based upon products of Tremco, Incorporated. Provide specified products.
- B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
 1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
 2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746/D3746M, ASTM D4272/D4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- B. Flashings and Fastening: Provide base flashings, perimeter flashings, detail flashings and component materials and installation techniques that comply with requirements and recommendations of the following:
 1. NRCA Roofing Manual (Sixth Edition) for construction details and recommendations.
 2. SMACNA Architectural Sheet Metal Manual (Seventh Edition) for construction details.
- C. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
- D. Fire-Resistance Ratings: Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
- E. Solar Reflectance Index: Not less than 78 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.

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- F. Energy Performance: Roofing system shall have an initial solar reflectance index of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.

2.3 MATERIALS, GENERAL

- A. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

2.4 ROOFING MEMBRANE MATERIALS

A. Base Sheet:

- 1. SBS/RET/Urethane-modified asphalt coated polyester reinforced high elongation sheet, smooth surfaced, ASTM D6164 Type I Grade S.

- a. **Powerply Endure 200 Smooth.**

- b. Tensile Strength at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction 130 lbf/in (22 kN/m) ; cross machine direction; 110 lbf (19 kN/m).
 - c. Tear Strength at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction 160 lbf (700 N); cross machine direction; 130 lbf (575 N).
 - d. Elongation at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction, 55 percent; cross machine direction, 60 percent.
 - e. Low Temperature Flex, maximum, ASTM D5147: -40 deg. F (-40 deg. C).
 - f. Thickness, minimum, ASTM D5147: 0.094 inch (2.4 mm) .

B. Ply Sheet:

- 1. Asphalt and glass-fiber roofing ply sheet for hot-applied built-up roofing systems, ASTM D2178 Type IV.
 - a. Net Dry Mass of asphalt impregnated glass felt, ASTM D146: 7.5 lb/100 sq ft (360 g/ sq m).
 - b. Breaking Strength, ASTM D146: 44 lbf/in (7.70 kN/m).
 - c. Pliability, 1/2 inch (13 mm), ASTM D146: Pass.

C. SBS Modified Bituminous Cap Sheet:

- 1. SBS/RET/Urethane-modified asphalt-coated glass-fiber-reinforced high-tensile strength sheet, white granular surfaced, ASTM D6163 Type III Grade G.
 - a. **Powerply Endure 100 FR.**
 - b. Tensile Strength at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction 185 lbf/in (32 kN/m); Cross machine direction 210 lbf/in (35 kN/m).

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- c. Tear Strength at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction, 325 lbf (1445 N); Cross machine direction 325 lbf (1445 N).
- d. Elongation at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction 6 percent; Cross machine direction 8 percent.
- e. Low Temperature Flex, maximum, ASTM D5147: Machine Direction, -40 deg. F (-40 deg. C); Cross machine direction -35 deg. F (-37 deg.C).
- f. Thickness, minimum, ASTM D5147: 0.130 inch (3.3 mm).

D. Membrane Flashing Backer Sheet:

- 1. SBS/RET/Urethane-modified asphalt coated polyester reinforced high elongation sheet, smooth surfaced, ASTM D6164 Type I Grade S.
 - a. Tensile Strength at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction 130 lbf/in (22 kN/m) ; cross machine direction; 110 lbf (19 kN/m).
 - b. Tear Strength at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction 160 lbf (700 N); cross machine direction; 130 lbf (575 N).
 - c. Elongation at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction, 55 percent; cross machine direction, 60 percent.
 - d. Low Temperature Flex, maximum, ASTM D5147: -40 deg. F (-40 deg. C).
 - e. Thickness, minimum, ASTM D5147: 0.094 inch (2.4 mm) .

E. Membrane Flashing Sheet:

- 1. SBS/RET/Urethane-modified asphalt-coated glass-fiber-reinforced high-tensile strength sheet, white granular surfaced, ASTM D6163 Type III Grade G.
 - a. Tensile Strength at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction 185 lbf/in (32 kN/m); Cross machine direction 210 lbf/in (35 kN/m).
 - b. Tear Strength at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction, 325 lbf (1445 N); Cross machine direction 325 lbf (1445 N).
 - c. Elongation at 77 deg. F (25 deg. C), minimum, ASTM D5147: Machine direction 6 percent; Cross machine direction 8 percent.
 - d. Low Temperature Flex, maximum, ASTM D5147: Machine Direction, -40 deg. F (-40 deg. C); Cross machine direction -35 deg. F (-37 deg.C).
 - e. Thickness, minimum, ASTM D5147: 0.130 inch (3.3 mm).

F. Fluid-Applied Flashing Materials:

- 1. Polyurethane-modified methyl methacrylate reinforced roof coating system base coat, two-part moisture-curing for use with a compatible top coat.

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- a. Combustion Characteristics, UL790: Maintains combustion characteristics of existing roof system.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 0 g/L.
 - c. Tensile Strength, ASTM D5147: 175 lbf/in (31 N/mm).
 - d. Elongation, Reinforced, ASTM D5147: 40 percent.
 - e. Crack Bridging, ASTM D5147: Pass - 2 mm.
 - f. Hardness, Shore A, minimum, ASTM D2240: 93.
 - g. Minimum Thickness, Reinforced Base Coat: 80 mils (2.0 mm) wet total: Apply 40 mils (1.0 mm) wet, plus 40 mils (1.0 mm) wet over reinforcing fabric.
2. Polyurethane-modified methyl methacrylate roof coating system top coat, two-component 0 VOC, UV resistant, for application over compatible base coat.
 - a. Combustion Characteristics, UL 790: Maintains combustion characteristics of existing roof system.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 0 g/L.
 - c. Tensile Strength, ASTM D5147: 175 lbf/in (30 N/mm).
 - d. Elongation, Reinforced, ASTM D5147: 40 percent.
 - e. Crack Bridging, ASTM D5147: Pass, 2 mm.
 - f. Hardness, Shore A, minimum, ASTM D2240: 93.
 - g. Solar Reflectance Index (SRI), minimum, ASTM E1980: 95.
 - h. Minimum Thickness: 32 mils (0.81 mm) wet over cured base coat.
3. Polyester Reinforcing and Protection Fabric: 100 percent stitch-bonded mildew-resistant polyester fabric intended for reinforcement of compatible fluid-applied membranes and flashings.
 - a. Tensile Strength, Minimum, ASTM D1682: 50 lbf (23 kg) avg..
 - b. Elongation, Minimum, ASTM D1682: 60 percent.
 - c. Tear Strength, Minimum, ASTM D1117: 16 lbf (7.3 kg) avg..
 - d. Weight: 3 oz./sq. yd (102 g/sq. m).

G. Detail Fabric:

1. Woven Glass Fiber Mesh, Vinyl-Coated: Non-shrinking, non-rotting, vinyl-coated woven glass mesh for reinforcing flashing seams, membrane laps, and other roof system detailing.

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- a. Tensile strength, 70 deg. F, min ASTM D146: Warp, 65 lbf/in (285 N); fill, 75 lbf/in (310 N).

2.5 ADHESIVE MATERIALS

- A. General: Adhesive and sealant materials recommended by roofing system manufacturer for intended use and compatible with roofing membrane.

1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

- B. Lap Sheet Adhesive:

1. Cold-applied roofing membrane seam adhesive, elastomeric urethane adhesive, two-part, solvent-free, formulated for use as a seam adhesive for bituminous membrane seams, gun-grade.

- a. **Powerply Endure Bio Adhesive TF.**

- b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 0 g/L.

- c. Hardness, Shore A, ASTM C661: 30 to 35.

- C. Ply/Cap/Flashing Sheet Adhesive:

1. Hot-melt asphalt adhesive, ASTM D312 Type IV.

- a. Softening Point, min/max, ASTM D36: 215–225 deg. F (100–105 deg. C).

- b. Ductility at 77 deg. F, (25 deg C) minimum, ASTM D113: 1.5 cm.

- c. Penetration at 77 deg. F (25 deg. C), min/max, ASTM D5: 15–25 dmm.

- D. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application.

1. Roof Cement, Asphalt-Based: ASTM D4586, Type II, Class I, fibrated roof cement formulated for use in installation and repair of asphalt ply and modified bitumen roofing plies and flashings; UL-classified for fire resistance.

- a. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 190 g/L.

- b. Non-Volatile Matter, ASTM D4586: 85 percent.

- c. Resistance to sag ASTM D4586: 1/8 in. (3 mm).

- E. Mastic Sealant: Polyisobutylene, plain or modified bitumen, nonhardening, nonmigrating, nonskinning, and nondrying.

1. Edge Sealer: Urethane two-component, ASTM C920, Type M, Grade P, Class 12.5, Use O, fast setting, solvent-free, low-odor, formulated for compatibility and use with specified roofing membranes and flashings.

- a. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 0 g/L.

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- b. Hardness, Shore A, minimum ASTM C661: 40.

2.6 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing membrane.
- B. Fasteners: Factory-coated steel fasteners and metal plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roofing components to substrate, tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.
- C. Base-Ply Sheet Mechanical Fasteners: Manufacturer's standard 2-inch wide barbed galvanized steel seam plate.
- D. Acrylic Mastic:
 - 1. Seam Sealer and Patching Sealer: Acrylic elastomeric sealer, single-component, high solids, low-VOC, formulated for compatibility and use with specified roofing and wall substrates.
 - a. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 50 g/L.
 - b. Tensile Strength, minimum, ASTM D412: 450 psi (3100 kPa).
 - c. Hardness, Shore A: 45.
 - d. Elongation, minimum, ASTM D412: 300 percent.
 - e. Impact Resistance, minimum: 160 in/lb (18 kN/m).
- E. Metal Coating: ASTM D 6083, solar-reflective acrylic elastomer emulsion coating.
- F. Joint Sealant: Elastomeric joint sealant compatible with roofing materials, with movement capability appropriate for application.
 - 1. Joint Sealant, Polyurethane: ASTM C920, Type S, Grade NS, Class 50 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints; paintable.
 - a. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 40 g/L.
 - b. Hardness, Shore A, ASTM C661: 40.
 - c. Adhesion to Concrete, ASTM C794: 35 pli.
 - d. Tensile Strength, ASTM D412: 350 psi (2410 kPa).
 - e. Color: White.
- G. Metal Flashings:
 - 1. Edge Metal: Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 50 (Class AZM150 coating designation, Grade 340) prepainted by the coil-coating process to comply with ASTM A 755/A 755M; structural quality.

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- a. Thickness: 0.0236-inch/24 ga.(0.60-mm) minimum thickness.
 - b. Color to be selected by Owner.
 - c. 22-gauge galvanized cleat.
 - d. Rise on draining edge: ¼”.
 - e. Rise on non-draining edge: ½”.
 - f. Fascia: ½” longer than existing.
2. Edge metal at identified rake location: 24 ga bonderized.
 3. Gutter Metal: Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 50 (Class AZM150 coating designation, Grade 340) prepainted by the coil-coating process to comply with ASTM A 755/A 755M; structural quality.
 - a. Thickness: 0.0236-inch/24 ga.(0.60-mm) minimum thickness.
 - b. Color to be selected by Owner.
 - c. 16 gauge galvanized straps at 18” oc.
 4. Outlet Tubes: Match gutter material.
 5. Downspouts: Match existing gauge, size, profile, and attachment.
 6. Counterflashing: 22-gauge galvanized steel.
 7. T-Tops: Minimum 8” high, 22 gauge galvanized steel with sides and screens.
- H. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

2.7 ROOF INSULATION MATERIALS

- A. Roof Insulation, General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
1. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes on the high side of all curbs.
- B. Insulation Material:
1. Board Insulation, Polyisocyanurate: CFC- and HCFC- free, with recycled content glass-fiber mat facer on both major surfaces, ASTM C1289 Type II Class 1.
 - a. Compressive Strength, ASTM D1621: Grade 2: 20 psi (138 kPa).
 - b. Conditioned Thermal Resistance at 75 deg. F (24 deg. C): 14.4 at 2.5 inches (50.8 mm) thick.
 - c. Match existing thickness.

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2.8 INSULATION ACCESSORIES

- A. Substrate Board:
 - 1. Gypsum panel, glass-mat-faced, ASTM C1177/C1177M.
 - a. Thickness: 1/4 inch (6 mm).
- B. Insulation Cant Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.
- C. Tapered Edge Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.

2.9 SURFACING MATERIALS

- A. Acrylic Emulsion Coating Material:
 - 1. Acrylic Roof Coating, Highly-Reflective Elastomeric: ASTM D6083, applied as base coat plus finish coat over prepared and primed roof surfaces.
 - a. **Solargard 6083 Base and Top Coat.**
 - b. Solar Reflectance Index (SRI), white, ASTM E1980: 105 initial; 100 aged.
 - c. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 50 g/L.
 - d. Tensile Strength at 73 deg. F (23 deg. C), minimum, ASTM D2370: 250 psi (1700 kPa).
 - e. Elongation at 73 deg. F (23 deg. C), minimum, ASTM D2370: 350 percent.
 - f. Flexibility at -15 deg F (-26 deg C), ASTM D522: Pass 1/2 inch mandrel bend after 1000 hrs. accelerated weathering.
 - g. Solids by weight, minimum ASTM D1644: 60 percent.
 - h. Solids by volume, minimum ASTM D2697: 50 percent.
 - i. Color, Top Coat: White.
 - j. Minimum Thickness over BUR and MB: 24 mils (0.60 mm) wet each coat for base and finish coats.

2.10 WALKWAYS

- A. Walkway Material:
 - 1. Walkway pads, ceramic-granule-surfaced reinforced asphaltic composition slip-resisting pads, manufactured as a traffic pad for foot traffic, 1/2 inch (13 mm) thick minimum.
 - a. Flexural Strength at max. load, minimum, ASTM C203: 218 psi (1.5 kPa).
 - b. Granule adhesion (weight loss), maximum, ASTM D4977: 1.1 gram.
 - c. Impact Resistance at 77 deg. F (25 deg. C), ASTM D3746: No Damage to Roof.

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- d. Pad Size: 36 by 48 inch (914 by 1220 mm).
- B. Rubber blocks: 100% rubber blocks with steel channels and reflective strips designed for supporting conduit.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 - 1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
 - 2. Wood Roof Deck: Verify that wood deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch (1.6 mm) out of plane relative to adjoining deck.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Water test all roof drains and existing downspouts prior to commencing work. Notify the district in writing if there are any clogged or slow flowing roof drains prior to starting demo.

3.3 INSTALLATION, GENERAL

- A. Install roofing system in accordance with manufacturer's written instructions, approved shop drawings, and Contract Documents.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.4 ROOFING INSTALLATION DETAILS

- A. NRCA Installation Details: Install roofing system in accordance with applicable NRCA Manual Plates and NRCA recommendations; modify as required to comply with manufacturer's approved details and perimeter fastening requirements.

3.5 INSULATION INSTALLATION

- A. Comply with roofing manufacturer's written instructions for installing roof insulation.
- B. Coordinate installing membrane roofing system components, so insulation is not exposed to precipitation or left exposed at the end of the workday.

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- C. Install insulation under area of roofing to match existing thickness. Where overall insulation thickness is 2.7 inches (68 mm) or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
- D. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - 1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- E. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
 - 1. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.
- F. Tapered Crickets: Install tapered crickets on the high side of all curbs.
 - 1. Make slope of crickets minimum of two times the roof slope and not less than 1/4 inch in 12 inches.
- G. Install cover boards over insulation and decking with long joints in continuous straight lines with end joints staggered between rows. Offset joints of decking below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together.
 - 1. Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.
 - 2. Adhere cover board over walkways and other locations where fasteners can be seen on the underside of the decking in low rise foam insulation adhesive.
- H. Cant Strips: Install and secure preformed 45-degree cant strips at junctures of built-up roofing with vertical surfaces or angle changes greater than 45 degrees.

3.6 ROOFING MEMBRANE INSTALLATION, GENERAL

- A. Install roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations in NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing" and as follows:
- B. Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.
- C. Cooperate with testing agencies engaged or required to perform services for installing roofing system.
- D. Coordinate installation of roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
 - 1. Provide tie-offs at end of each day's work configured as recommended by NRCA Roofing Manual Appendix: Quality Control Guidelines - Insulation to protect new roofing.
 - 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
 - 3. Remove temporary plugs from roof drains at end of each day.

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4. Remove and discard temporary seals before beginning work on adjoining roofing.
- E. Substrate-Joint Penetrations: Prevent roofing asphalt and adhesives from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

3.7 SBS-MODIFIED BITUMINOUS MEMBRANE INSTALLATION

- A. Install modified bituminous roofing membrane sheets according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, installing as follows:
 1. Unroll roofing membrane sheets and allow them to relax for minimum time period required by manufacturer.
 2. Laps: Accurately align roofing membrane sheets, without stretching, and maintain uniform side and end laps. Plan layout to stagger lap seams and end laps. Install roofing membrane sheets so side and end laps shed water. Completely bond and seal laps, leaving no voids.
 3. Commence layout at low point of roof area.
 4. Repair tears and voids in laps and lapped seams not completely sealed.
- B. Base Sheet:
 1. Install lapped base-ply sheet course, extending sheet over and terminating beyond cants.
 2. Starting at one end of sheet, install mechanical fasteners along center of 4 inch (102 mm) side lap spaced as indicated on approved shop drawings. Install fasteners to set the seam plate tight to the membrane. Do not overdrive fastener. Do not ripple or wrinkle the membrane.
 3. Adjust fastener spacing at perimeter and corners in accordance with approved shop drawings. Cover exposed fasteners in field of base sheet with 6 inch (150 mm) strips of base sheet adhered in base sheet overlap adhesive.
 4. Lap Seam Treatment: Adhere side and end lap seams with base sheet overlap adhesive and roll using weighted roller in accordance with manufacturer's instructions.
 5. Fully adhere base sheet over adhered coverboard in hot-applied membrane adhesive applied at rate required by roofing manufacturer
- C. Smooth Ply Sheet:
 1. Fully embed sheet in hot-applied membrane adhesive applied at rate required by roofing manufacturer at ridges, curbs, walls, and over crickets. Roll sheet using weighted roller. Ensure complete and continuous seal and contact between adhesive and membrane without wrinkles, fishmouths, and blisters.
- D. Granular Surfaced Cap Sheet:
 1. Fully embed sheet in hot-applied membrane adhesive applied at rate required by roofing manufacturer. Roll sheet using weighted roller. Ensure complete and continuous seal and contact between adhesive and membrane without wrinkles, fishmouths, and blisters.

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3.8 FLASHING AND STRIPPING INSTALLATION

- A. Install base flashing over cant strips and other sloped and vertical surfaces, at roof edges, and at penetrations through roof; secure to substrates according to roofing system manufacturer's written instructions, and as follows:
 - 1. Extend base flashing up walls and curbs.
 - 2. Prime substrates with asphalt primer if required by roofing system manufacturer.
 - 3. Backer Sheet Application: Mechanically fasten backer sheet to walls or parapets.
 - a. Adhere backer sheet over built-up roofing at cants in hot-applied flashing sheet adhesive.
 - 4. Flashing Sheet Application: Adhere flashing sheet to substrate in hot-applied adhesive. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.
 - a. Flashing Sheet Top Termination: Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.
 - 1) Seal top termination of base flashing with a metal termination bar.
 - b. Flashing Sheet Bottom Termination: Adhere flashing sheet to roofing membrane in continuous bed of hot-applied adhesive.
 - c. Install skirt metal counterflashing at all HVAC units, through wall counterflashing, and other locations where base flashing cannot be tucked under metal flashing at least 3".
 - 5. Fluid-Applied Flashing Application: Apply base coat with embedded fabric reinforcement and top coat at penetrations in accordance with manufacturer's written instructions.
 - a. Apply base coat to achieve minimum wet mil coating thickness indicated in Part 2 product listing, unless greater thickness is recommended by manufacturer
 - b. Apply top coat over flashing base coat and spread coating evenly to achieve minimum wet mil coating thickness indicated in Part 2 product listing, unless greater thickness is recommended by manufacturer.
- B. Install stripping, according to roofing manufacturer's written instructions, where metal flanges and edgings are set on built-up roofing.
- C. Flashing-Sheet Stripping: Install flashing-sheet stripping in a continuous coating of manufacturer's recommended adhesive and extend onto roofing membrane. Secure metal at 3" oc staggered with 3 pan head screws at all laps. Secure flange of Solatubes with pan head screws at 3" oc staggered. Apply two stripping plies extending 12" and 18" past the metal flange. Grind prefinished surfaces to bare metal prior to priming and installing stripping plies.
- D. Roof Drains: Set metal flashing in bed of asphalt roofing mastic on completed ply system. Cover metal flashing with two roofing membrane stripping plies and extend a minimum of 12 and 24 inches beyond edge of metal flashing onto field of roofing membrane. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring.

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1. Restore roof drains with metal coating system. Grind down to bare metal and prime prior to coating application.
- E. Install new counterflashing and wind clips at all existing locations.
- F. Lift through wall counterflashing to install base flashing. Resecure base flashing with hex head screws with neoprene washers at 12" oc.
- G. Replace low profile vents and existing T-tops with new T-tops.
- H. Install new wood curbs and sheet pelican hoods for insulated lines and multiple lines entering the same opening in the deck.
- I. Seal all vent, duct, duct drop, and pan seams and pan penetrations with acrylic sealer and polyester reinforcement. Coat all previously coated and uncoated metal including vents with metal coating at a rate of 3 gallons per square. Remove prior repairs, prepare, and prime surfaces prior to coating application.
- J. Gutters:
 1. Install 16" girth gutter supported by straps at locations identified on drawings.
 2. Install new outlet tubes.
 3. Reuse heavy gauge downspouts. Install new where indicated on drawings.
- K. Install new outlet tubes from gutter on upper roof system, across walkway roofs, and connected to the existing downspouts. Support new downspout on block supports.

3.9 COATING INSTALLATION

- A. Acrylic Emulsion Coating:
 1. Apply acrylic emulsion coating to prepared roofing membrane, base flashings, and uncoated metal vents and ducts according to manufacturer's written instructions, with number of coats, thickness of application, and application method as recommended in writing by coating manufact

3.10 WALKWAY INSTALLATION

- A. Walkways, General: Install walkways according to roofing manufacturer's written instructions.
 1. Install walkways from the roof access ladders to and surrounding all serviceable equipment.
 2. Set walkway pads in cold-applied adhesive.
- B. Install rubber blocks to support all conduit. Include a block every 8' and additional blocks at changes in direction and where needed for proper support. Use block manufacturer's risers for high conduit.
 1. At conduit lower than 5" off the finished roof where rubber blocks will not fit use redwood blocks.
 2. Set blocks on oversized cap sheet section.
 3. Do not over tighten clamps, leave slightly loose to allow for conduit movement.

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3.11 FIELD QUALITY CONTROL

- A. Roofing Inspector: Contractor shall engage a qualified roofing inspector for full time inspections, to perform roof tests and inspections and to prepare start up, interim, and final reports. Roofing Inspector's quality assurance inspections shall comply with criteria established in NRCA's "Quality Control and Quality-assurance Guidelines for the Application of Membrane Roofing Systems."
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation at commencement and upon completion.
 - 1. Notify Owner 48 hours in advance of date and time of inspection.
- C. Repair or remove and replace components of built-up roofing where test results or inspections indicate that they do not comply with specified requirements.
 - 1. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.12 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075216.15

SECTION 075416 - KETONE ETHYLENE ESTER (KEE) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. All products in bold italics, listed in Part 2 – Products, and on “Attachment A”, will be furnished by Rosemead School District using its authority under the CMAS Contract. All remaining products listed within the Part 2 section, and any additional needed quantities of the products listed on “Attachment A”, shall be furnished by the Roofing Contractor.
- B. CMAS Contract #: 4-21-03-1001
- C. Section Includes:
 - 1. Adhered thermoplastic KEE roofing system.
- D. Related Sections:
 - 1. Division 07 Section "Preparation for Re-Roofing".

1.2 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D1079 "Standard Terminology Relating to Roofing and Waterproofing" and glossary in applicable edition of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" for definition of terms related to roofing work in this Section.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Roofing Conference: Conduct conference at Project site.
 - 1. Meet with Owner, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 - 2. Review drawings and specifications.
 - 3. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 5. Examine substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 - 6. Review structural loading limitations of roof deck during and after roofing.
 - 7. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 - 8. Review temporary protection requirements for roofing system during and after installation.

9. Review roof observation and repair procedures after roofing installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Sustainable Design Submittals:
 1. Product Test Reports for Solar Reflectance: For roof materials, indicating that roof materials comply with Solar Reflectance Index requirement.
- C. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.
 1. Base flashings and membrane terminations.
 - a. Indicate details meet requirements of NRCA required by this Section.
- D. Samples for Verification: For the following products:
 1. Sheet roofing.

1.5 INFORMATIONAL SUBMITTALS

- A. Contractor's Product Certificate: Submit certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.
- B. Qualification Data: For Installer, Manufacturer and Roofing Inspector.
 1. Include letter from Manufacturer written for this Project indicating approval of Installer.
- C. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 1. Submit evidence of compliance with performance requirements.
 - a. Include: UL listing certificate and Energy Performance.
 2. Product Compatibility: Indicate manufacturer has verified compatibility of roofing system components, including but not limited to: Roofing membrane, flashing sheets, adhesives, and sealants.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.
- E. Warranties: Unexecuted sample copies of special warranties.
- F. Daily Inspection Reports: Reports of Roofing Inspector. Include weather conditions, description of work performed, tests performed, defective work observed, and corrective actions taken to correct defective work.
 1. Submit reports within 24 hours after inspection.

1.6 CLOSEOUT SUBMITTALS

- A. Executed copies of warranties.
- B. Maintenance Data: To include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of five years' experience installing products comparable to those specified, able to communicate verbally with Contractor, and employees, and qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.
- B. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:
 - 1. An authorized full-time technical employee of the manufacturer.
 - 2. An independent party certified as a Registered Roof Observer by the International Institute of Building Enclosure Consultants (formerly the Roof Consultants Institute) retained by the Contractor or the Manufacturer and approved by the Manufacturer.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site access to manufacturer's written recommendations and instructions for installation of products.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.9 PROJECT / FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

- B. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
 - 1. Provide tie-offs at end of each day's work to cover exposed roofing and insulation with a course of roofing sheet securely in place with joints and edges sealed.
 - 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
 - 3. Remove temporary plugs from roof drains at end of each day.
 - 4. Remove and discard temporary seals before beginning work on adjoining roofing.

1.10 WARRANTY

- A. Manufacturer's Warranty: Roof System Manufacturer's standard form in which Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within warranty period, as follows.
 - 1. Form of Warranty: Manufacturer's standard warranty form.
 - 2. Scope of Warranty: Work of this Section and including sheet metal details and termination details installed by the roof system Installer and approved by the Roof System Manufacturer.
 - 3. Warranty Period: 20 years from date of completion.
- B. Manufacturer Inspection Services: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's inspections is included in the Contract Sum.
 - 1. Inspections to occur in following years: 2, 5, 10, and 15 following completion.
- C. Installer Warranty: Installer's warranty signed by Installer, as follows.
 - 1. Form of Warranty: Form acceptable to Roofing Manufacturer and Owner.
 - 2. Scope of Warranty: Work of this Section.
 - 3. Warranty Period: 2 years from date of completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The roof system specified in this Section is based upon products of Tremco, Incorporated. Provide specified products.
- B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
 - 1. Accelerated Weathering: Roofing system shall withstand 10,000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
 - 2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746/D3746M, ASTM D4272/D4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- B. Flashings and Fastening: Provide base flashings, perimeter flashings, detail flashings and component materials and installation techniques that comply with requirements and recommendations of the following:
 - 1. NRCA Roofing Manual (Sixth Edition) for construction details and recommendations.
 - 2. SMACNA Architectural Sheet Metal Manual (Seventh Edition) for construction details.
- C. Exterior Fire-Test Exposure: ASTM E108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
- D. Energy Performance: Roofing system shall have an initial solar reflectance index of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.

2.3 MATERIALS, GENERAL

- A. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

2.4 SUBSTRATE BOARD

- A. Gypsum panel, cellulosic fiber reinforced, water-resistant, ASTM C1278/C1278M.
 - 1. Thickness over: 1/4 inch (6mm).

2.5 THERMOPLASTIC MEMBRANE MATERIALS

- A. KEE Roof Membrane:
 - 1. Thermoplastic Ketone Ethylene Ester (KEE) coated polyester fabric-reinforced fleece-backed sheet, ASTM D6754.
 - a. **Tremply KEE FB 60 mil.**
 - b. Breaking Strength, minimum, ASTM D751: Machine direction, 500 lbf (87 kN/m); Cross machine direction 400 lbf (70 kN/m).
 - c. Tear Strength, minimum, ASTM D751: Machine direction, 125 lbf (22 kN/m); Cross machine direction (145 lbf (25 kN/m).

- d. Elongation at Break, ASTM D751: 20 percent.
- e. Dynamic Impact/Puncture Resistance, ASTM D5635: Pass.
- f. Minimum Membrane Thickness, nominal, less backing, ASTM D751: 60 mils (1.5 mm).
- g. Thickness over fiber, optical method: 0.016 inches.
- h. Accelerated Weathering, ASTM G155 and ASTM G154: Not greater than 5,000 hr., no cracking or crazing.
- i. Abrasion Resistance, ASTM D3389: Not greater than 2,000 cycles, H-18 wheel, 1,000 g load.

- B. Sheet Flashing: Manufacturer's standard, smooth-backed, sheet flashing of same material, type, reinforcement, thickness and color as KEE roof membrane.

2.6 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.
 - 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Membrane Bonding Adhesive:
 - 1. Bonding adhesive, waterborne low-VOC, for bonding KEE fleece-backed single ply membranes and flashings to substrates.
 - a. **Tremply KEE FB WB II Bonding Adhesive.**
 - b. VOC, maximum, ASTM D3960: 153 g/L.
- C. Flashing Membrane Adhesive:
 - 1. Bonding adhesive, solvent based fast drying, VOC-compliant, for bonding KEE smooth-backed single ply membranes and flashings to substrates.
 - a. VOC, maximum, ASTM D 3960: 200 g/L.
- D. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 mm by 3 mm) thick; with anchors.
- E. Fasteners: Factory-coated steel fasteners and metal plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening components to substrate, and acceptable to membrane roofing system manufacturer.
- F. Metal Flashings:
 - 1. Edge Metal: Clad metal.
 - 2. Gutter Metal: Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 50 (Class AZM150 coating designation, Grade 340) prepainted by the coil-coating process to comply with ASTM A 755/A 755M; structural quality.

- a. Thickness: 0.0236-inch/24 ga.(0.60-mm) minimum thickness.
 - b. Color to be selected by Owner.
- 3. Outlet Tubes: Match gutter material.
- 4. Downspouts: 3" round 16 gauge galvanized steel. Paint to match existing.
 - a. Match existing layout.
- G. Joint Sealant: Elastomeric joint sealant compatible with roofing materials, with movement capability appropriate for application.
 - 1. Joint Sealant, Polyurethane: ASTM C920, Type S, Grade NS, Class 50 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints; paintable.
 - a. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 40 g/L.
 - b. Hardness, Shore A, ASTM C661: 40.
 - c. Adhesion to Concrete, ASTM C794: 35 pli.
 - d. Tensile Strength, ASTM D412: 350 psi (2410 kPa).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 INSTALLATION, GENERAL

- A. Install roofing system in accordance with manufacturer's written instructions and approved details.
- B. NRCA Installation Details: Install roofing system in accordance with applicable NRCA Manual Plates and NRCA recommendations; modify as required to comply with manufacturer's approved details.

3.4 SUBSTRATE BOARD

- A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

1. Fasten substrate board to deck to resist uplift pressure at corners, perimeter, and field of roof according to membrane roofing system manufacturers' written instructions.
2. Adhere substrate board to decking in areas where fasteners will be visible on the underside of the decking.

3.5 ADHERED MEMBRANE ROOFING INSTALLATION

- A. Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.
- B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.
- C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Water-Based Bonding Adhesive: Apply to substrate at rate required by manufacturer. Install membrane immediately into adhesive, avoiding any air entrapment; do not allow adhesive to dry. Roll membrane into wet adhesive. Do not apply adhesive to splice area of membrane.
- E. In addition to adhering, mechanically fasten membrane roofing securely at perimeter of roofing.
- F. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
- G. Welded Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.
 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
 2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
 3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

3.6 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
- C. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- D. Install clad edge metal system secured at 4" oc with screws designed for attachment to the metal support channel.
- E. Gutter:
 1. Install new gutter systems at existing locations.

2. Install new outlet tubes and downspouts. Secure downspout at top and bottom of wall.

3.7 FIELD QUALITY CONTROL

- A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
- B. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.
- C. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.8 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075416

SECTION 075416A - KETONE ETHYLENE ESTER (KEE) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Products in bold italics, listed in Part 2 – Products, and on “Attachment A”, will be furnished by Rosemead School District using its authority under the CMAS Contract. All remaining products listed within the Part 2 section, and any additional needed quantities of the products listed on “Attachment A”, shall be furnished by the Roofing Contractor.
- B. CMAS Contract #: 4-21-03-1001
- C. Section Includes:
 - 1. Mechanically-fastened thermoplastic KEE roofing system on metal deck, including:
 - 2. Roof insulation.
 - 3. Roof insulation cover board.

1.2 DEFINITIONS

- A. Roofing Terminology: See ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For the following products:
 - 1. Sheet roofing.

1.4 INFORMATIONAL SUBMITTALS

- A. Contractor's Product Certificate: Submit certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.
- B. Qualification Data: For Installer, Manufacturer, and Roofing Inspector.
 - 1. Include letter from Manufacturer written for this Project indicating approval of Installer.
- C. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1. Submit evidence of compliance with performance requirements.
 - 2. Product Compatibility: Indicate manufacturer has verified compatibility of roofing system components, including but not limited to: Roofing membrane, flashing sheets, adhesives, and sealants.

- D. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.
- E. Warranties: Unexecuted sample copies of special warranties.
- F. Inspection Reports: Daily reports of Roofing Inspector. Include weather conditions, description of work performed, tests performed, defective work observed, and corrective actions taken to correct defective work.

1.5 CLOSEOUT SUBMITTALS

- A. Executed copies of warranties.
- B. Maintenance Data: To include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of five years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Architect, and employees, and qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.
- B. Manufacturer Qualifications: Approved manufacturer listed in this Section, UL listed for roofing systems comparable to that specified for this Project, with minimum five years' experience in manufacture of thermoplastic roof membrane products in successful use in similar applications.
 - 1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
 - a. Product data, including certified independent test data indicating compliance with requirements.
 - b. Samples of each component.
 - c. Sample submittal from similar project.
 - d. Project references: Minimum of five installations of specified products not less than five years old, with Owner and Architect contact information.
 - e. Sample warranty.
 - 2. Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements.
 - 3. Approved manufacturers must meet separate requirements of Submittals Article.
- C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:
 - 1. An authorized full-time technical employee of the manufacturer.

2. An independent party certified as a Registered Roof Observer by the Roof Consultants Institute, retained by the Contractor or the Manufacturer and approved by the Manufacturer.
- D. Manufacturer's Installation Instructions: Obtain and maintain on-site access to manufacturer's written recommendations and instructions for installation of products.
- E. Preinstallation Roofing Conference: Conduct conference at Project site.
1. Meet with Owner, Architect, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 2. Review drawings and specifications.
 3. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 5. Examine substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 6. Review structural loading limitations of roof deck during and after roofing.
 7. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 8. Review temporary protection requirements for roofing system during and after installation.
 9. Review roof observation and repair procedures after roofing installation.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.8 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
- B. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
 - 1. Provide tie-offs at end of each day's work to cover exposed roofing and insulation with a course of roofing sheet securely in place with joints and edges sealed.
 - 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
 - 3. Remove temporary plugs from roof drains at end of each day.
 - 4. Remove and discard temporary seals before beginning work on adjoining roofing.

1.9 WARRANTY

- A. Manufacturer: Manufacturer's standard warranty form, covering work of this Section, in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within warranty period.
 - 1. Warranty Period: 20 years from date of completion.
- B. Installer Warranty: Installer's warranty signed by Installer, covering the Work of this Section, on form acceptable to Roofing Manufacturer and Owner.
 - 1. Warranty Period: 2 years from date of completion.
- C. Manufacturer Inspection Services: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's inspections is included in the Contract Sum.
 - 1. Inspections to occur in following years: 2, 5, 10, and 15 following completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The roof system specified in this Section is based upon products of Tremco, Incorporated.
- B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.

1. Accelerated Weathering: Roofing system shall withstand 10,000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
 2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D 3746/C 3746M, ASTM D 4272/D 4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- B. Flashings and Fastening: Provide base flashings, perimeter flashings, detail flashings and component materials and installation techniques that comply with requirements and recommendations of the following:
1. NRCA Roofing Manual (Sixth Edition) for construction details and recommendations.
 2. SMACNA Architectural Sheet Metal Manual (Seventh Edition) for construction details.
- C. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
- D. Energy Performance: Roofing system shall have an initial solar reflectance index of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.

2.3 MATERIALS, GENERAL

- A. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

2.4 THERMOPLASTIC MEMBRANE MATERIALS

- A. KEE Roof Membrane:

1. Thermoplastic Ketone Ethylene Ester (KEE) coated polyester fabric-reinforced roof membrane sheet, ASTM D6754.
 - a. **Tremply KEE 60 mil.**
 - b. Breaking Strength, minimum, ASTM D751: Machine direction, 500 lbf (87 kN/m); Cross machine direction, 400 lbf (70 kN/m).
 - c. Tear Strength, minimum, ASTM D751: Machine direction, 125 lbf (21 kN/m); Cross machine direction, 145 lbf (25 kN/m).
 - d. Elongation at Break, ASTM D751: 20 percent.
 - e. Dynamic Impact/Puncture Resistance, ASTM D5635: Pass.
 - f. Minimum Membrane Thickness, nominal, less backing, ASTM D751: 60 mils (1.5 mm).
 - g. Thickness over fiber, optical method: 0.014 inches.
 - h. Accelerated Weathering, ASTM G155 and ASTM G154: Not greater than 5,000 hr., no cracking or crazing.

- i. Abrasion Resistance, ASTM D3389: Not greater than 2,000 cycles, H-18 wheel, 1,000 g load.
 - j. Color: White.
- B. Sheet Flashing: Manufacturer's standard smooth-backed sheet flashing of same material, type, reinforcement, thickness, and color as KEE sheet membrane.

2.5 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.
 - 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Metal Stress Plates: Manufacturer's standard AZ50 Galvalume-coated steel formed plates, 0.047 inch thick, with radial corners and membrane-engaging barbs engineered to enhance wind resistance for mechanically-attached KEE membrane roofing systems. FMG approved.
- C. Fasteners: Factory-coated steel fasteners and metal plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening components to substrate, and acceptable to membrane roofing system manufacturer.
- D. Termination Joint Sealant: Silicone, S, NS, 25 or 50, NT: Single-component, nonsag, plus 25 to 50 percent and minus 25 to 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT, and compatible with adjacent materials.
- E. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.
- F. Metal Flashings:
 - 1. Edge Metal: Clad metal.
 - 2. Gutter Metal: Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 50 (Class AZM150 coating designation, Grade 340) prepainted by the coil-coating process to comply with ASTM A 755/A 755M; structural quality.
 - a. Thickness: 0.0236-inch/24 ga.(0.60-mm) minimum thickness.
 - b. Color to be selected by Owner.
 - 3. Outlet Tubes: Match gutter material.
 - 4. Downspouts: 3" round 16 gauge galvanized steel. Paint to match existing.
 - a. Match existing layout.
- G. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.6 ROOF INSULATION MATERIALS

- A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from insulation manufacturer's standard sizes, suitable for application, and of thicknesses indicated.
- B. Roof Insulation: Provide roof insulation product in thicknesses indicated in Part 3 as follows:
 - 1. Extruded-Polystyrene (XPS) Board Insulation: ASTM C 578, Type IV, 25-psi (173-kPa) minimum compressive strength.
 - a. Basis of design product: Extruded-Polystyrene (XPS) Board Insulation.
 - b. Flame Spread and Smoke Developed, ASTM E 84: 25 and 450, maximum.
- C. Cover Board:
 - 1. Fanfold Recover Board. ½" thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 - 1. Steel Roof Deck:
 - a. Verify that deck is securely fastened and properly supported with no projecting fasteners and with no adjacent units in excess of 1/16 inch (1.6 mm) out of plane relative to adjoining deck.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 INSTALLATION, GENERAL

- A. Install roofing system in accordance with manufacturer's written instructions and approved details.
- B. Install blocking around perimeter of building matching height of standing seams.
- C. Remove trim piece to provide a flush surface for edge metal installation.
- D. NRCA Installation Details: Install roofing system in accordance with applicable NRCA Manual Plates and NRCA recommendations; modify as required to comply with manufacturer's approved details and perimeter fastening requirements of FM Global references if applicable.

E. Gutter:

1. Install new gutter systems at existing locations.
2. Install new outlet tubes and downspouts. Secure downspout at top and bottom of wall.

3.4 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
- D. Cover Boards: Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together.
 1. Mechanically fasten cover boards.

3.5 MECHANICALLY FASTENED MEMBRANE ROOFING INSTALLATION

- A. Mechanically fasten membrane roofing over area to receive roofing and install according to roofing system manufacturer's written instructions.
 1. For in-splice attachment, install membranes roofing with long dimension perpendicular to steel roof deck flutes.
- B. Start installation of membrane roofing in presence of roofing system manufacturer's technical personnel.
- C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Mechanically fasten roofing securely at terminations, penetrations, and perimeter of roofing.
- E. Adhere insulation and membrane over overhangs to prevent fasteners from showing through the bottom of the decking.
- F. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
- G. In-Seam Attachment: Secure one edge of membrane sheet using fastening plates or metal battens centered within membrane seam and mechanically fasten membrane sheet to roof deck.
- H. Metal Stress Plate Installation:
 1. Locate plates in grid pattern in accordance with membrane manufacturer's instructions.
 2. Install plates in straight rows in the specified number and spacing to achieve the required wind uplift resistance in the main field, edges and corners of the roof.

3. Install plates and separation pads using fasteners that comply with the specified applicable building code wind uplift rating and the fastener and membrane manufacturer's requirements. Ensure that all fasteners are properly driven normal to the surface of the sub-structure. Do not over-drive fasteners; plates that are recessed into and/or not flush with the surface of the insulation are not acceptable.
- I. Welded Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.
 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
 2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
 3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

3.6 FIELD QUALITY CONTROL

- A. Roofing Inspector: Contractor shall engage a qualified roofing inspector to perform roof tests and inspections and to prepare start up, interim, and final reports. Roofing Inspector's quality assurance inspections shall comply with applicable criteria established in ARMA/NRCA's "Quality Control Guidelines for the Application of Built-up Roofing."
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
- C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.
- D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.7 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075416

SECTION 07920
JOINT SEALANTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Provisions of Division 01 apply to this section.
- B. Section Includes:
 - 1. Joint sealants as indicated or required.
- C. Related Sections:
 - 1. Section 07600: Flashing and Sheet Metal.

1.02 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawings indicating sealant joint locations, with full-size sealant joint details.
- B. Product Data: Submit manufacturer's literature for each sealant material.
- C. Material Samples: Submit Samples indicating color range available for each sealant material intended for installation in exposed locations.
- D. Certifications: Submit manufacturer's certification materials comply with requirements specified.
- E. Site Samples: At locations required, provide a Sample of sealant for each typical installation, approximately 24" long, including joint preparation, backing, sealant and tooling. Allow backing to extend 6" beyond end of sealant for inspection of substrate.
- F. Test Reports: Submit manufacturer's adhesion compatibility test reports according to ASTM C 794 for each substrate.

1.03 QUALITY ASSURANCE

- A. Qualifications of Installer: The Work of this section shall be installed by a firm which has been in the business of installing similar materials for at least 5 consecutive years; and can show evidence of satisfactory completion of 5 projects of similar size and scope. Installer shall have applicators trained and approved by manufacturer for performing this Work.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Store in accordance with manufacturer's recommendations. Provide a uniform ambient temperature between 60 and 80 degrees F.

1.05 WARRANTY

- A. Manufacturer shall provide a 5 year material warranty.
- B. Installer shall provide a 2 year labor warranty.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Furnish sealants meeting following in-service requirements:
 - 1. Normal curing schedules are permitted.
 - 2. Non-staining, color fastness (resistance to color change), and durability when subjected to intense actinic (ultraviolet) radiation are required.
- B. Furnish the products of only one manufacturer unless otherwise required, sealant colors as selected to match the adjoining surfaces.

2.02 MATERIALS

- A. Sealants:
 - 1. Sealant 1: Acrylic latex, one-part, non-sag, mildew resistant acrylic emulsion compound complying with ASTM C 834, Type S, Grade NS, formulated to be paintable.
 - a. Tremco Inc., Acrylic Latex Caulk.
 - b. Bostik Construction Products Division, Chem-Calk 600.
 - c. Pecora Corporation, AC-20.
 - 2. Sealant 2: Butyl sealant, one-part, non-sag solvent-release-curing sealant complying with FS TT-S-001657 for Type 1 and formulated with a minimum of 75 percent solids.
 - a. Tremco Inc., Tremco Butyl Sealant.
 - b. Bostik Construction Products Division, Chem-Calk 300.
 - c. Pecora Corp., BC-158.
 - 3. Sealant 3: Silicone sealant, one-part non-acid-curing silicone sealant complying with ASTM C 920, Type S, Grade NS, Class 25.
 - a. Dow Corning Corp., Dow Corning 790, 791, 795.
 - b. General Electric Co., Silpruf.
 - c. Tremco, Inc., Spectrem 1.

- d. Pecora Corp., 864.
- 4. Sealant 4: One-part mildew-resistant silicone sealant, complying with ASTM C 920, Type S, Grade NS, Class 25.
 - a. Dow Corning Corp., Dow Corning 786.
 - b. General Electric Co., Sanitary 1700.
 - c. Tremco, Inc., Proglaze White.
 - d. Pecora Corp. 863 White.
- 5. Sealant 5: One-part non-sag urethane sealant, complying with ASTM C 920, Type S, Grade NS, Class 25.
 - a. Bostik Construction Products Div., Chem-Calk 900.
 - b. Mameco International, Inc., Vulkem 116.
 - c. Tremco, Inc., Dymonic.
 - d. Sika Corporation, Sikaflex 1-A.
- 6. Sealant 6: Multi-part pouring urethane sealant, complying with ASTM C 920, Type M, Grade P, Class 25.
 - a. Tremco, Inc., HPL.
 - b. Mameco International, Inc., Vulkem 255.
 - c. Sika Corporation, Sikaflex 2C NS/SL.
 - d. W.R. Meadows, Pourthane.
- 7. Sealant 7: Acoustical sealant, non-drying, non-hardening permanently flexible conforming to ASTM D 217.
 - a. Pecora Corp., BA-98 Acoustical Sealant.
 - b. Tremco, Inc., Tremco Acoustical Sealant.
 - c. United States Gypsum Co., Sheetrock Acoustical Sealant.
- B. Penetrations Through Fire Barriers:
 - 1. 3M Brand Fire Barrier Calk CP-25.
 - 2. 3M Brand Fire Barrier Putty 303.
- C. Primer: Non-Staining Type. Provide primer as required and shall be product of manufacturer of installed sealant.

- D. Lacquer sealer shall be clear, as recommended by sealant manufacturer.
- E. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer.
- F. Sealants shall have normal curing schedules, shall be nonstaining, color fast and shall resist deterioration due to ultraviolet radiation.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that joint openings are ready to receive Work and field tolerances are within the guidelines recommended by sealant manufacturer.

3.02 SURFACE PREPARATION

- A. Joints and spaces to be sealed shall be completely cleaned of all dirt, dust, mortar, oil, and other foreign materials which might adversely affect caulking Work. Where necessary, degrease with an solvent or commercial degreasing agent. Surfaces shall be thoroughly dry before application of sealants.
- B. If recommended by manufacturer, remove paint and other protective coatings from surfaces to be calked before priming and installation of sealants.
- C. Preparation of surfaces to receive sealant shall conform to the sealant manufacturer's specifications. Provide air pressure or other methods to achieve required results. Provide masking tape to keep sealants off surfaces that will be exposed in finished Work.
- D. Etch concrete or masonry surfaces to remove excess alkalinity, unless sealant manufacturer's printed instructions indicate that alkalinity does not interfere with sealant bond and performance. Etch with 5 percent solution of muriatic acid; neutralize with dilute ammonia solution, rinse thoroughly with water and allow to dry before sealant installation.
- E. Perform preparation in accordance with ASTM C 804 for solvent release sealants, and ASTM C 962 for elastomeric sealants.
- F. Protect elements surrounding Work of this section from damage or disfiguration.

3.03 SEALANT APPLICATION SCHEDULE

	<u>Location</u>	<u>Type</u>	<u>Color</u>
A.	Exterior & Interior joints in horizontal surfaces of concrete; between metal & concrete masonry and mortar.	Sealant 6	To match adjacent material
B.	Exterior door, entrance & window frames. Exterior & interior vertical joints in concrete & masonry metal flashing.	Sealant 3 or 5	To match adjacent material

C.	Joints within Skylight framing system.	Sealant 3	Translucent or Black
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3.04 APPLICATION

- A. Provide sealant around all openings in exterior walls, and any other locations indicated or required for structure weatherproofing and/or waterproofing.
- B. Sealants shall be installed by experienced mechanics using specified materials and proper tools. Preparatory Work (cleaning, etc.) and installation of sealant shall be as specified and in accordance with manufacturer's printed instructions and recommendations.
- C. Concrete, masonry, and other porous surfaces, and any other surfaces if recommended by manufacturer, shall be primed before installing sealants. Primer shall be installed with a brush that will reach all parts of joints to be filled with sealant.
- D. Sealants shall be stored and installed at temperatures as recommended by manufacturer. Sealants shall not be installed when they become too jelled to be discharged in a continuous flow from gun. Modification of sealants by addition of liquids, solvents, or powders is not permitted.
- E. Sealants shall be installed with guns furnished with proper size nozzles. Sufficient pressure shall be furnished to fill all voids and joints solid. In sealing around openings, include entire perimeter of each opening, unless indicated or specified otherwise. Where gun installation is impracticable, suitable hand tools shall be provided.
- F. Sealed joints shall be neatly pointed on flush surfaces with beading tool, and internal corners with a special tool. Excess material shall be cleanly removed. Sealant, where exposed, shall be free of wrinkles and uniformly smooth. Sealing shall be complete before final coats of paint are installed.
- G. Comply with sealant manufacturer's printed instructions except where more stringent requirements are indicated on Drawings or specified.
- H. Partially fill joints with joint backing material, furnishing only compatible materials, until joint depth does not exceed 1/2 inch joint width. Minimum joint width for metal to metal joints shall be 1/4 inch. Joint depth, shall be not less than 1/4 inch and not greater than 1/2 inch.
- I. Install sealant under sufficient pressure to completely fill voids. Finish exposed joints smooth, flush with surfaces or recessed as indicated. Install non-tracking sealant to concrete expansion joints subject to foot or vehicular traffic.
- J. Where joint depth prevents installation of standard bond breaker backing rod, furnish non-adhering tape covering to prevent bonding of sealant to back of joint. Under no circumstances shall sealant depth exceed 1/2 inch maximum, unless specifically indicated on Drawings.
- K. Prime porous surfaces after cleaning. Pack joints deeper than 3/4 inch with joint backing to within 3/4 inch of surface. Completely fill joints and spaces with gun applied compound, forming a neat, smooth bead.

3.05 MISCELLANEOUS WORK

- A. Sealing shall be provided wherever required to prevent light leakage as well as moisture leakage. Refer to Drawings for condition and related parts of Work.
- B. Install sealants to depths as indicated or, if not indicated, as recommended by sealant manufacturer but within following general limitations:
 - 1. For joints in concrete walks, slab and paving subject to traffic, fill joints to a depth equal to 75 percent of joint width, but not more than 3/4 inch deep or less than 3/8 inch deep, depending on joint width.
 - 2. For building joints, fill joints to a depth equal to 50 percent of joint width, but not more than 1/2 inch deep or less than 1/4 inch deep.

3.06 CLEANING

- A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.07 CURING

- A. Sealants shall cure in accordance with manufacturer's printed recommendations. Do not disturb seal until completely cured.

3.08 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

END OF SECTION