

TABLE OF CONTENTS

DIVISION 01 – GENERAL REQUIREMENTS

- 01 11 00 SUMMARY OF WORK
- 01 30 01 PROJECT ADMINISTRATION
 - PRECONSTRUCTION DAMAGE REPORT
 - DAILY PROGRESS REPORT
 - FM GLOBAL FORM X2688 – APPLICATION FOR ACCEPTANCE OF ROOFING SYSTEM
- 01 33 24 SCHEDULE OF PRE-JOB SUBMITTALS
- 01 35 24 CONSTRUCTION PROJECT SAFETY
- 01 78 36 WARRANTIES

DIVISION 02 – EXISTING CONDITIONS

- 02 41 20 ROOF DEMOLITION AND CLEANUP

DIVISION 05 – METALS

- 05 01 30.61 STEEL ROOF DECKING REPAIR/REPLACEMENT

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

- 06 10 53 MISCELLANEOUS ROUGH CARPENTRY

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

- 07 21 16 BATT INSULATION
- 07 22 16 ROOF BOARD INSULATION
- 07 27 19 PLASTIC SHEET AIR BARRIER
- 07 54 19.01 MECHANICALLY FASTENED PVC THERMOPLASTIC MEMBRANE ROOFING
- 07 54 20.01 MECHANICALLY FASTENED KEE THERMOPLASTIC MEMBRANE ROOFING
- 07 62 00 SHEET METAL FLASHING AND TRIM

ROOF PLAN(S) AND DETAIL DRAWING

PART ONE – GENERAL**1.01 Description**

- A. This section is for the convenience of the Contractor only and shall not be construed as a complete accounting of all work to be performed.
- B. The extent of the Scope of Work is indicated on the drawings and by the requirements of each section of the specifications.
- C. The Contractor shall examine the site and shall be responsible for verifying all existing construction and conditions.
- D. Refer to additional notes on the roof plan drawing.

1.02 Code Compliance

- A. The completed roof system shall meet the following requirements:
 - 1. Building Code: 2006 International Building Code
 - 2. Energy Code: 2006 International Energy Conservation Code
 - 3. External Fire Rating: UL Class A external fire rating.
- B. The completed roof system shall meet the following design wind load pressures:
 - 1. Field: - 89.64 psf
 - 2. Perimeters: - 135.91 psf
 - 3. Corners: - 193.75 psf
- C. The installed copings shall comply with ANSI/SPRI ES-1 Standards and shall meet the following design wind pressures:
 - 1. Horizontal: 64 psf
 - 2. Vertical: 104 psf

1.03 FM Global Compliance

- A. The completed roof system shall meet FM Global Class 1 - 90 - A - MH.
- B. The Contractor shall perform FM Global associated pre-job submittals as specified in Section 01 30 01 – Project Administration.
- C. Roof covering materials, insulation, fasteners, and adhesives used in this project shall be listed in RoofNav as approved products at the time the project is bid. Refer to www.roofnav.fmglobal.com
- D. Roof covering materials, insulation, fasteners, and adhesives shall be selected by the Contractor from the specified products, to provide a roof system that is defined by an active RoofNav Assembly Number, or a written acceptance by FM Global, pre-arranged by the Roofing Consultant.

- E. The following RoofNav Assembly Numbers apply to this project:
 - 1. Firestone Building Products – Roof Section A – Concourse Assembly No. 213747-0-0
- F. At a minimum, fastener placement, and perimeter and corner zones shall be as defined in FM Global Property Loss Prevention Data Sheets 1-28 and 1-29, and RoofNav.
- G. At a minimum, wood nailer installation shall meet the requirements of FM Global Property Loss Prevention Data Sheet 1-49.
- H. At a minimum, roof related sheet metal fabrication and installation shall meet the requirements of FM Global Property Loss Prevention Data Sheet 1-49.
- I. FM Global Hot Work Permit procedures shall be followed whenever they apply in the performance of the work.
- J. Roof covering materials, insulation, fasteners, and adhesives delivered to the construction site shall have FM Global approval labels on the product or packaging.

1.04 Quality Assurance by Roof System Manufacturer

- A. Membrane Manufacturer's Technical Representative, who shall be a full time employee of the membrane Manufacturer, shall provide on-site training and quality assurance in conjunction with the beginning of membrane installation.
- B. The Manufacturer's Technical Representative shall coordinate all site visits with the Contractor and Owner's Representative a minimum of three (3) business days in-advance.

PART TWO – PRODUCTS

2.01 No products are required in this section.

PART THREE – EXECUTION

3.01 Demolition and Roof Preparation

- A. Coordinate all aspects of demolition work with Owner's Representative and all other trades.
- B. Provide protective measures in and around the building as directed by the Owner's Representative prior to beginning roofing work.
- C. Provide competent person within the building from the beginning of tear-off, until such time as roofing debris/construction material may not enter the building. Contractor's interior personnel shall maintain radio contact with crew supervisor on the roof at all times.
- D. Prior to demolition work, verify that all soil pipes, flues, steel members, and other similar penetrations are secured to the building structure. Coordinate removal or securement of all unsecured penetrations prior to the start of demolition work.
- E. Water test all drains to ensure proper operation prior to beginning work.

- F. Tear-off existing roof system to the roof decking.
- G. Back out all membrane/insulation fasteners and plates from the decking.
- H. Tear-off all base flashings. Prepare all substrates as required by the Manufacturer of the replacement flashings.
- I. Remove all existing fiber cants at base of curbs and walls. Structural wood cants shall remain and shall be refastened.
- J. Remove deteriorated wood nailers/plywood located during post tear-off inspection. Perform this work on a unit cost basis.
- K. Remove deteriorated gypsum wall board located during post tear-off inspection. Perform this work on a unit cost basis.
- L. Remove existing deteriorated steel decking as determined during post tear-off decking inspection. Perform this work on a unit cost basis.
- M. Remove and dispose of existing roof related sheet metal, unless a particular component is identified on the drawings for reuse of the existing.
- N. Remove existing reglet counterflashings where noted and reuse receiver.
- O. Loosen, modify, and refasten existing metal wall panels as required for installation of flashing work.
- P. Remove all debris from decking and broom clean prior to beginning roof system application.
- Q. Remove debris from roof area and properly dispose of all materials off site.
- R. Clean existing drains down to the cast iron surface and prepare drains for membrane roofing. Remove broken drain bolts from drain castings where required.
- S. At the end of each day, ensure that all drains are in proper working order and that drain lines are totally unrestricted. Implement any required corrective measures before leaving the job site that day.
- T. Seal all perimeters, penetrations, and drains as required to prevent construction materials from entering the building.

3.02 Decking Repair / Replacement

- A. Replace deteriorated decking as specified. Perform this work on a unit cost basis.
- B. Clean, wire brush, and prime paint any surface rusted steel decking encountered during post tear-off inspection of the decking. Perform this work on a unit cost basis.
- C. Refasten existing decking as specified.

3.03 Rough Carpentry

- A. Install replacement wood nailers/plywood where deteriorated components were removed. Perform this work on a unit cost basis.
- B. Refasten existing nailers/plywood to building structure as required to meet the specified

standards.

- C. Install nailers as shown on the drawings.
- D. Install nailers for curb extensions as required for minimum curb height of 8".

3.04 Metal Fabrications

- A. Modify existing access ladder at Sky Bridge to facilitate installation of new tapered insulation cricket and flashing membrane.

3.05 Miscellaneous Insulation

- A. Install fiberglass batt insulation in polyethylene saddle at expansion joints.
- B. Install fiberglass batt insulation at mechanical unit curbs as required.

3.06 Air Barrier

- A. Install air barrier over the roof decking, as specified.
- B. Seal air barrier at all perimeters and penetrations.

3.07 Rigid Insulation

- A. Install roof insulation and means of attachment per drawings and specifications.
- B. Install tapered insulation drain sumps per drawings and specifications.
- C. Install tapered crickets and edge strips as shown or specified.

3.08 Low Slope Roofing Membrane / Flashings

- A. Install mechanically fastened, reinforced TPO single-ply membrane system.
- B. Install TPO flashings at all perimeters and penetrations.
- C. Install walkway as indicated or shown on drawings. Include this work in the bid. Install any additional locations of walkway as directed by the Owner's Representative on a unit cost basis.

3.09 Roof Related Sheet Metal

- A. Install roof related sheet metal components as per drawings and specifications.
- B. Reuse existing sheet metal where specifically noted as such on the detail drawings.
- C. Provide all necessary sealant primers, sealants, sealant tapes, and fasteners to ensure a watertight installation.
- D. Install membrane clad metal flashings, fasteners, aluminum tape, and heat welded membrane strip flashings per the drawings and specifications.

3.10 Plumbing Work

- A. Free any clogged drains or drain lines.
- B. Replace all missing, damaged, plastic, or improperly fit drain strainers, and/or clamping rings. All replacement drain strainers shall be cast iron strainers and shall fit with clamping rings. All replacement clamping rings shall be cast iron and shall properly fit with existing drain bowls.
- C. Install replacement drain bolts. Remove any broken bolts from drain castings, and prepare existing bolt sockets by retapping, where required.
- D. Clean, prime, and paint drain rings and drain strainers, as follows:
 - Surface preparation: Remove all old bitumen, sealants, debris; and loose rust and loose paint using power-assisted hand tools and/or solvents.
 - Primer: Apply one coat of Rust-O-Leum's 1060 / 1069 Heavy Duty Primer
 - Finish: Apply one coat of Rust-O-Leum's 3400 Industrial Enamel
- E. Functional clamping ring and drain strainer shall be installed at each drain during the same workday as membrane installation.

3.11 Mechanical Work

- A. Disconnect and reconnect units as required for lifting.

3.12 Electrical Work

- A. Disconnect and reconnect units as required for lifting.

3.13 Quantity Allowances

- A. The bid and contract price shall include the following quantity allowances, to be adjusted by unit costs listed in Bid Form:
 - 1. Wire brush, clean, and prime paint rusted steel decking 500 Square Feet
 - 2. Remove and replace gypsum wall board to match existing 200 Square Feet
- B. Miscellaneous walkway applications indicated or shown on the roof plan or detail drawings shall be included in the bid.
- C. The value within the contract associated with each allowance item shall be separately listed on the schedule of values submitted with each application for payment. Refer to the Division 01 Administrative Instructions for further information.

- End of Section -

PART ONE – GENERAL**1.01 Description**

- A. This section outlines the administrative procedures and requirements in effect under this contract. The Contractor shall advise all his administrative personnel, field personnel, and subcontractors of the requirements of this section.

PART TWO – PRODUCTS**2.01 No products are required in this section.****PART THREE – EXECUTION****3.01 Project Meetings**

- A. Preconstruction Meeting
 - 1. Preconstruction meeting will be scheduled within 14 days after the Owner has issued notice to proceed. Attendance by authorized representatives of the Contractor and all major subcontractors is required. The Owner's Representative will advise other interested parties and request their attendance.
 - 2. Minimum Agenda – Distribute data on and discuss:
 - a. Organizational arrangement of Contractor's forces and personnel and of subcontractors, material suppliers, and Owner.
 - b. Channels and procedures for communication.
 - c. Construction schedule including sequence of critical work.
 - d. Contract documents including distribution of required copies of original documents and revisions.
 - e. Processing of shop drawings and other data submitted to the Owner for review.
 - f. Processing of field decisions and change orders.
 - g. Rules and regulations governing performance of the work.
 - h. Procedures for safety and first aid, security, quality control, housekeeping, and other related matters.
 - i. Scheduling of project meetings.
 - j. Project record documents.
- B. Progress Meetings
 - 1. Progress meetings may be called by the Owner's Representative, the Project Consultant, or the Contractor as necessary for proper coordination of the work. The

- meeting(s) will be called with no less than 48-hours notice to all parties.
2. To the maximum extent practicable, the Contractor shall assign the same person or persons to represent the Contractor and major subcontractors at project meetings throughout progress of the work. Subcontractors, material suppliers, and others may be invited to attend those project meetings in which their aspects of the work are involved.
 3. Typical Agenda
 - a. Review, revise as necessary, and approve minutes of previous meeting.
 - b. Review progress of the work since last meeting including status of submittals for approval.
 - c. Identify problems that impede planned progress.
 - d. Develop corrective measures and procedures to regain planned schedule.
 - e. Complete other current business.
 4. The proceedings of these meetings will be recorded by the Owner's Representative. Each required representative at the meetings, in addition to the Owner, will be furnished one copy of the meeting minutes.
 5. The Owner's Representative conducting meetings, recording and distributing meeting minutes on behalf of the Owner will not be construed as coordinating or scheduling Contractor's work.

3.02 Submittals

A. Submittal Requirements

1. Contractor shall submit transmittal letter and **five copies** of required submittals to the Owner's Representative. Required submittals are listed in Section 01 33 24 – Schedule of Pre-Job Submittals.
2. FM Global Projects: Contractor shall submit a transmittal letter, two copies of required submittals, and FM Global Form X2688 – Application for Acceptance of Roofing System to FM Global for approval (use form included in the project manual). A copy of the associated transmittal letter to FM and Form X2688 shall be provided to the Owner's Representative with the submittal package.
 - a. FM Global contact person for the project is:

Louise Yonemoto
Sr. Consultant Engineer
FM Global
100 Pringle Ave, Suite 400
Walnut Creek, CA 94596
Tel (925) 287-4336
 - b. Refer to Section 01 11 00 – Summary of Work for additional information pertaining to FM Global projects.
3. Submittal requirements are found here and in the technical sections of the

- specifications. Make submittals as required by the contract documents and revise and resubmit as necessary to establish compliance with the specified requirements.
4. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted and verify each item of the submittal to see that it conforms with the requirements of the contract documents. By affixing the Contractor's signature to each submittal, certify this coordination has been performed.
 5. Format of submittals shall be either five sets in hard copy format or one set in Adobe Acrobat (.pdf) electronic format. Submittals provided in any other format may be returned to the Contractor without being reviewed.
 - a. Submittals provided in hard copy format shall be organized in three-ring or GBC binders, with a tab for each section of the specifications, as indicated on the schedule of pre-job submittals. All submittals required under each tab shall be placed in the same order as indicated on the schedule. A copy of the Contractor's transmittal letter shall be provided at the front of each binder.
 - b. Submittals provided in electronic format shall be organized in the Adobe Acrobat file with a divider page for each section of the specifications, as indicated on the schedule of pre-job submittals. All submittals required under each tab shall be placed in the same order as indicated on the schedule. The Contractor's transmittal letter shall be provided as the first page of the document.
 6. Delays caused by tardiness in receipt of submittals will not be an acceptable basis for extension of the contract completion date.
 7. Review by the Owner's Representative will not be construed as a complete check but only that the general method of construction and detailing is satisfactory. Review will not relieve the Contractor from responsibility for errors that may exist.
 8. The Owner reserves the right to delay the project start and/or withhold payment until pre-job submittals are complete and reviewed.
- B. Submittal Schedule
1. Contractor shall make each submittal allowing the Owner's Representative 14 days of review time. All submittals shall be made far enough in advance of scheduled dates for installation to provide all time required for reviews, for possible revisions and resubmittals, and for placing orders and securing delivery.
- C. Shop Drawings and Coordination Drawings
1. Submitting shop drawings is a project requirement. Shop drawings are required for:
 - a. Any proposed deviations from project drawings (submittal does not constitute approval).
 - b. Sheet metal fabrication, metal type and gauge, joining methods, fastener types, and fastener placement.
 - c. As called for elsewhere in this specification.
 2. Shop drawings shall have the following attributes:

- a. All shop drawings shall be of sufficient scale to show all pertinent aspects of the item.
 - b. Provide five copies of each sheet.
 - c. Shop drawings shall show dimensions of fabricated items, joining methods, fastening frequency, and relationships of building components.
 - d. Shop drawings shall show more detail, not less, than details in project manual.
- D. Manufacturer's Literature
1. Submit Manufacturer's literature for materials being incorporated into the work. Where contents of submitted literature from Manufacturer includes data not pertinent to the submittal, clearly indicate which portion of the contents is being submitted for review.
- E. Samples
1. Samples need not be submitted for items specified by product name and Manufacturer unless a decision is required regarding color, style, or finish. Samples shall be of the precise article proposed to be furnished.
 2. Unless the precise color is specifically described in the contract documents, submit accurate color charts to the Owner's Representative for review and selection whenever a choice of color is available in a specified product.
 3. Unless otherwise specified, submit two samples.
 4. Submit other samples as called for in the individual specifications.
- F. Notice of Award/Guarantee Application
1. Submit copy of notice of award or guarantee application to the roof system Manufacturer.
 2. When available, submit Manufacturer's written approval of notice of award or guarantee application.
- G. Substitutions
1. The contract is based on the standards of quality established in the contract documents.
 2. All products proposed for use, including those specified by required attributes and performance, shall require approval by the Owner's Representative before being incorporated into the work.
 3. Do not substitute materials, equipment, or installation procedures unless such substitution has been specifically approved for this work by the Owner's Representative.
 4. Where the phrase "or equal" or "or Owner approved equal" occurs in the contract

documents, do not assume alternative materials, equipment, or installation procedures will be approved as equal unless the substitution has been specifically authorized by the Owner's Representative.

5. The decision of the Owner's Representative will be final.
- H. Contact / Subcontractor List
1. Submit contact list to the Owner's Representative.
 2. The contact list shall include the following information for the Contractor and all subcontractors:
 - a. Trade
 - b. Company Name and Address
 - c. Project Manager
 - d. Field Supervisor
 - e. Telephone Numbers
 - f. Fax Numbers
 - g. Cellular/Pager Number
 - h. Email Addresses
 - i. Two 24-Hour Emergency Contact Phone Numbers
- I. Payment Application and Schedule of Values
1. Submit proposed payment application and schedule of values to be used in project invoicing.
 2. Payment application shall be provided on AIA Document G702, unless otherwise directed or approved by the Owner.
 3. Schedule of values shall be provided on AIA Document G703, unless otherwise directed or approved by the Owner.
 4. Schedule of values shall itemize the following, at a minimum (the total of all items shall equal the contract sum):
 - a. Project Administration (submittals, Manufacturer support services, warranties, reporting, and closeout)
 - b. Mobilization and Safety
 - c. Roofing Materials
 - d. Sheet Metal Materials
 - e. Demolition and Disposal (Itemize by Roof Section)

- f. Roofing Construction (Itemize by Roof Section)
 - g. Sheet Metal Construction (Itemize by Roof Section)
 - h. Demobilization and Final Cleanup
 - i. List all Subcontracts and Value for Each
 - j. List all Contract Allowances and Value for Each (Itemize by Roof Section if Requested by the Owner's Representative)
 - k. Approved Contract Change Orders
- J. No Asbestos Statement
- 1. Contractor shall submit in writing a statement certifying that no products he will use on the project contain asbestos or asbestos-related products.
- K. Preconstruction Damage Report
- 1. Prior to beginning the contract work, the Contractor shall inspect the site with the Owner and document any pre-existing damage to the interior and exterior. Report shall be generated using the form provided.
- L. Submittal Review
- 1. The Owner's Representative will review all submittals and indicate the following on the Schedule of Pre-job Submittals:
 - a. "No Exceptions" This notation indicates the Contractor may proceed with fabrication or purchase of the item.
 - b. "Make Corrections Noted" This notation indicates the submittal is considered to be complete, if the Contractor agrees with and makes the noted corrections. If the Contractor does not agree with the noted corrections and wishes to make other changes not contemplated in the first review, then resubmittal is required.
 - c. "Revise and Resubmit" Contractor shall make indicated changes necessary to comply with contract documents and review notes, and then resubmit. Make resubmittals as required prior to fabricating or purchasing items.
 - d. "Rejected" Item submitted does not comply with contract documents. Review project requirements and resubmit item. Make resubmittals as required prior to fabricating or purchasing items.
 - 2. Make all revisions required by the Owner's Representative. If the Contractor considers any required revision to be a change, he shall notify the Owner's Representative as provided for under "Changes" in the Owner-Contractor Agreement. Show each drawing revision by number, date, and subject in a revision block on the drawing, make only those revisions directed by the Owner's Representative.
 - 3. When the submittal process has been completed for a given item, resubmittal for substitution of materials, equipment, or installation procedure will not be considered,

unless accompanied by an acceptable explanation as to why the substitution is necessary.

3.03 Construction Scheduling

- A. To assure adequate planning and execution of the work so the work is completed within the number of calendar days allowed in the contract and assist the Owner in evaluating progress of the work, prepare and maintain the schedules and reports described in this section.
- B. Definitions
 - 1. "Day" used throughout the contract, unless otherwise stated, means "calendar day."
- C. If any activity is not completed on or before the stated scheduled date, the Owner's Representative will have the right to order the Contractor to expedite completion of the activity by whatever means the Owner deems appropriate and necessary, without additional compensation to the Contractor.
- D. If any activity is 30 or more days behind schedule, the Owner will have the right to perform the activity or have the activity performed by whatever method the Owner deems appropriate.
- E. Costs incurred by the Owner in connection with expediting construction activity under this article will be deducted from the contract sum by the Owner.
- F. It is expressly understood and agreed that failure by the Owner to exercise the option to either order the Contractor to expedite an activity or to expedite the activity by other means will not be considered precedent-setting for any other activities.
- G. Construction Schedule Submittal
 - 1. Within 14 days after receipt of notice to proceed, submit five copies of the construction schedule to the Owner's Representative for review. The Owner's Representative will review the schedule in accordance with the submittal review procedures outlined in this section.
 - 2. The schedule shall be provided in a bar chart format with one activity listed in each row (from top to bottom), and one calendar day listed in each column (from left to right).
 - 3. Activities shown on the schedule shall include, but are not necessarily limited to:
 - a. Submittals and approvals of shop drawings and samples
 - b. Preconstruction meeting
 - c. Procurement of equipment and materials
 - d. Project mobilization and safety setup
 - e. Roof construction (itemize by roof section)
 - f. Sheet metal
 - g. Miscellaneous work
 - h. Final cleanup
 - i. Final inspection by Manufacturer

- j. Final inspection by Owner and Owner's Representative
- k. Punchlist completion
- l. Project closeout/warranties
- m. Final completion

3.04 Progress Reporting

- A. The Contractor shall complete a daily progress report. Progress reports shall be generated using the form provided, to provide a continuous record of the progress of the work.
- B. Contractor shall complete one form for each workday, including work days canceled or shortened due to weather, material shortages, or labor conditions.
- C. Forms shall be legibly filled out in ink with all pertinent items completed.
- D. Progress reports are to be filled out on a daily basis by the Contractor's job site representative, who shall be in a supervisory position. The Owner's Representative shall receive one copy of all progress reports on a weekly basis.
- E. The Owner reserves the right to withhold payment for lack of required progress reporting.

3.05 Changes to the Work

- A. All changes to the work shall be documented with Change Directives, approved in writing by the Owner, Contractor, and Roofing Consultant.

3.06 Project Closeout

- A. Project Completion
 - 1. When the Contractor is complete, Contractor shall:
 - a. Submit written certification to the Owner through the Owner's Representative that the project, or designated portion of the project, is complete and ready for inspection.
 - b. Submit list of major items to be completed or corrected.
 - c. Submit written certification that the Manufacturer has inspected the roof and that it complies with all provisions for issuance of the warranty.
 - 2. Owner and/or Owner's Representative will make an inspection within ten days after receipt of certification. Contractor shall provide access to all roofs for inspection, where a permanent means of access does not exist.
 - 3. If Owner's Representative considers the work to be complete:
 - a. Owner's Representative will prepare and submit to Contractor a Completion Punch List, listing all items to be completed or corrected as determined by the inspection.

- b. Contractor shall then complete work listed for completion or correction, sign the Completion Punch List forms, and return three original signed copies to the Owner's Representative.
 4. If Owner's Representative considers the work not to be complete:
 - a. The Owner's Representative will notify Contractor in writing stating reasons.
 - b. Contractor shall then complete work and send second written notice to Owner's Representative certifying that the project is complete.
 - c. Owner's Representative will reinspect work within ten calendar days after receipt of certification. Contractor shall provide access to all roofs for inspection, where a permanent means of access does not exist. Consultant will then prepare and submit to Contractor a completion punch list.
 - d. Contractor shall then complete work listed for completion or correction, sign the Completion Punch List forms, and return three original signed copies to the Owner's Representative.
- B. Completion Inspection
 1. At the discretion of the Owner and the Owner's Representative, the Owner's Representative may make a final inspection within ten calendar days after receipt of the signed Completion Punch List. Contractor shall provide access to all roofs for inspection, where a permanent means of access does not exist.
 2. If Owner's Representative considers the work to be finally complete in accordance with the requirements of the contract documents, Owner's Representative will request Contractor to make project closeout submittals.
 3. If Owner's Representative does not consider the work to be finally complete:
 - a. Owner's Representative will notify Contractor in writing stating reasons.
 - b. Contractor shall take immediate steps to remedy the stated deficiencies and shall send written notice to Owner's Representative certifying that work is complete.
 - c. Owner's Representative will reinspect work within ten calendar days after receipt of certification. Contractor shall provide access to all roofs for inspection, where a permanent means of access does not exist.
- C. Reinspection Costs
 1. If Owner's Representative is required to perform a second (or subsequent) inspection(s) because of failure of work to comply with certifications of Contractor, Owner will deduct amount for additional inspection services from final payment to Contractor.
- D. Closeout submittals shall consist of one original signed and notarized document, and two photocopies of the following:
 1. Warranties, Manufacturer's Punchlists, and Documentation of Completion as required by Section 01 78 36

2. Evidence of payment and release of liens from suppliers and subcontractors.
3. AIA G706 - Contractor's Affidavit of Payment of Debts and Claims.
4. AIA G706A – Contractor's Affidavit of Release of Liens
5. AIA G707 – Consent of Surety to Final Payment
6. Evidence that the jurisdictional authority issuing the building permit has accepted the project and closed-out the permit.
7. Final adjustment of accounts including:
 - a. Original contract sum
 - b. Additions and deductions resulting from (if applicable):
 - 1) Previous Change Orders
 - 2) Adjustment of Contract Allowances
 - 3) Unit Price Work
 - 4) Other adjustments
 - 5) Deductions for uncorrected work
 - 6) Deductions for reinspection payments
 - 7) Deductions for actual damages
 - c. Total contract sum as adjusted
 - d. Previous payments
 - e. Sum remaining due
- E. Owner's Representative will prepare final Change Order, reflecting approved adjustments to contract sum not previously made by Change Orders.
- F. Final Application for Payment
 1. Contractor shall submit final application in accordance with conditions of the contract.

3.07 Workmanship Warranty Inspection

- A. The Contractor shall attend an 18-month inspection of the roofs included in this project, if requested by the Owner or Owner's Representative. Contractor shall provide access to all roofs for inspection, where a permanent means of access does not exist.

- End of Section -

PRECONSTRUCTION DAMAGE REPORT

CONTRACTOR:

PROJECT: Reno-Sparks Convention Center
A – Concourse
4590 S. Virginia Street
Reno, Nevada

OWNER: Reno-Sparks Convention Center
4590 S. Virginia Street
Reno, NV 89509

PROJECT NO.: RENRENO002C

ANTICIPATED CONSTRUCTION START DATE:

Upon inspection of the above-mentioned premises, we are in agreement that existing visible damage to the facility consists of the following: (List item description, quantity, location, extent of damage; include photographs if appropriate; use back of form if additional space is required).

INTERIOR:

EXTERIOR:

The above-mentioned items should be excluded from any future claims for damages related to the construction project.

OWNER:

CONTRACTOR:

DATE:

DATE:

APPLICATION FOR ACCEPTANCE OF ROOFING SYSTEM



CONTACT INFORMATION:

INDEX NUMBER:

ROOFING CONTRACTOR (NAME & ADDRESS)	TELEPHONE NO.:	FAX:
	E-MAIL ADDRESS:	CONTACT:
CLIENT (NAME & ADDRESS)	TELEPHONE NO.:	FAX:
	E-MAIL ADDRESS:	CONTACT:

OVERVIEW OF WORK: *(Submit 1 form per roof area)*

Building Name & Number:			
Building Dimensions: Length:	ft/m;	Width:	ft/m.;
		Height	ft/m.
Roof Slope:			
Parapet Height ,max (in./m):		Parapet Height ,min (in /m):	
Type of Work: <input type="checkbox"/> New Construction <input type="checkbox"/> Recover (New roof over existing Roofing System) <input type="checkbox"/> Reroof (New cover/remove existing roofing system to deck) <input type="checkbox"/> Other			
FM Approved RoofNav Assembly Numbers:			

ROOF SURFACING:

<input type="checkbox"/> None	
<input type="checkbox"/> Coating	<i>(Trade Name/Application Rate)</i>
<input type="checkbox"/> Granules	<i>(Application Rate)</i>
<input type="checkbox"/> Gravel/Slag	<i>(Application Rate)</i>
<input type="checkbox"/> Ballast: <input type="checkbox"/> Stone Size	<input type="checkbox"/> Pavers <i>(Beveled or square edge);</i> <input type="checkbox"/> Other:
Ballast Weight (psf): Field:	Perimeter: Corners:

ROOF COVER/MEMBRANE:

(Please provide ALL applicable details including trade name, type, number of plies, thickness, reinforced, adhesive)

<input type="checkbox"/> Panel: <input type="checkbox"/> Through Fastened Metal <input type="checkbox"/> Standing Seam metal <input type="checkbox"/> Fiber Reinforced Plastic (FRP) <input type="checkbox"/> Other:
<input type="checkbox"/> Built Up Roofing (BUR)
<input type="checkbox"/> Modified Bitumen
<input type="checkbox"/> Single Ply: <input type="checkbox"/> Adhered <input type="checkbox"/> Fastened <input type="checkbox"/> Ballasted
<input type="checkbox"/> Spray Applied
<input type="checkbox"/> Other:

BASE SHEET:

(Please include Trade Name, Type, and Width)

<input type="checkbox"/> None
Trade Name: Width: <input type="checkbox"/> 36 In. <input type="checkbox"/> 1 meter (39 In.)
<input type="checkbox"/> Fastened <input type="checkbox"/> Adhered
<input type="checkbox"/> Secured per RoofNav OR <input type="checkbox"/> Per FM Global Loss Prevention Data Sheet 1-29
Comments:
<input type="checkbox"/> Air Retarder
<input type="checkbox"/> Vapor Retarder

INSULATION

Layer	Trade Name	Thickness (In.)	Fastened	Adhered	Tapered
1. Top			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Next			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Next			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Next			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Glass Fiber/Mineral Wool/Batt		<input type="checkbox"/> Facer Type/Vapor Barrier			
<input type="checkbox"/> Thermal Barrier					
<input type="checkbox"/> Other:					
<input type="checkbox"/> None					

APPLICATION FOR ACCEPTANCE OF ROOFING SYSTEM



DECK:

(Please include manufacturer, type, yield strength, thickness/gage, etc.)

<input type="checkbox"/> Steel:	
<input type="checkbox"/> LWIC (Form Deck):	<input type="checkbox"/> Cementitious Wood Fiber:
<input type="checkbox"/> Concrete: <input type="checkbox"/> Pre-cast panels or <input type="checkbox"/> Cast in Place	
<input type="checkbox"/> Wood	
<input type="checkbox"/> Fiber Reinforced Cement	<input type="checkbox"/> Fiber Reinforced Plastic
<input type="checkbox"/> Gypsum: <input type="checkbox"/> Plank	<input type="checkbox"/> Poured
<input type="checkbox"/> Other:	
Comments:	

ROOF STRUCTURE (Include Size, Gage, Etc.):

<input type="checkbox"/> Purlins <input type="checkbox"/> "C" OR <input type="checkbox"/> "Z"		
<input type="checkbox"/> Joists <input type="checkbox"/> Wood OR <input type="checkbox"/> Steel		
<input type="checkbox"/> Beams <input type="checkbox"/> Wood OR <input type="checkbox"/> Steel		
<input type="checkbox"/> Other:		
Spacing: Field:	Perimeter:	Corners:
Comments:		

FASTENERS USED IN ROOF ASSEMBLY:

Roof Cover Fasteners: Trade Name:		Length:	Diameter:
Stress Plate/Batten:			
Spacing: Field: X	Perimeter: X	Corners: X	
Insulation Fasteners: Trade Name:		Type:	
Size:		Stress Plate:	
Spacing: Field:	Perimeter:	Corners:	
Deck Or Roof Panels Fasteners:		Type:	
Trade Name:		Size Washer:	
Length:		Washer:	
If Weld: Size:	Weld:	Washer:	
Deck Side Lap Fasteners: Field: X	Perimeter: X	Corners: X	
Spacing: Field: X	Perimeter: X	Corners: X	
Base Sheet Fasteners		Type:	
Trade Name:		Length:	
Head Diameter:		Length:	
Spacing: (Attached Sketches as necessary)		Corners:	
Spacing Along Laps: Field:	Perimeter:	Corners:	
No. Intermediate Rows: Field:	Perimeter:	Corners:	
Spacing Along Intermediate Rows: Field:	Perimeter:	Corners:	

PERIMETER FLASHING:

(Attach a detailed sketch of metal fascia, gravel stop, nailer, coping, etc.)

<input type="checkbox"/> FM Approved Flashing	<input type="checkbox"/> Per FM Global Loss Prevention Data Sheet 1-49
<input type="checkbox"/> Other:	Comments:

DRAINAGE:

For new construction: Has roof drainage been designed by a Qualified Engineer per FM Global Loss Prevention Data Sheet 1-54 and the local building code? <input type="checkbox"/> Yes <input type="checkbox"/> No (Attach details)
For re-roofing and recovering: will the roof drainage be changed from the original design (for example: drain inserts, drains covered or removed, new expansion joints, blocked or reduced scupper size)? <input type="checkbox"/> Yes <input type="checkbox"/> No
If yes, were the changes reviewed by a Qualified Engineer? <input type="checkbox"/> Yes <input type="checkbox"/> No (Attach details)
Is secondary (emergency) roof drainage provided per FM Global Data Sheet 1-54? <input type="checkbox"/> Yes <input type="checkbox"/> No (Attach details)

Signature of Property Owner: _____

Title: _____
Date: _____

Signature of Installing Contractor: _____

APPLICATION FOR ACCEPTANCE OF ROOFING SYSTEM



Title: _____

Date: _____

FM Global OFFICE REVIEW

(Please leave blank for FM Global Office Review)

WIND:

Design Wind Speed: _____ (mph)	Ground Terrain: <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
Uplift Pressure in field: _____ (psf)	Uplift Rating Required:
Adequate Uplift Rating Provided:	Adequate? <input type="checkbox"/> Yes <input type="checkbox"/> No

FIRE:

Internal Assembly Rating: <input type="checkbox"/> Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Non-Combustible	
External Fire Rating: <input type="checkbox"/> Class A <input type="checkbox"/> Class B <input type="checkbox"/> Class C <input type="checkbox"/> None	
Concealed Spaces? <input type="checkbox"/> Yes <input type="checkbox"/> No	Sprinklers below Roof? <input type="checkbox"/> Yes <input type="checkbox"/> No
Adequate? <input type="checkbox"/> Yes <input type="checkbox"/> No	

HAIL:

Hail Rating Needed? <input type="checkbox"/> SH <input type="checkbox"/> MH <input type="checkbox"/> None	Hail Rating Provided? <input type="checkbox"/> SH <input type="checkbox"/> MH <input type="checkbox"/> None
Adequate? <input type="checkbox"/> Yes <input type="checkbox"/> No	

COLLAPSE:

If standing seam, has collapse been reviewed? <input type="checkbox"/> Yes <input type="checkbox"/> No
--

COMMENTS:

Reviewed By: _____

Date: _____

FM Global Field Review:

(Leave blank for on-site review by FM Global Loss prevention Consultant):

System installed per reviewed/accepted plans? Yes No
If no, explain: _____

Installation witnessed by FM Global? Yes No

Uplift test needed? No Yes

(Uplift testing is REQUIRED for applicable new and recover roofs in hurricane, typhoon or tropical cyclone prone regions (see DS 1-29 and 1-52 for more information))

Uplift testing satisfactorily completed Yes No DNA

If yes, note pressures held for the: _____ Field _____ Perimeter _____
_____ Corners _____

If no, explain and provide required and obtained uplift pressures and other details and attach to this form.

Reviewed By: _____

Date: _____

PROJ NO.: RENRENO002C
 PROJ : Reno-Sparks Convention Center
2011 Roof Replacement Project - A Concourse
4590 S. Virginia Street
Reno, Nevada 89509

Checking is only for conformance with the design concept of the Project and compliance with the information given in the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site; for information that pertains solely to the fabrication process or to techniques of construction; and for coordination of the work of all trades.

CONTRACTOR: _____

SUBMITTED BY: _____ BENCHMARK
 DATE: _____ REVIEWED BY: _____

SUBMITTAL NO: _____ DATE: _____

1. Contractor shall submit transmittal letter and all items listed in the schedule in accordance with Section 01 30 01 - Project Administration, allowing 14 days for review by the Owner's Representative.
2. Contractor shall clearly indicate which information each submittal is pertinent to the project.
3. Contractor shall refer to submittal requirements in each specification section for additional clarification.

General Information		Transmittal No.					Approval Status			
Spec Section	Submittal	"X" If Included					No Exceptions	Make Corrections Noted	Revise and Resubmit	Rejected
		1	2	3	4	5				

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

00 21 13	Instructions To Bidders									
	Performance Bond									
	Labor & Material Payment Bond									
	Certificate of Insurance									

DIVISION 01 - GENERAL REQUIREMENTS

01 30 01	Project Administration									
	FM Global Form X2688 and Transmittal Letter Copy									
	Transmittal Letter Showing Submittals Sent to FM Global									
	Written Approval of X2688 and Submittals from FM Global									
	Notice of Award or Guarantee Application to Roofing Manufacturer									
	Manufacturer's Approval of Notice of Award or Guarantee Application									
	Contact/Subcontractor List									
	Building Permit									
	Proposed Schedule of Values for Invoicing									
	Construction Schedule									

General Information		Transmittal No.					Approval Status			
Spec Section	Submittal	"X" If Included					No Exceptions	Make Corrections Noted	Revise and Resubmit	Rejected
		1	2	3	4	5				
	No Asbestos Statement									
	Preconstruction Damage Documentation									
01 35 24	Construction Project Safety									
	Pre-Job Site Safety Plan/Assessment									
	MSDS Sheets									
DIVISION 05 - METALS										
05 01 30.61	Steel Roof Decking Repair/Replacement									
	Manufacturer's Literature									
	List of Materials									
	Manufacturer's Recommended Installation Methods									
DIVISION 06 - WOOD, PLASTICS AND COMPOSITES										
06 10 53	Miscellaneous Rough Carpentry									
	List of Materials									
DIVISION 07 - THERMAL AND MOISTURE PROTECTION										
07 21 16	Batt Insulation									
	Manufacturer's Literature									
	List of Materials									
07 22 16	Roof Board Insulation									
	Manufacturer's Literature									
	List of Materials									
	Manufacturer's Recommended Installation Methods									
07 27 19	Plastic Sheet Air Barrier									
	Manufacturer's Literature									
	List of Materials									

Spec Section	General Information Submittal	Transmittal No.					Approval Status			
		"X" If Included					No Exceptions	Make Corrections Noted	Revise and Resubmit	Rejected
		1	2	3	4	5				

07 54 21.01

Mechanically Fastened TPO Thermoplastic Membrane Roofing

Manufacturer's Literature									
List of Materials									
Manufacturer's Recommended Installation Methods									
Shop Drawing For Proposed Temporary Water Cutoff									

07 62 00

Sheet Metal Flashing and Trim

Shop Drawings									
Product Information or Material List for All Accessories									
Color Chart or Samples For Metal Color Selection									
Color Chart or Samples For Caulking Color Selection									

Distribution by Consultant	No. of Copies
Roofing Contractor	2
Benchmark Field Consultant	1
Benchmark Job File	1
Client	1

PART ONE – GENERAL**1.01 Description**

- A. Work Included: To assure the work site environment is safe for the employees of all Contractors, Subcontractors, Consultants, Manufacturer's Representatives, Owner's Representatives, and building occupants, this section has been written to identify and emphasize the importance of safe working conditions. If any conflict arises over a specific provision or rule, the laws and rules governing that specific location shall be followed.
- B. The Contractor shall be solely responsible for construction project safety.

1.02 Related Work

- A. Additional safety-related items may be found elsewhere in the contract documents.

1.03 Standards

- A. Standards: Comply with all pertinent standards specified in the contract documents, including those listed below. If the building code references a specific edition or revision of an individual standard, then comply with that edition or revision. Otherwise, comply with the latest published edition or revision available on the date the Contractor submits its price proposal to the Owner.
 - 1. Occupational Safety and Health Act of 1970.
 - 2. State, County, and City requirements, as applicable.

1.04 Quality Assurance

- A. Per OSHA 29 CFR 1926.20(b), the Contractor shall make frequent and regular job site safety inspections to ensure compliance with all applicable standards and site-specific safety requirements.
- B. The first inspection shall be performed no later than the first week of the project. After the first inspection, subsequent inspections shall be performed a minimum of every thirty (30) days, or as required by the standard.
- C. A qualified person designated by the Contractor, who has the authorization to take prompt corrective measures, shall perform all inspections. This may be an employee of the Contractor or a Subcontractor. Proof of the qualified person's education, training, and qualifications must be provided for verification, upon the request of the Owner's Representative.
- D. The Contractor's qualified person making safety inspections shall prepare a report for each job site safety inspection. The Contractor shall submit each report to the Owner's Representative within five (5) calendar days of the inspection.
- E. Contractor shall have sole responsibility for maintaining the job site in compliance with all applicable regulations, Owner requirements, and the Contractor's pre-job site safety plan/assessment. This responsibility shall apply whether or not the Owner or Consultant is present on the job site.

- F. Contractor shall appoint a competent person to be present at all times on the project site, who shall have authority to make decisions regarding safety and health issues on the Contractor's behalf. The competent person shall speak fluent English, and must be able to communicate with Contractor's employees, Subcontractor's employees, and Owner's employees.
- G. Contractor shall maintain MSDS at the job site in accordance with OSHA requirements.

1.05 Submittals

- A. Contractor shall submit a pre-job site safety plan/assessment, which is prepared by the Contractor's qualified safety professional. This plan/assessment shall outline specific safety considerations for each individual section or level of roof included in the project. Examples of items that shall be included in the safety plan/assessment include:
 - 1. Laydown/staging areas
 - 2. Crane/hoist
 - 3. Setup/material storage
 - 4. Fall protection
 - 5. Skylights and roof openings
 - 6. Hot work/fire protection
 - 7. Pedestrian/vehicular safety
 - 8. Interior safety
 - 9. Any other pertinent, site-specific issue(s) not listed
- B. Contractor shall submit Material Safety Data Sheets for materials to be used on the project.

PART TWO – PRODUCTS

2.01 Materials and Equipment

- A. General: Contractor shall supply all necessary materials and equipment required to complete the work in a manner consistent with a safe work site and as required by regulatory agencies.
- B. All equipment used on the project shall be in safe operating condition and shall be maintained in a safe condition for the project duration. Equipment found to be unsafe or in disrepair shall be repaired and made safe or shall be removed from the job site and replaced, if necessary, at no cost to the Owner.
- C. Disposal of any solvents, containers, and other regulated materials shall meet all applicable laws.

PART THREE – EXECUTION**3.01 General**

- A. The safety requirements listed here are by design broad in nature. The Contractor shall augment as necessary the information contained in this section with more specific information from OSHA and roofing industry requirements.

3.02 Contractor Employee Training

- A. Contractor shall provide adequate training for employees to ensure their safety and the safety of others on the project site. Contractor shall provide instruction in the proper operation of power tools, hoisting equipment, tankers, and other pieces of equipment employees will be required to use in completion of the work.
- B. Contractor shall ensure each worker is aware of job and site specific hazards and of the safety precautions appropriate to each.
- C. Contractor shall present a safety and loss prevention orientation program to each new employee before that employee starts work.
- D. Contractor and Subcontractors shall inform their employees of all safety and health rules pertaining to their particular job.
- E. Contractor and Subcontractors shall inform their employees of location and use of safety devices such as first aid kits, phones, fire extinguishers, etc.
- F. Contractor shall implement a regular system of work inspection to detect and correct hazardous conditions, safety rule violations, and unsafe working practices.
- G. Contractor shall ensure that their workers and any Subcontractor's workers participate in any safety orientations or training programs required by the Owner.
- H. Employees shall be trained regarding any job site alarms, code signals, evacuation warnings, appropriate responses, and requirements for actions that will need to be taken.

3.03 Accident Reporting

- A. Investigating and reporting of accidents is necessary for all Contractors and Subcontractors. An accident investigation and report shall be immediately made by the Contractor's designated competent person on site. Contractor shall provide to the Owner's Representative a copy of the completed Accident Report, Employer's First Report of Injury or Illness, or such other similar reports required by federal, state, county and municipal or local safety laws. All reporting and record keeping requirements shall be in accordance with OSHA regulations.

3.04 First Aid

- A. Contractor and Subcontractors shall be responsible for providing first aid and medical treatment for their employees. The names, addresses and telephone numbers of Contractor's and Subcontractors' doctors, hospital and ambulance services shall be conspicuously posted, as required by law.
- B. A suitable first aid kit shall be located at all times on the roof, and shall be conspicuously located and readily accessible at all times. The first aid kit shall be of an appropriate size for

the roofing crew.

3.05 Individual Conduct and Safety

- A. Contractor's and Subcontractors' employees shall be made aware of and comply with the following rules that will be in effect on all job sites.
 - 1. Alcoholic beverages and illegal drugs will not be permitted.
 - 2. Employees entering job site under the influence or possession of alcohol or drugs will be subject to removal from the job site.
 - 3. The carrying of firearms and all other weapons is prohibited.
 - 4. Fighting, gambling, stealing, soliciting, and horseplay will not be tolerated.
 - 5. Abusive language or disrespectful behavior in public areas will not be tolerated.

3.06 Personal Protective Equipment (PPE) and Clothing

- A. The Contractor shall furnish and require the use and wearing of PPE and protective clothing by its employees and any Subcontractor's employees.
- B. Approved eye and face protection is required to be worn when warranted by the exposure, or where mandated by facility safety requirements. Safety glasses with side shields are required in all circumstances where there is an exposure to flying particles. Plastic face shields are required to be worn for guarding against flying particles and spraying liquids or corrosives.
- C. Appropriate clothing shall be worn at all times.
- D. Hard hats must be worn at all times whenever there is a possibility of head injury from impact, flying or falling objects, or where mandated by facility safety requirements.
- E. Hearing protection shall be utilized where mandated by OSHA regulations or facility safety requirements.
- F. Protective footwear shall be used where mandated by OSHA regulations or facility safety requirements.

3.07 Housekeeping

- A. The Contractor or Subcontractors shall maintain good housekeeping standards at all times as an integral part of the work. Daily cleanup of work, lay-up, and personnel areas is required and must be performed.
- B. Materials shall be piled so that safe clearances are maintained and tipping or movement is prevented. Loose materials on the roof must be secured so that they cannot be blown or bumped off.
- C. Accumulation of material that may create a fire hazard is not permitted. Never store excessive amounts of material in one place, so as to potentially overload the roof.
- D. Roof areas are to be "watertight at night" at all times during the job. Contractor's or Subcontractors' failure to do so can be grounds for dismissal.

3.08 Signs and Barricades

- A. When it is necessary to barricade an area for overhead work, to protect personnel from hazardous operations, or to move equipment or cranes, barricades are to be provided by the Contractor or Subcontractors. Barricades must be erected before the work requiring them begins. If the barricades are in a roadway or walkway, blinking lights must be used after dark. When the work is completed, the barricades must be removed from the job site.
- B. Contractor or Subcontractors are forbidden to remove posted signs.
- C. Traffic control signage shall be constructed of metal and conform to the latest edition of *Manual of Uniform Traffic Control Devices (MUTCD)*.

3.09 Fall Protection

- A. The Contractor shall select and implement one of the following methods of fall protection, in compliance with OSHA regulations.
 - 1. Fall restraint (motion stopping) system.
 - 2. Personal fall arrest system with warning lines.
- B. The two fall protection methods are listed in order of Benchmark, Inc. preference, with a fall restraint (motion stopping) system being the most preferred and the personal fall arrest system being the least preferred.
- C. All plastic domed skylights or smoke hatches, open mechanical curbs, openings in the roof deck, and similar openings or holes which could be potential fall hazards shall be guarded at all times to prevent accidental falls.

3.10 Ladders

- A. Contractor and Subcontractor provided ladders shall be free of defects. Ladders with split or cracked side rails, damaged rungs, missing feet, or other defects shall not be brought to the project site. Ladders set up near doorways, walkways, or other congested areas must be barricaded or guarded.
- B. Ladders shall be of adequate length and must extend at least 3 feet or 4 rungs above the upper landing.
- C. Place straight ladders on solid, level footings with the foot of the ladder a minimum distance from the wall equal to 1/4 the length of the ladder from the resting point.
- D. Straight ladders shall have non-skid feet and be securely tied off.
- E. Face the ladder and use both hands going up or down.
- F. Do not climb or descend ladders with tools, equipment, or material in your hands.
- G. Metal ladders shall not be used.
- H. Roofs not able to be accessed using a 40 foot or shorter ladder must be accessed by alternative means. If access cannot be achieved from other roofs or through the building interior, then an OSHA approved scaffolding tower with access ladder shall be erected and maintained by the Contractor.

3.11 Fire Protection

- A. Fully charged, inspected and tagged fire extinguishers must be located at all times on all occupied roof sections and staging areas. All fire extinguishers shall be minimum 20 lb., type ABC. At a minimum, one fire extinguisher shall be provided for each 3,000 square feet of roof area under construction. Travel distance from any point of the protected area to the nearest fire extinguisher shall not exceed 50 feet.
- B. The Contractor shall ensure that all required fire extinguishers are maintained in a fully charged and operable condition, including testing, inspections, and tagging. Fire extinguishers with out-of-date inspection tags shall be removed and replaced immediately.
- C. Smoking may be prohibited on the job site for various reasons. Employees will be expected to obey all "No Smoking" signs.
- D. Store all flammable liquids in approved safe containers. Contents will be described and marked flammable.
- E. Flammable liquids must not be stored in excess of 10 gallons on the roof overnight.
- F. When using flammable liquids to clean, dispose of the rags in approved containers or remove them from the roof daily to prevent possible spontaneous combustion.
- G. Never store bulk flammable material or liquids closer than 25 feet from open flames or other source of ignition.
- H. All hot work must be done in accordance with permit procedures in use at the facility. Obtain all necessary approvals prior to proceeding with any work that results in a flame or spark.

3.12 Electrical Safety

- A. All electrical circuits shall utilize ground-fault circuit interrupters (GFCI) to protect workers from injury.
- B. Regularly inspect all power cords. Any defective power cords shall be taken out of service and removed from the job site immediately.
- C. Only double insulated power tools shall be used.
- D. Regularly inspect all power tools. Any defective tools, including tools with damaged or repaired power cords, shall be taken out of service and removed from the job site immediately.
- E. When working on powered equipment, and power must be disconnected to perform the required work, the Contractor shall implement lock-out and tag-out procedures to protect workers from injury.
- F. Do not set up ladders or stage construction operations adjacent to power lines. If the only available locations are near power lines, implement measures to prevent injury, and coordinate any required outages with the Owner's Representative in advance.

3.13 Crane and Hoist

- A. Contractor shall comply with the Manufacturer's specifications and limitations. Rated load capacities, recommended operating speeds, and special hazard warnings or instructions shall be conspicuously posted on all equipment. Instructions or warnings shall be visible from the operator's station.
- B. Accessible areas within the swing radius of the rear of the rotating superstructure shall be properly barricaded to prevent the public or employees from being struck or crushed by the crane.
- C. All crawler or truck cranes in use shall meet the requirements as prescribed in the ANSI B30-5-1968 Safety Code for Crawler and Truck Cranes.
- D. Inspect all rigging equipment prior to use (chains, ropes, slings, shackles, etc.). Remove any defective equipment from the job site.

3.14 Public Liability

- A. Unauthorized persons are not allowed access to the roof at any time. Contractor shall control access to the roof.
- B. Barricades and signs shall be posted on the ground around the work area to warn the public.
- C. Locate air intake ducts, air conditioners, or air pumps. Notify Owner's Representative when dust or fumes may be drawn into the facility so that the unit may be shutdown and/or covered.
- D. At night, lock trucks, deactivate hoisting equipment, and take down ladders.
- E. Park vehicles so that they do not pose a hazard to other traffic moving around the job site. Trucks and equipment should not block sidewalks or other pedestrian travel ways without providing a clear, well-marked, alternate route of travel.

- End of Section -

PART ONE – GENERAL

- 1.01** The Contractor shall warrant all materials and workmanship for a period of two years from the date of acceptance of the completed work by the Owner. The Contractor shall make good any defects in materials or workmanship that may develop during the two-year period by repairing or replacing such defects at his own expense without cost to the Owner. Contractor shall use the form provided in this section.
- 1.02** The Contractor shall make all necessary notices for warranty purpose to the primary roofing Manufacturer, to secure timely inspections and issuance of the warranty.
- 1.03** Upon completion of work and prior to final payment, Contractor shall pay all required fees, secure all required inspections, and complete all items necessary to secure and deliver to the Owner the following items:
- A. Copies of all Manufacturer's punch lists and documentation of completion.
 - B. Primary Roofing Manufacturer's 25-year no dollar limit (NDL) labor and material, total roof systems warranty. The total system warranty shall include the following:
 - 1. Roof membrane
 - 2. Roof membrane flashings
 - 3. Roof insulation
 - 4. Roof system fasteners, termination bars, and other miscellaneous accessories supplied by the roofing Manufacturer
 - C. Manufacturer's Warranty shall cover wind speeds up to 90 miles per hour (mph).
 - D. Accessory Warranties
 - 1. 20-year warranty for Kynar 500/Hylar 5000 metal finish.
- 1.04** Primary Roofing Manufacturer's warranty shall cover defects in materials and workmanship, and shall become effective at the completion of the work. This warranty shall not include any buy-out clauses and shall not be prorated.
- 1.05** All warranties shall contain written provision(s) stating that they will be fully transferable at any time during the specified warranty period.
- 1.06** Submit all items to the Owner or the designated representative within ten days of receipt from the Manufacturer or within ten days of the final inspection.

CONTRACTOR'S WARRANTY

Trade: Roofing and Roof Related Sheet Metal

Manufacturer and System Installed: _____

Contractor: _____

Contract Number and Date: _____

Project and Location: Reno-Sparks Convention Center

2011 Roof Replacement Project

4590 S. Virginia Street

Reno, NV 89509

Area of Roof Installation: A - Concourse

Date of Acceptance
(Effective Warranty Date): _____

1. Contractor warrants to Owner that the roofing system identified above have been installed in accordance with the specifications of the contract referenced above, and the specifications of the Manufacturers of all materials used in performance of the work.
2. Contractor warrants to Owner that Contractor for a period of two (2) years commencing with the date of Owner's acceptance of the installation, will make good any deficiencies that develop as a direct result of workmanship defects, by repairing or replacing such defects. All corrective work shall utilize materials and installation procedures in strict accordance with the specifications.
3. Contractor warrants to Owner that Contractor for a period of two (2) years commencing with the date of Owner's acceptance of the installation, will maintain all sheet metal flashing in a watertight condition without cost to the Owner.
4. Contractor's liability hereunder shall be limited to the repair or necessary replacement of any defective component of the work without cost to Owner and shall not include incidental or consequential damages.

CONTRACTOR

By: _____
(Officer)

Title: _____

Company: _____

Date Executed: _____

- End of Section -

PART ONE – GENERAL**1.01 Description**

- A. Provide all labor, materials, equipment, and tools to prepare the existing roofing system for the specified work, as designated in the specifications or on the drawings.
- B. Provide for the proper disposal of all existing materials to be removed, as designated in the specifications or on the drawings.
- C. Provide for the cleanup of excess materials, equipment, tools, and construction debris, as required to maintain the project site in a neat and orderly condition.

1.02 Standards

- A. Resource Conservation and Recovery Act of 1976.
- B. State, County, and City requirements, as applicable.

1.03 Scheduling

- A. Coordinate the roof preparation work with the new work in such a manner as to keep the new insulation and roofing materials, building, and building interior absolutely dry and watertight.
- B. Coordinate all work with the Owner to minimize any disruptions of the Owner's operations.

1.04 Disposal

- A. All debris shall be stored in containers approved by the Owner's Representative, and removed from the roof on a daily basis.
- B. Keep Owner's property clean of any construction debris.
- C. Contractor shall dispose of construction debris in accordance with the referenced standards.

PART TWO – PRODUCTS**2.01 Cleaners**

- A. Cleaners used in conjunction with surface preparation work shall meet local code requirements for runoff water quality.

PART THREE – EXECUTION**3.01 Protection of Surfaces**

- A. Contractor shall take all precautions during demolition and preparation necessary to protect the building and adjacent surfaces from being soiled or damaged.
- B. Contractor shall restore to original condition any damage caused during work performed under this section.
- C. Keep roof surface clean of any debris that might prevent proper drainage.

- D. At start of each workday, drains located within daily work area shall be temporarily plugged to prevent debris from falling into the drain. Plugs shall be removed at the end of each workday.
- E. Prior to demolition work, verify that all soil pipes, flues, steel members, and other similar penetrations are secured to the building structure. Coordinate removal or securement of all unsecured penetrations prior to the start of demolition work.

3.02 Debris Handling

- A. No material shall be dropped to any point lying outside the exterior walls of the structure, unless otherwise approved in writing by the Owner's Representative.
- B. All material chutes or section of chutes at an angle greater than 45° from the horizontal shall be entirely enclosed.
- C. On all buildings over 20 feet in height, debris shall be transported using a fully enclosed receptacle that is mechanically lowered. A fully enclosed trash chute may also be used where appropriate for height of the building.
- D. Chutes may be job fabricated or purchased premanufactured. If premanufactured chutes are used, Manufacturer's setup and operating instructions shall be followed.
- E. When installing trash chutes, proper counterbalance shall be used to offset the weight and use of the chute. If wood boards or metal struts are used, they shall be set up to prevent a tripping hazard to employees. A safety factor of 5 shall be used to determine counterbalance.
- F. No job site materials shall be used to counterbalance a chute.
- G. Guard rails shall be installed on either side of the chute, to a distance of 6 feet minimum from the opening. Guardrails shall be installed according to OSHA standards.
- H. Where the material is dumped from mechanical equipment or wheelbarrows, a securely attached toeboard or bumper not less than 4" thick and 6" high shall be provided at each chute. Additionally, the Contractor shall use a guard around the top of the chute to prevent any debris from falling next to the chute.
- I. Chutes shall be designed and constructed of such strength as to eliminate failure due to impact of materials or debris loaded therein.

3.03 Disposal

- A. Properly dispose of all construction debris on a daily basis.
- B. Do not store debris on roof unless otherwise directed by the Owner. Contractor shall not overstress the roof decking.

3.04 Preparation of Surfaces

- A. The extent of preparation of surfaces is listed in each section; on the drawings; and in Section 01 11 00 – Summary of Work.
- B. All debris shall be removed from the roof decking. The decking shall be broom clean at a

minimum, and additionally prepared as noted on the drawings, as specified elsewhere, and as required by the Manufacturer of materials to be applied over the decking.

- C. All debris shall be removed from the rib openings of metal decking, where metal decking is present, prior to the start of new roof system installation.

3.05 Cleanup

- A. Throughout the duration of the project, retain all stored materials and equipment in an orderly arrangement allowing maximum access, not impeding drainage or traffic and providing the required protection of materials.
- B. Weekly, and more often if necessitated by job conditions, Contractor shall inspect all arrangements of materials stored on site and restack, tidy and resecure as required.
- C. Contractor shall clear the construction areas and shall provide for the removal of all construction debris from the site. Contractor shall not allow the accumulation of scrap, debris, waste material, and other items not required for construction of this work. Contractor shall provide storage of all items awaiting removal from the project site, observing all requirements for fire protection, and protection of the surrounding site.
- D. Daily and more often if necessitated by job conditions, Contractor shall inspect the site and pickup all scrap, debris, and waste material. Contractor shall remove such items promptly, leaving the construction area and site clean daily.
- E. Contractor shall be responsible to assure that his subcontractors have properly removed and disposed of all debris relating to their contract.
- F. At least twice each month and more often if directed by the Owner, Contractor shall completely remove all scrap, debris, and waste material from the project site. Contractor shall maintain the site in a neat and orderly condition at all times.
- G. At the completion of the contract, Contractor shall remove from the project site all equipment, tools, excess materials, and construction debris related to his contract. Contractor shall be responsible to assure that his subcontractors have properly removed from the project site all equipment, tools, excess materials, and construction debris related to their contract.
- H. Contractor shall be responsible for returning all areas set aside for staging and storage to their original condition.
- I. Contractor shall repair damage and remove stains caused by work related to his contract.

- End of Section -

PART ONE – GENERAL**1.01 Description**

- A. Work includes, but is not necessarily limited to:
 - 1. Remove existing steel decking, where required due to corrosion or where otherwise specified for replacement, by breaking welds or removing fasteners, and removing entire sheet. Replace with new decking per drawings and specifications.
 - 2. Wirebrush and prime paint surface rusted steel decking, where the level of corrosion does not necessitate deck replacement.
 - 3. Fasten decking per drawings and specifications.
- B. If loosening, temporary supporting, and reattachment of deck-mounted equipment/piping is required for performance of decking replacement work, the Contractor shall provide the associated work under the appropriate bid price.

1.02 Quality Assurance

- A. Standards: Comply with all pertinent standards specified in the contract documents, including those listed below. If the building code references a specific edition or revision of an individual standard, then comply with that edition or revision. Otherwise, comply with the latest published edition or revision available on the date the Contractor submits its price proposal to the Owner.
 - 1. *Steel Deck Institute Design Manual*, Steel Deck Institute
 - 2. *Steel Deck Construction Handbook*, Steel Deck Institute
 - 3. Manufacturer's published specifications, product data sheets, application instructions, and technical bulletins.
 - 4. *Annual Book of ASTM Standards*, ASTM International
- B. Qualifications of Installers: Use adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts, and who are completely familiar with the specified requirements and methods needed for proper performance of the work in this section. In acceptance or rejection of the work, the Owner will make no allowance for lack of skill on the part of the workers.

1.03 Submittals

- A. General: Comply with the provisions of Section 01 30 01.
- B. Product Data: 14 days prior to starting work, submit:
 - 1. Most recent copy of Manufacturer's literature applicable to products and specifications to be used.
 - 2. Complete material list of all items proposed to be furnished and installed under this section.

3. Manufacturer's recommended methods of installation.
 - a. When approved by the Owner, the Manufacturer's recommended methods of installation, unless superseded by the specification, will become the basis for inspecting, and acceptance or rejection of the actual installation procedures used in this work.

1.04 Delivery, Storage, and Handling

- A. Deliver materials to the job site in original, unopened bundles. Materials are to be stored off the ground with one end elevated to provide drainage and are to be protected from the elements with weatherproof tarps ventilated to avoid condensation.
- B. Keep all materials clearly identified with all identifying marks legible. Keep all damaged material clearly identified as damaged and stored separately to prevent its inadvertent use.
- C. Do not allow installation of damaged or otherwise non-complying material.
- D. Use all necessary means to protect the materials in this section before, during, and after installation, and to protect the work and materials of all other trades.
- E. In the event of damage, immediately make all necessary repairs and replacements subject to the approval of, and at no additional cost to the Owner.
- F. Roof surfaces shall be protected from damage at all times.

1.05 Warranty

- A. Warranty: See Section 01 78 36.

PART TWO – PRODUCTS

2.01 Steel Deck

- A. Steel roof deck shall be prime painted or G-90 galvanized steel decking to match finish of existing decking material.
- B. Roof deck shall conform to ASTM A 1008 (Prime Painted) or ASTM A 653 (G-90 Galvanized) Grade 33, having a minimum yield strength of 33 ksi.
- C. New steel deck shall match existing deck profile. Contractor shall field verify existing deck profile.
- D. Steel roof decking shall be 22-gauge.
- E. Flat stock deck repair material, if necessary, shall be 18-gauge, G-90 galvanized sheet metal.

2.02 Primer

- A. Rust-inhibitive primer shall be Rust-O-Leum 769 damp-proof red primer or approved equal.

2.03 Fasteners

- A. Fasteners for securement of steel deck to structural supports or for steel deck and steel flat stock side laps shall be self-drilling, screw type fasteners. Powder-activated or compressed air actuated fasteners will not be accepted or used.
- B. Fasteners shall be FM Global approved.
- C. Approved Products
 - 1. Teks 5 or ICH Traxx/5, 12 – 24 x 1-1/4" by ITW Buildex – For fastening of steel deck to structural members
 - 2. Stitch Teks 1 or ICH Traxx/1, 12 – 14 x 3/4" by ITW Buildex – For fastening of steel deck side laps and flat stock repair materials
 - 3. Approved equal

2.04 Washers

- A. Washers shall be used in conjunction with deck fasteners where specified.
- B. Washers shall be carbon steel, 3/4" diameter with 0.328" center hole and 0.065" minimum thickness.

PART THREE – EXECUTION**3.01 Deck Replacement Criteria**

- A. Deck replacement shall be performed where the level of deck corrosion reduces the pullout resistance of the roof insulation and/or roof membrane fasteners, as compared to adjacent areas of decking that are not corroded.
- B. Where the deck is surface rusted, but the level of corrosion does not reduce fastener pullout resistance, the decking shall be wire brushed and prime painted, as specified within this section.

3.02 Installation – Deck Replacement

- A. Steel roof deck shall be replaced in full-length sheets to match existing deck layout, unless otherwise stated elsewhere.
- B. Perimeter and corner areas shall be calculated based upon the applicable version of ASCE-7.
- C. Steel roof deck shall be fastened to the structural members directly through bottom of the rib.
- D. Screws shall be spaced 12" o.c. at ends and all supports in the field of the roof. Screws shall be spaced 6" o.c. at ends, and all supports within the roof perimeters and corners.
- E. Side laps shall be fastened together, not exceeding 36" o.c. in the field, and 30" in the perimeters and corners center-to-center between each side lap fastener, or side lap fastener and support.

- F. Fasten the deck to the structural members at each side lap, regardless of resultant fastener spacing. For overlap-style side laps, ensure fasteners penetrate all deck panels at the laps. For interlocking-style side laps, install one fastener on each side of the lap.
- G. End laps shall be 2" minimum.
- H. Ensure workers stand on the upper deck panel when fastening laps.
- I. Ensure the fasteners do not penetrate conduit or miscellaneous piping located at bottom of the decking.
- J. Place deck in straight alignment with adjoining deck units for entire length of run.
- K. Place deck units flat and square, secured to adjacent framing without warp or excessive deflection.
- L. Cut and neatly fit deck around roof penetrations.
- M. For openings less than 12" x 12" in size, G-90 galvanized sheet metal may be used for the repair, overlapping the adjacent decking 18" on all sides. Sheet metal repair shall be fastened to existing deck units with side lap fasteners spaced 6" o.c.
- N. For openings less than 24" x 24" in size but greater than 12" x 12" in size, partial deck sheet may be used for the repair, overlapping the adjacent decking 18" minimum at end laps. Fasten repair material to the existing decking with side lap fasteners spaced 6" o.c. If structural members are present, fasten decking to steel as specified.
- O. For openings larger than 24" x 24" in size, full decking sheets spanning three or more structural members shall be utilized. Fasten decking to structural members and install side lap fasteners as specified in 3.01.
- P. The exception to subparagraph 3.01, O. is where an obsolete curb is removed and structural support members exist on all four sides. In this scenario, decking may be installed over the void and 18" beyond support members at each end of decking sheets. Fasten decking to structural members and install side lap fasteners as specified in 3.01.

3.03 Steel Deck Repair – Surface Rust

- A. Perform all preparation and cleaning procedures in strict accordance with the paint Manufacturer's recommendations as approved by the Owner's Representative.
- B. Surface rust areas shall be wire brushed to remove any loose or foreign materials that would adversely affect adhesion or appearance of applied coating.
- C. Stir all materials before application to produce a mixture of uniform density and as required during the application of materials. Do not stir into the material any film that may form on the surface.
- D. Over the prepared surfaces, apply coat of rust-inhibitive primer. Coverage shall be complete and of uniform thickness. Dry coat 1-2 mils thick.

3.04 Attachment of Existing Decking

- A. Following removal of all roofing materials and debris, and after any deck replacement or painting has been completed, install additional fasteners as required to achieve the following minimum spacings:
 - 1. Perimeters and Corners
 - a. To each support, install one (1) screw per rib, 6" o.c.
 - b. At side laps, install screws at 30" o.c.
- B. When fastening decking to supports, install fasteners through 3/4" diameter washers in the corner zones.

3.05 Verification

- A. Contractor shall inspect the work described by this section of the specification and shall verify that all components are complete and properly installed.
- B. Contractor shall correct any deficient work prior to installing subsequent work or notification of completion.

- End of Section -

PART ONE – GENERAL**1.01 Description**

- A. Work includes, but is not necessarily limited to:
 - 1. Installing wood nailers and/or plywood per the drawings and specifications.
 - 2. Refastening existing wood nailers and/or plywood in accordance with the specified standards, where existing nailers and/or plywood are suitable for reuse.
 - 3. Removal and replacement of existing deteriorated nailers and/or plywood.

1.02 Quality Assurance

- A. Standards: Comply with all pertinent standards specified in the contract documents, including those listed below. If the building code references a specific edition or revision of an individual standard, then comply with that edition or revision. Otherwise, comply with the latest published edition or revision available on the date the Contractor submits its price proposal to the Owner.
 - 1. Manufacturer's published specifications, product data sheets, application instructions, and technical bulletins.
- B. Qualifications of Installers: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts, and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this section.
- C. In acceptance or rejection of the work of this section, the Owner will make no allowance for lack of skill on the part of the workers.

1.03 Submittals

- A. General: Comply with the provisions of Section 01 30 01.
- B. Product Data: 14 days prior to starting work, submit:
 - 1. Complete material list of all items proposed to be furnished and installed under this section.

1.04 Delivery, Storage, and Handling

- A. Store all materials up, off of the roof or ground, and covered with weatherproof tarps anchored sufficiently, so as to resist wind blow-off. Roof surfaces shall be protected from damage at all times.
- B. Keep all materials clearly identified with all grade marks legible. Keep all damaged material clearly identified as damaged and stored separately to prevent its inadvertent use.
- C. Do not allow installation of damaged or otherwise non-complying material.
- D. In the event of damage, immediately make all necessary repairs and replacements to the approval of and at no additional cost to the Owner.

1.05 Warranty

- A. Warranty: See Section 01 78 36.

PART TWO – PRODUCTS**2.01 Nailers**

- A. All nailers shall be #2 or better, construction grade lumber.
- B. Size to be as indicated on the drawings.
- C. Minimum nailer size shall be 2" x 6" (nominal).
- D. Minimum top nailer thickness shall be 1-1/2" (nominal).
- E. Nailers shall extend 1/2" beyond metal flanges.

2.02 Plywood

- A. All plywood is to be minimum 1/2", APA Rated Exterior, Structural 1. Only waterproof glue is acceptable.
- B. Refer to drawings for plywood thickness at each detail.

2.03 Carbon Steel Fasteners

- A. All fasteners must be carbon steel with corrosion-resistant coating. Fasteners shall meet FM 4470.
- B. Masonry/Concrete Fasteners
 - 1. Corrosion-resistant, threaded fastener with low profile head.
 - 2. Fasteners shall be a minimum of 3/16" diameter with a 1" minimum embedment.
 - 3. Fastener to be FM Global approved.
 - 4. Approved Products
 - a. Tapcon Flat-Head Phillips with Blue Climaseal or White UltraShield by ITW Buildex
 - b. Tapper Flat-Head Phillips with Perma-Seal Coating by Powers Fasteners, Inc.
- C. Steel/Wood Fasteners
 - 1. Corrosion-resistant, self-tapping, self-drilling screw with low profile head.
 - 2. Fastener to be FM Global approved.
 - 3. Approved Products

- a. Roof Grip by OMG with Climaseal Coating
 - b. Dekfast by SFS intec, Inc., with Sentri Coating
 - c. Standard roofing fastener by OMG, with CR-10 coating.
4. Fasteners to be #12 minimum and of sufficient length to penetrate into steel 3/4" and wood 1".
- D. Washers
1. Round, carbon steel, ASTM F 844-072, galvanized per ASTM F 2674. Minimum diameter 5/8".

PART THREE – EXECUTION

3.01 Nailers

- A. Nailers are to be installed as per detail drawings.
- B. Discard units of material with defects that might impair quality of work and units that are too small to use in fabricating work with minimum joints or optimum joint arrangement.
- C. Set nailers to required levels and lines with members plumb and true.
- D. All perimeter nailers shall be of uniform height within a given roof section.
- E. Nailers shall be installed with 1/4" gap between ends of adjoining pieces.
- F. Nailers shall be fastened in accordance with the following schedule:
 1. Fasteners in 6" or wider (nominal) lumber shall be installed in two (2) rows, staggered one-third of nailer width. Listed spacings indicate distance between fasteners in adjacent rows.
 2. Two (2) fasteners shall be installed within 6" of each nailer end.
 3. Corner fastener spacing shall extend 8' from all outside building corners.
 4. Where two or more nailers are installed, each nailer shall be fastened independently.
 5. Over all deck types, the bottom nailer shall be fastened using the specified fasteners and 5/8" diameter washers. Countersink washers and fasteners level with top of wood using spade bit or similar method. Fasten subsequent nailers, where specified, using the specified screws without washers.
 6. Maximum fastener spacing shall be as specified on the drawings.

3.02 Plywood

- A. Plywood is to be installed as per detail drawings.
- B. Plywood joints must be true and well fitting, allowing for expansion and contraction. Allow 1/8" at end and edge joints.

- C. Plywood fasteners shall be installed in a uniform grid pattern, with a maximum spacing of 18" o.c. between adjacent fasteners.
- D. Where fastening to steel stud framing, fasten to each framing member at 6" o.c.

3.03 Verification

- A. Contractor shall inspect the work described by this section of the specification and shall verify that all components are complete and properly installed.
- B. Contractor shall correct any deficient work prior to installing subsequent work or notification of completion.

3.04 Cleaning

- A. When sawing of wood or plywood is performed on the rooftop, contain and/or clean sawdust in such a way as to prevent contamination of substrate to receive subsequent construction materials.
- B. Contractor shall follow the requirements to Section 02 41 20 – Roof Demolition & Cleanup.

- End of Section -

PART ONE – GENERAL**1.01 Description**

- A. Furnish and install fiberglass batt insulation complete, in-place, per the drawings and specifications.

1.02 Quality Assurance

- A. Standards: Comply with all pertinent standards specified in the contract documents, including those listed below. If the building code references a specific edition or revision of an individual standard, then comply with that edition or revision. Otherwise, comply with the latest published edition or revision available on the date the Contractor submits its price proposal to the Owner.
 - 1. Manufacturer's published specifications, product data sheets, application instructions, and technical bulletins.
- B. Qualifications of Installers: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts, and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this section.
- C. In acceptance or rejection of the work of this section, the Owner will make no allowance for lack of skill on the part of the workers.

1.03 Delivery, Storage, and Handling

- A. Use all means to protect the materials of this section before, during, and after installation, and to protect the work and materials of all other trades. Roof surfaces shall be protected from damage at all times.
- B. Deliver materials to the job site in original, unopened containers no sooner than 14 days prior to start of job. Materials to be stored up, off the roof deck or ground, and covered with weatherproof tarps anchored sufficiently, so as to resist wind blow-off. When storing materials on the roof, do not overstress deck.
- C. In the event of damage, immediately make all repairs and replacements to the approval of the Owner's Representative and at no additional cost to the Owner.

1.04 Submittals

- A. General: Comply with the provisions of Section 01 30 01.
- B. Product Data: 14 days prior to starting work, submit:
 - 1. Most recent copy of Manufacturer's literature for products to be used.
 - 2. Complete material list of all items proposed to be furnished and installed under this section.

PART TWO – PRODUCTS**2.01 Batt Insulation**

- A. Fiberglass Batts: Unfaced, reinforced fiberglass batts as manufactured by Owens-Corning or Johns Manville.
- B. Batt thickness is to be twice the dimension of the opening to which it is being inserted.

2.02 Polyethylene Vapor Retarder

- A. Approved Products
 - 1. Generic 6-mil polyethylene sheet

2.03 Seam Tape

- A. Seam tape shall be a 4" wide, heavy duty, weather resistant, rubber adhesive tape.
- B. Approved Products
 - 1. Vapor Block Tape (Part #VBT4X210) by Americover
 - 2. Approved equal

PART THREE – EXECUTION**3.01 Installation**

- A. Where shown on the drawings, install polyethylene vapor retarder. Seal all joints and edges vapor tight using seam tape.
- B. Install fiberglass batt insulation as indicated on the detail drawings. Insulation is to be securely wedged into place and shall fill all voids.

3.02 Verification

- A. Contractor shall inspect the work described by this section of the specification and shall verify that all components are complete and properly installed.
- B. Contractor shall correct any deficient work prior to installing subsequent work or notification of completion.

3.03 Cleaning

- A. Contractor shall follow the requirements to Section 02 41 20 – Roof Demolition & Cleanup.

- End of Section -

PART ONE – GENERAL**1.01 Description**

- A. Provide and install roof board insulation and means of securement complete, in-place, per the drawings and specifications.

1.02 Quality Assurance

- A. Standards: Comply with all pertinent standards specified in the contract documents, including those listed below. If the building code references a specific edition or revision of an individual standard, then comply with that edition or revision. Otherwise, comply with the latest published edition or revision available on the date the Contractor submits its price proposal to the Owner.
 - 1. *The NRCA Roofing and Waterproofing Manual*, National Roofing Contractors Association
 - 2. Manufacturer's published specifications, product data sheets, application instructions, and technical bulletins.
 - 3. *Annual Book of ASTM Standards*, ASTM International
- B. Qualifications of Installers: Use adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts, and who are completely familiar with the specified requirements and methods needed for proper performance of the work in this section. In acceptance or rejection of the work, the Owner will make no allowance for lack of skill on the part of the workers.
- C. Roofing Inspections: Make all required notifications and secure all required inspections by the Manufacturer of the approved materials to facilitate issuance of the specified roof warranty.
- D. U.L. Listing: Provide materials bearing Underwriters Laboratories (U.L.) marking on bundle, package, or container indicating that materials have been produced under U.L.'s classification and follow-up service.

1.03 References

- A. References: Materials used in this section shall be listed in the reference(s) below. The reference(s) used shall be the latest published edition available on the date the Contractor submits its price proposal to the Owner.
 - 1. *Roofing Materials and Systems Directory and Fire Resistance Directory*, Underwriters Laboratories, Inc.

1.04 Submittals

- A. General: Comply with the provisions of Section 01 30 01.
- B. Product Data: 14 days prior to starting work, submit:
 - 1. Most recent copy of Manufacturer's literature applicable to products and specifications to be used.

2. Complete material list of all items proposed to be furnished and installed under this section.
3. Manufacturer's recommended methods of installation.
 - a. When approved by the Owner's Representative, the Manufacturer's recommended methods of installation, unless superseded by the specification, shall become the basis for inspecting, and acceptance or rejection of the actual installation procedures used in this work.

1.05 Delivery, Storage, and Handling

- A. Deliver materials to job site in their original unopened containers, no sooner than 14 days prior to start of project. Package labels shall indicate material name, production date, and/or product code. Slit Manufacturer-supplied plastic covering and cover with weatherproof tarps that are securely anchored so as to resist blow-off.
- B. Store materials in dry, raised, protected areas in an upright position. Control temperature of storage areas in accordance with Manufacturer's instructions. Protect materials from exposure to the elements. Do not exceed allowable live load of storage area.
- C. Use all necessary means to protect the materials in this section before, during, and after installation, and to protect the work and materials of all other trades.
- D. In the event of damage, immediately make all necessary repairs and replacements subject to the approval of and at no additional cost to the Owner.
- E. Follow the Manufacturer's recommendations for storage of temperature sensitive materials.

1.06 Scheduling

- A. Work shall be performed on a daily basis with each section completed before progressing to the next day's work, unless specifically directed otherwise by the Owner's Representative.
- B. Completion of work will be defined as the installation of all specified roof preparation, insulation, field membrane, flashings, counterflashings, sheet metal, fasteners, and caulking.

1.07 Warranty

- A. Warranty: See Section 01 78 36.

PART TWO – PRODUCTS

2.01 General

- A. All materials used on this project shall be compatible with the existing conditions and with each other.
- B. No product shall contain any asbestos or asbestos-related products.
- C. Insulation, fasteners, and/or adhesives used on this project shall be approved by the roofing membrane Manufacturer, shall be compatible with the roof system specified, and shall qualify for the specified roofing membrane Manufacturer's warranty.

2.02 Insulation Materials

- A. Gypsum Wall Board
 - 1. Non-structural, moisture resistant gypsum panel. Gypsum board shall conform to ASTM D 3273 for mold resistance. Gypsum board shall be supplied in 4' x 8' sheets. Gypsum board shall be flat stock 1/2" thick.
 - 2. Approved Products
 - a. DensGlass by Georgia-Pacific Gypsum Corp.
- B. Polyisocyanurate Foam Roof Insulation
 - 1. Insulation shall be a closed-cell, polyisocyanurate foam core with factory-laminated facers conforming to ASTM specification C 1289, Type II, Class 1. Foam core shall have a rated flame spread of 75 or less according to ASTM E 84. Insulation shall have minimum compressive strength of 20 psi (Grade 2) according to ASTM C 1289. Insulation shall be supplied in 4' x 8' boards. Insulation thickness shall be as noted on the drawings.
 - 2. Approved Products
 - a. ISO 95+ GL by Firestone Building Products Co. LLC
- C. Tapered Polyisocyanurate Foam Roof Insulation
 - 1. Insulation shall be a closed-cell, polyisocyanurate foam core with factory-laminated facers conforming to ASTM specification C 1289, Type II, Class 1. Foam core shall have a rated flame spread of 75 or less according to ASTM E 84. Insulation shall have minimum compressive strength of 20 psi (Grade 2) according to ASTM 1289. Insulation shall be supplied in 4' x 4' boards. Insulation shall have a minimum slope of 1/2" per foot. Insulation slope shall be as noted on the drawings.
 - 2. Approved Products
 - a. Tapered ISO 95+ GL by Firestone Building Products Co. LLC
- D. Tapered Fiberboard Edge Strip
 - 1. Wood fiber insulation boards factory cut to provide slope. Insulation shall conform to ASTM C 208. Insulation shall be supplied in 6" x 4' boards. Insulation shall be tapered from 0" to 1/2" across width of board.
 - 2. Approved Products
 - a. As approved by the roof membrane Manufacturer

2.03 Insulation Fasteners

- A. Steel

1. Corrosion-resistant, self-tapping, self-drilling screw with #3 phillips head. 1/4" hexhead fasteners are not approved. Fastener shall be carbon steel with corrosion-resistant coating. Fastener and plate shall meet FM 4470 requirements.
2. Galvalume AZ50 coated steel plate, supplied by fastener Manufacturer.
3. Fastener and plate shall be approved by FM Global.
4. Approved Products
 - a. Insulation Fastener – Firestone All-Purpose Fastener by Firestone Building Products Co. LLC
 - b. Insulation Plate – Insulation Fastening Plate by Firestone Building Products Co. LLC
5. Steel Deck: Fasteners shall be the shortest length to penetrate the top flange of the deck by 3/4".
6. Fasteners must not penetrate bottom rib of steel deck. Fasteners shall not protrude below the bottom rib of steel deck.

PART THREE – EXECUTION

3.01 Description

- A. The latest Manufacturer specifications and installation instructions shall be followed along with the following requirements. These specific minimum requirements must be included in the bid and shall not be altered.
- B. Inspection
 1. Examine the areas and conditions under which work in this section will be installed. Correct conditions detrimental to the proper and timely completion of the work. Do not proceed until such conditions have been corrected.
- C. Preparation and Surface Conditions
 1. Before insulation application is started, remove trash, debris, grease, oil, water, moisture, and contaminants from substrate to receive insulation.
 2. Prepare all surfaces according to applicable specification sections.
 3. Protect adjacent areas from damage.
 4. Surfaces scheduled to receive insulation shall be free of any standing water, frost, snow, or loose debris.
 5. Substrate shall be smooth, free of sharp projections, and free of obvious depressions.
 6. All nailers shall be installed prior to installing insulation.
- D. Installation – General

1. Perform all related work specified elsewhere necessary for the installation of the specified roof insulation.
2. Ensure that fasteners do not penetrate conduit or other miscellaneous items located on the underside of the roof deck, or spall the underside of the deck.
3. Do not apply insulation materials when water in any form (i.e., rain, dew, ice, frost, snow, etc.) is present.
4. Install tapered insulation crickets at the upslope side of each curb that is 18" or wider. Cricket shall extend out half the width of the curb and the cricket's slope shall be twice the opposing field slope.
5. Perimeter and corner areas shall be calculated based upon the applicable version of ASCE-7.

3.02 Air Barrier

- A. Prior to installing the insulation, install an air barrier as specified in Section 07 27 19 – Plastic Sheet Air Barrier.

3.03 Mechanically Fastened Construction

A. Multiple Layers

1. Bottom layer of insulation shall be installed with all joints tightly butted and end joints staggered 12" minimum. Insulation shall fit tightly around penetrations.
2. Areas of damage or broken corners shall be cut out and replaced with pieces 12" x 12" minimum.
3. Additional layer(s) of insulation shall be installed over preceding layer(s) with all joints tightly butted and end joints staggered 12" minimum. Insulation shall fit tightly around penetrations.
4. Insulation joints in each layer shall be offset a minimum of 12" from insulation joints in the preceding layer, including all daily tie-off locations.
5. Areas of damage or broken corners shall be cut out and replaced with pieces 12" x 12" minimum, fastened into place.
6. Fastener spacings shall be as defined within this section, but no less than two fasteners per each piece of insulation.
7. Fasten the top layer of insulation boards with screw and plate type fasteners. Minimum spacing shall be as listed below. If insulation Manufacturer's fastening requirements exceed those of this section, then Manufacturer's recommendations shall be followed.

Field: 1 per every 2 square feet
Perimeters: 1 per every 2 square feet
8. Any whole or partial insulation board that falls within the perimeter or corner areas shall have the increased fastening applied over the entire board.

9. Fastening patterns and perimeter/corner areas shall be installed per the drawings and specifications.

3.04 Tapered Insulation

- A. Install tapered crickets, where indicated on the drawings in the sizes shown. End of cricket shall provide for slope into the sump at the drainage device. End of cricket shall be of sufficient width at sump such that flat spots do not occur in valley. Cricket slope shall be twice the field slope, unless otherwise noted on the drawings.
- B. Utilize tapered insulation panels and tapered edge strips to construct sumps at roof drains, where detailed. Delete thermal insulation within sumps, as required, for installation of tapered panels, so as to provide continuous slope down to drainage device, without creating a sharp/steep sloped transition. At no time shall slope within drain sump exceed 1:12, unless otherwise noted in drawings.
- C. Install tapered crickets on the upslope sides of all rectangular penetrations with a dimension greater than 18" perpendicular to slope. Cricket slope shall be twice the field's slope, unless otherwise noted on drawings.
- D. Utilize tapered edge strip at transitions in construction of more than 1/4", and in other specified locations, to provide a smooth transition and proper support for the membrane system or subsequent insulation layer. Field cut and shape edge strip as required. Direct slope of edge strip so as to provide for proper drainage.
- E. Verify that tapered insulation is properly installed and that no irregularities exist that will result in ponding water in the finished roof system.

3.05 Verification

- A. Contractor shall inspect the work described by this section of the specification and shall verify that all components are complete and properly installed. Verify that insulation boards are positively secured.
- B. Contractor shall correct any deficient work prior to installing subsequent work or notification of completion.

3.06 Cleaning

- A. Contractor shall follow the requirements to Section 02 41 20 – Roof Demolition & Cleanup.

- End of Section -

PART ONE – GENERAL**1.01 Description**

- A. Furnish and install a single-ply polyethylene sheet air barrier complete, in-place, per the drawings and specifications.

1.02 Quality Assurance

- A. Standards: Comply with all pertinent standards specified in the contract documents, including those listed below. If the building code references a specific edition or revision of an individual standard, then comply with that edition or revision. Otherwise, comply with the latest published edition or revision available on the date the Contractor submits its price proposal to the Owner.
 - 1. *The NRCA Roofing and Waterproofing Manual*, National Roofing Contractors Association
 - 2. Manufacturer's published specifications, product data sheets, application instructions, and technical bulletins.
- B. Qualifications of Installers: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts, and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this section.
- C. In acceptance or rejection of the work of this section, the Owner will make no allowance for lack of skill on the part of the workers.
- D. Roofing Inspections: Make all required notifications and secure all required inspections by the Manufacturer of the approved materials to facilitate issuance of the specified roof warranty.
- E. The Contractor shall not subcontract the installation of the material covered under this section to an individual or firm that is not a full-time employee of the Contractor's company.

1.03 Submittals

- A. General: Comply with the requirements of Section 01 30 01.
- B. Product Data: 14 days prior to starting work, submit:
 - 1. Complete material list of all items proposed to be furnished and installed under this section.
 - 2. Most recent copy of Manufacturer's literature applicable to products and specifications to be used.

1.04 Delivery, Storage and Handling

- A. Protection: Use all means to protect the materials of this section before, during, and after installation and to protect the work and materials of all other trades.

- B. Delivery and Storage: Deliver materials to the job site in original, unopened containers no sooner than 14 days prior to start of job. Package labels shall indicate material name, production date, lot number, and/or product code. Materials shall be stored up off the roof or ground, and covered completely with weatherproof tarps that are securely anchored, so as to resist wind blow-off. When storing materials on the roof, do not overstress the deck.
- C. Replacements: In the event of damage, immediately make all repairs and replacements to the approval of the Owner and at no additional cost to the Owner.
- D. Follow the Manufacturer's recommendations for storage of temperature sensitive materials.

1.05 Scheduling

- A. Work is to be performed on a daily basis with each section completed before progressing to the next day's work unless specifically directed otherwise by the Owner's Representative.
- B. Completion of the work will be defined as the installation of all specified roof preparation, air barrier, insulation, field membrane, flashings, counterflashings, sheet metal, fasteners, and caulking.

1.06 Warranty

- A. Warranty: See Section 01 78 36.

PART TWO – PRODUCTS

2.01 General

- A. Minimum product requirements have been listed. All of these components shall be used and bid. Products not supplied by the Manufacturer shall be purchased from a Manufacturer-approved source.

2.02 Air Barrier

- A. Approved Products
 - 1. Generic 6-mil polyethylene sheet

2.03 Seam Tape

- A. Seam tape shall be a 4" wide, heavy duty, weather resistant, rubber adhesive tape.
- B. Approved Products
 - 1. Vapor Block Tape (Part #VBT4X210) by Americover
 - 2. Approved equal

PART THREE – EXECUTION**3.01 Description**

- A. The latest Manufacturer specifications and installation techniques shall be followed with the following requirements. These specific minimum requirements shall be included in the bid and are not to be altered.

3.02 Inspection

- A. Examine the areas and conditions under which work in this section will be installed. Correct conditions detrimental to the proper and timely completion of the work. Do not proceed until such conditions have been corrected.

3.03 Preparation and Surface Conditions

- A. Before air barrier installation is started, remove trash, debris, grease, oil, water, moisture, and contaminants that may affect installation.
- B. Prepare all surfaces according to applicable specification sections.
- C. Protect adjacent areas from damage with tarps or other durable materials.
- D. Surfaces scheduled to receive air barrier shall be free of any standing water, frost, snow, or loose debris.
- E. Substrate shall be smooth, free of sharp projections and free of obvious depressions.
- F. All metal fittings specified or shown on the drawings shall be in-place before roofing.
- G. All nailers shall be securely installed prior to air barrier installation.

3.04 Installation – General

- A. Perform all related work specified elsewhere necessary for the installation.
- B. Do not apply roofing materials when water in any form (i.e., rain, dew, ice, frost, snow, etc.) is present.

3.05 Installation – Air Barrier

- A. Over the indicated substrate, loosely lay in place one layer of polyethylene sheet air barrier with 6" side and end laps onto adjacent sheet(s). Splice all joints with seam tape. Repair all punctures, holes, and tears with polyethylene sheet air barrier and seam tape.
- B. Air barrier shall be installed under the insulation over the entire roof surface.
- C. Air barrier shall wrap over the edge of the insulation 12" at the roof perimeters.
- D. Seal air barrier at all penetrations using polyethylene sheet air barrier and seam tape.
- E. After installation, verify that air barrier is lying flat without folds; that all seams have been spliced; and all punctures, holes, and tears have been repaired.

3.06 Verification

- A. Contractor shall inspect the work described by this section of the specification and shall verify that all components are complete and properly installed.
- B. Contractor shall correct any deficient work prior to installing subsequent work or notification of completion.
- C. Inspect all air barrier and flashing seams prior to proceeding with subsequent construction. All loose or separated seams shall be repaired prior to proceeding.
- D. Inspect the air barrier for punctures or other damage prior to proceeding with subsequent construction. Repair any such damage prior to proceeding.

3.07 Cleaning

- A. Contractor shall follow the requirements of Section 02 41 20 – Roof Demolition & Cleanup.

- End of Section -

PART ONE – GENERAL**1.01 Description**

- A. Furnish and install a weather and watertight mechanically fastened TPO roof complete, in-place, per the drawings and specifications.

1.02 Quality Assurance

- A. Standards: Comply with latest edition of standards specified in this section and as referenced below:
1. *The NRCA Roofing Manual: Membrane Roof Systems 2007* - National Roofing Contractors Association.
 2. Membrane manufacturer's current published specifications, application instructions, and technical bulletins.
 3. *Annual Book of ASTM Standards*, Latest Revision – ASTM International.
- B. Qualifications of Installers: Use adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts, and who are completely familiar with the specified requirements and methods needed for proper performance of the work in this section. In acceptance or rejection of the work, the Owner will make no allowance for lack of skill on the part of the workers.
- C. Roofing Inspections: Make all required notifications and secure all required inspections by the manufacturer of the approved materials to facilitate issuance of the specified roof warranty.
- D. U.L. Listing: Provide materials bearing Underwriters Laboratories (U.L.) marking on bundle, package, or container, indicating that materials have been produced under U.L.'s classification and follow-up service.
- E. The Roofing Contractor shall not subcontract the installation of the roof system covered under this specification to an individual or a firm that is not a full-time employee of the Roofing Contractor's company. Included shall be the following components:
1. Insulation
 2. Roof Membrane
 3. Flashings
 4. Roof Walkways

1.03 Referenced Standards

- A. References: Materials used in this section shall be listed in the latest edition of the following:
1. *Roofing Materials and Systems Directory and Fire Resistance Directory* – Underwriters Laboratories Inc.

1.04 Submittals

- A. General: Comply with the provisions of Section 01200.
- B. Product Data: 14 days prior to starting work, submit:
 - 1. Most recent copy of manufacturer's literature applicable to products and specifications to be used.
 - 2. Complete material list of all items proposed to be furnished and installed under this section.
 - 3. Manufacturer's recommended methods of installation.
 - a. When approved by the Owner's Representative, the manufacturer's recommended methods of installation, unless superseded by the specification, will become the basis for inspecting, and acceptance or rejection of the actual installation procedures used in this work.
 - 4. Detail drawing showing the proposed temporary water cutoff detail.

1.05 Product Handling

- A. Protection: Use all means to protect the materials of this section before, during, and after installation and to protect the work and materials of all other trades.
- B. Delivery and Storage: Deliver materials to the job site in original, unopened containers no sooner than 14 days prior to start of job. Package labels shall indicate material name, production date, lot number, and/or product code. Materials shall be stored up, off of the roof deck or ground and covered completely with weatherproof tarps that are securely anchored, so as to resist wind blow-off. When storing materials on the roof, do not over stress deck.
- C. Replacements: In the event of damage, immediately make all repairs and replacements to the approval of the Owner and at no additional cost to the Owner.
- D. Follow the manufacturer's recommendations for storage of temperature sensitive materials.

1.06 Scheduling

- A. Work is to be performed on a daily basis with each section completed before progressing to the next day's work, unless specifically directed otherwise by the Owner's Representative.
- B. Completion of work will be defined as the installation of all specified roof preparation, insulation, field membrane, flashings, counterflashings, sheet metal, fasteners, and caulking.

1.07 Warranty

- A. Warranty: See Section 01 78 36.

PART TWO – PRODUCTS**2.01 General**

- A. Minimum product requirements have been listed. All of these components must be used and bid. Products not supplied by the manufacturer are to be purchased from a manufacturer-approved source.
- B. Manufacturer-supplied V.O.C. compliant products shall be bid and used per V.O.C. regulations in effect at the project location, at the time of bidding.
- C. No product shall contain any asbestos or asbestos-related products.

2.02 Acceptable Manufacturers

- A. Products manufactured or accepted by:
 - 1. Firestone Building Products Co. LLC

2.03 Products Supplied By Manufacturer

- A. Roof Membrane
 - 1. Roof membrane shall be nominal 60-mil, polyester reinforced, thermoplastic polyolefin sheet membrane as manufactured by Firestone Building Products Co. LLC. UltraPly TPO, standard white color. Sheet width shall be 96" (2.4 meters) for field sheets. Perimeter sheets shall be half the width of the field sheets.
- B. Flashing Membrane
 - 1. Flashing membrane shall be nominal 60-mil UltraPly TPO flashing, standard white color, as manufactured by Firestone Building Products Co. LLC.
 - 2. Pre-molded inside/outside corners and flashing boots are approved for use, provided they fit the flashing conditions.
- C. Membrane Adhesive – UltraPly Bonding Adhesive. Provide VOC compliant adhesive were required.
- D. Cut-Edge Sealant – Synthetic rubber sealant by Firestone Building Products Co. LLC, for use in sealing cut edges of reinforced membrane.
- E. Membrane Coated Sheet Metal – UltraPly TPO Coated Metal – .030" thick non-reinforced UltraPly TPO flashing laminated to 24-gauge galvanized sheet metal as supplied by Firestone Building Products Co. LLC. Color shall be white.
- F. Termination Bar – Firestone Termination Bar – 1.08" wide by 0.106" thick, aluminum counterflashing, with predrilled slotted holes every 3.9" o.c., as supplied by Firestone Building Products Co. LLC.
- G. Cover strips – .060" Reinforced UltraPly TPO membrane by Firestone Building Products Co.

LLC.

- H. Walkway – UltraPly TPO Walkway Pad, 30-inch wide by .130” thick minimum.
- I. Membrane Fasteners - Steel
 - 1. Corrosion-resistant, Red epoxy applied by Electrocoating, self-tapping, self-drilling screw with low profile head.
 - 2. Corrosion-resistant, AZ-55 Galvalume coated steel; 18 or 20-gauge, factory-made plate.
 - 3. Fastener and plate shall be approved by FM Global.
 - 4. Fastener and plate shall be supplied by Firestone Building Products Co. LLC.
 - 5. Approved Products
 - a. System Fastener – Firestone Heavy-Duty Plus by Firestone Building Products Co. LLC
 - b. Seam Plate – Firestone HD Plus Seam Plate by Firestone Building Products Co. LLC
- J. Pourable Sealer – Two-part polyurethane, two-color for reliable mixing; Pourable Sealer as supplied by Firestone Building Products Co. LLC.
- K. Sealant Tape – 1/8” x 3/4” Multi-Purpose Tape by source approved by Firestone Building Products Co. LLC.
- L. General Purpose Sealant: UltraPly TPO General Purpose Sealant by Firestone Building Products Co. LLC.

2.04 Other Materials

- A. All other materials not specifically described but required for a complete and proper installation of the work in this section shall be as selected by the Contractor, approved by the manufacturer, and subject to the approval of the Owner.

PART THREE – EXECUTION

3.01 Description

- A. The latest manufacturer specifications and installation techniques are to be followed along with the following requirements. These specific minimum requirements must be included in your bid and are not to be altered.

3.02 Inspection

- A. Examine the areas and conditions under which work in this section will be installed. Correct conditions detrimental to the proper and timely completion of work. Do not proceed until such

conditions have been corrected.

3.03 Surface Conditions

- A. Surfaces scheduled to receive roofing are to be free of any standing water, frost, snow, or loose debris.
- B. Substrate is to be smooth, free of sharp projections, and free of obvious depressions.
- C. All metal fittings specified or shown on drawings are to be in place before roofing.
- D. All nailers shall be securely installed prior to roofing.
- E. All surfaces scheduled to receive Firestone membrane must be free of physical contact with any bituminous surfaces, clean, and smooth.

3.04 Installation – General

- A. Perform all related work specified elsewhere necessary for the installation of the specified membrane system.
- B. Ensure that fasteners do not penetrate conduit or other miscellaneous items on the underside of the deck.
- C. Owner's Representative may take a seam sample of approximately 8" x 8" twice daily. Contractor shall be responsible for making watertight each sample area immediately after sample is cut.

3.05 Installation of Roofing Membrane

- A. Membrane sheet shall be oriented such that fastener rows (seams) run perpendicular to the steel deck rib direction in all field, perimeter, and corner areas.
- B. Unroll and position roofing membrane, without stretching, over the approved substrate.
- C. Sheets are to be overlapped a minimum of 6".
- D. Membrane shall be unrolled, lining up edge of roll with adjacent sheet.
- E. Membrane shall be installed in a neat and orderly fashion.
- F. Fastener spacings depend on building location, parapet height, building height, deck type, and deck thickness. Maximum spacing for fasteners is 12" o.c. for required field sheets, perimeter sheets, and added rows of fasteners. Fasteners must penetrate top flanges of metal decking where existing.
- G. Seaming area is to be clean and free of dust, dirt, and debris. When cleaning is required, follow the manufacturer's procedures for cleaning.
- H. All seams are to be welded using a Sarnamatic or roof membrane manufacturer approved equal welder. All seams are to be welded daily. All T-laps shall be patched, using heat

welded membrane.

- I. All seams are to be fully welded a minimum of 1" from the edge of the lap joint.
- J. Seams are to be allowed to cool and then checked for fish mouths and other voids. All necessary repairs are to be made daily by hot air welding.
- K. Membrane is to be secured at the roof perimeter by one of the following methods:
 - 1. Fastening through the membrane with a manufacturer-approved plate and fastener to the roof deck.
 - 2. Fastening the deck flange of a membrane clad metal flashing through the membrane and into a secure nailer at 3" o.c.
- L. Membrane fasteners and plates are to be installed around all roof penetrations and all changes in plane greater than 15°. Soil pipes, stacks and drains require four fasteners placed evenly around the penetration.

3.06 Perimeter Fastening

- A. Fastening rates shall be increased along all roof edges with the following exceptions:
 - 1. Roof edges along the bases of interior building walls or at the bases of roof elevation changes.
 - 2. Roof transitions, expansion joints, control joints, or fire walls, where the difference between the finished adjacent roof elevations is $\leq 36"$. If the elevation difference is $>36"$, the edge of the higher roof shall be treated as a perimeter.
- B. Perimeter Zone Fastening: Where the perimeter roof edge runs perpendicular to the deck rib direction, increased fastening shall be provided by using perimeter sheets fastened within the lap seams. Extend perimeter sheets to the intersecting perimeter roof edges. Perimeter sheet width shall be $\leq 60\%$ of the field sheet width.
- C. Perimeter Zone Fastening: A minimum of 3 perimeter sheets shall be used.
- D. Perimeter Zone Fastening: Where the perimeter roof edge runs parallel to the deck rib direction, the field sheets shall be installed through the perimeter zone to the intersecting perimeter roof edge. Increased fastening shall then be provided in the perimeter zones, by installing an additional row of membrane plates and fasteners, parallel to and midway between the field sheet seams.
- E. Perimeter and Corner Zone Fastening: The length of the added fastener rows within the perimeter and corner zones shall equal the total width of the areas that receive perimeter sheets.
- F. Perimeter and Corner Zone Fastening: The added rows of plates and fasteners shall be installed over and through the membrane, and fastened to the top flange of the deck at the specified fastening rate. Strip-in each fastener row using 8" wide strips of heat welded field membrane material, with each extending a minimum of 4" beyond the fastener on each end.

3.07 Flashings

- A. Flashings shall be constructed and terminated as per the detail drawings. The specified

water cutoff sealant or sealant tape shall be applied behind the top edges of the flashings. The top edges of flashings shall be fastened per the manufacturer's requirements at a minimum, unless superseded by the detail drawings.

- B. UltraPly Bonding Adhesive over the clean, dry, compatible substrate using an approved solvent-resistant roller. Apply in a uniform coat at the rate of 3/4 to 2 gallons per 100 square feet depending upon substrate finish. Allow adhesive to dry completely before installing flashing membrane.
- C. All flashings shall be totally bonded to the previously coated substrate at a rate of approximately 50 square feet per gallon of adhesive. Do not allow adhesive to dry completely on the underside of the membrane. The bonded sheet shall be pressed firmly into place using a hand roller.
- D. Flashings shall extend a minimum of 6" onto the roof membrane and 8" up the vertical.
- E. Pitch pans shall be avoided. Prior approval from the Owner's Representative is required for pitch pan use.

3.08 Membrane Clad Metal Flashings

- A. Where indicated on the detail drawings, install membrane clad metal flashings.
- B. Form and install flashings in the shapes and profiles indicated on the detail drawings.
- C. Metal flashings shall be fastened according to the detail drawings. If the manufacturer's fastening requirements exceed those shown on the drawings, then manufacturer's requirements are to be followed.
- D. Adjacent flashing sheets shall be spaced 1/4" apart. The ends of each sheet shall be fastened 3" o.c. along the butt joint. The joint shall be covered with 2-inch-wide aluminum tape. A 5-inch-wide strip of flashing membrane shall be hot air-welded over the joint.
- E. All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings are allowed without prior written approval from the Owner's representative and membrane manufacturer.

3.09 Roof Walkways

- A. Walkways shall be installed in a neat, orderly fashion and where indicated on roof plan or in specifications.
- B. Chalk line walkway location on roof membrane and position walkway in-place, using chalk line as a guide.
- C. Install walkway continuous and centered with previous walkway material. Apply a continuous coat of bonding adhesive to the field sheet and back of walkway in accordance with manufacturer's requirements.
- D. Walkway shall be secured to the roof membrane by heat welding. All edges shall be continuously welded watertight.

3.10 Temporary Water Cutoffs

- A. Temporary water cutoffs are to be constructed at the end of each working day to protect the insulation, roofing, building, and building interior from damage due to wind, snow, and rain.

- B. Contractor shall provide methods and materials compatible with the membrane, to provide a positively adhered weather and watertight seal, capable of withstanding inclement weather and ponded water.

- C. Construction of temporary water cutoffs is to be detailed by the Contractor and approved by the manufacturer and the Owner's Representative.

- D. Temporary water cutoffs and contaminated membrane shall be neatly trimmed and removed at the start of the next workday.

3.11 Cleanup

- A. Contractor shall follow provide a "broom clean" finish at the completion of this work.

3.12 Verification

- A. Inspect all membrane and flashing seams prior to notification of completion. All seams will be probed and repaired prior to acceptance of the project.

- End of Section -

PART ONE – GENERAL**1.01 Description**

- A. Furnish and install roof related sheet metal work per the drawings and specifications, including all clips, sealant, fasteners, and joining to make weather and watertight.

1.02 Quality Assurance

- A. Standards: Comply with all pertinent standards specified in the contract documents, including those listed below. If the building code references a specific edition or revision of an individual standard, then comply with that edition or revision. Otherwise, comply with the latest published edition or revision available on the date the Contractor submits its price proposal to the Owner.
 - 1. *ANSI/SPRI ES-1.*
 - 2. *Architectural Sheet Metal Manual*, Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
 - 3. *The NRCA Roofing and Waterproofing Manual* National Roofing Contractors Association
 - 4. Manufacturer's published specifications, product data sheets, application instructions, and technical bulletins.
 - 5. *Annual Book of ASTM Standards*, ASTM International
- B. Qualifications of Installers: Use adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts, and who are completely familiar with the specified requirements and methods needed for proper performance of the work in this section.
- C. In acceptance or rejection of the work of this section, the Owner will make no allowance for lack of skill on the part of the workers.

1.03 Submittals

- A. General - Comply with provisions of Section 01 30 01.
- B. Fourteen days prior to starting work on project, submit shop drawings showing location, diagrams, and details of fabrication and installation.
- C. Drawings to show type and gauge of metal used. Gauges of sheet metal specified in this section are minimums.
- D. Submit product information or material list noting fasteners, sealants, sealant primers, sealant tapes, and other required accessories.
- E. Submit color chart or physical samples for selection of prefinished metal color by the Owner.
- F. Submit color chart or physical samples for selection of sealant color by the Owner.

1.04 Delivery, Storage, and Handling

- A. Use all means to protect the materials of this section before, during, and after installation and to protect the work and materials of all other trades. Roof surfaces shall be protected from damage at all times.
- B. Deliver only new materials to the job site. Materials to be stored in such a manner as to be protected from wind displacement, rain, snow, or inclement weather. When storing materials on the roof, do not overstress the deck.
- C. In the event of damage, immediately make all repairs and replacements to the approval of the Owner and at no additional cost to the Owner.
- D. Follow the Manufacturer's recommendations for storage of temperature sensitive materials.

1.05 Scheduling

- A. All new sheet metal work shall be closely coordinated with the installation of the new roofing system.
- B. Sheet metal shall be installed directly after roofing work such that roofing terminations shall not be left unprotected by metal.

1.06 Warranty

- A. All new materials and workmanship provided under this section of the specifications shall be guaranteed in writing by the Contractor for two (2) years.
- B. The Contractor shall maintain all roof related sheet metal in a watertight condition without cost to the Owner during the Contractor's warranty period.
- C. Warranty: See Section 01 78 36

PART TWO – PRODUCTS**2.01 General**

- A. Manufacturer supplied V.O.C. compliant products shall be bid and used if V.O.C. regulations are in effect at the project location at the time of bidding.
- B. No product shall contain any asbestos or asbestos-related products.

2.02 Materials

- A. Sheet metal components, metal types, finishes, gauges/thicknesses, and joint types, and ANSI/SPRI ES-1 compliance data are specified in the detail drawings.
- B. Where sheet metal is required and no material or gauge is indicated on the drawings, provide the highest quality and gauge commensurate with the referenced standards.
- C. Contractor shall use gauges or thicknesses listed in the drawings or as prescribed in the referenced standards for specific girths, whichever is greater.
- D. Approved equal products must be proposed prior to the bid due date, and approval shall be

granted by the Owner prior to award of contract.

2.03 Material Specifications

A. Galvanized Steel

1. Galvanized steel shall be G-90 material.
2. Specifications References
 - a. ASTM A 653/A 653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process
3. Continuous clips, where specified for use, shall be galvanized steel, one gauge thicker than the primary component being secured.

B. Kynar Prefinished Steel

1. G-90 galvanized steel with a polyester wash coat on the concealed side, and Kynar 500/Hylar 5000 coating on the exposed side.
2. Approved Products
 - a. PAC-CLAD by Peterson Aluminum Corporation
 - b. TUFFCLAD by Clad-Tex Metals
 - c. ColorKlad by Ryerson Inc.
 - d. UNA-CLAD by Firestone Building Products
 - e. Approved equal
3. Color shall be selected by the Owner from the Manufacturer's standard colors.
4. Continuous clips, where specified for use, shall be galvanized steel, one gauge thicker than the primary component being secured.

2.04 Carbon Steel Fasteners

- A. All fasteners shall be carbon steel with corrosion-resistant coating, unless otherwise noted. Fasteners shall show no more than 15% red rust corrosion after 30 cycles of Kesternich testing.
- B. Masonry / Concrete Fasteners
 1. Fasteners shall be threaded or expansion type as required by site conditions.
 2. Threaded fasteners shall be corrosion-resistant with hex washer head.
 3. Expansion fasteners shall be zinc-alloy jacketed with stainless steel drive pin and mushroom head (nylon or plastic anchors are not approved).
 4. Corrosion-resistant, watertight, EPDM sealing washer shall be supplied for either threaded or expansion type fasteners.

5. Fasteners shall be approved by FM Global.
 6. Approved Products
 - a. Tapcon Hex Washer Head with Blue Climaseal or White UltraShield Coating by ITW Buildex
 - b. Tapper with Perma-Seal Coating by Powers Fasteners, Inc.
 - c. Metal Hit Anchor by Hilti
 - d. Zamac Hammer-Screw with Carbon Steel Drive Screw by Powers Fasteners, Inc.
 - e. Masonry Anchor by OMG
 - f. Dekfast ZAC Anchor with Sentri XP Coating by SFS Intec, Inc.
 - g. Approved equal
 7. Fasteners to be nominal 3/8" thickness minimum and of sufficient length to penetrate the masonry/concrete 1".
- C. Steel / Wood Fasteners
1. Corrosion-resistant, self-drilling, self-tapping screw with hex washer head for exposed fastening.
 2. Corrosion-resistant, watertight, EPDM sealing washer for exposed fastening.
 3. Approved Products – Steel Fasteners
 - a. Tek Screw with Climaseal Coating by ITW Buildex
 - b. Dekfast ZAC Impax Anchor with Sentri XP Coating by SFS intec, Inc.
 - c. Approved equal
 4. Approved Products – Wood Fasteners
 - a. TruGrip GT with Climaseal Coating by ITW Buildex
 - b. Dekfast ZAC Tapping Fastener with Sentri XP Coating by SFS intec, Inc.
 - c. Approved equal
 5. Fasteners to be nominal 1/4" thickness minimum and of sufficient length to penetrate the steel 1/2" or into wood minimum 1-1/2".
 6. 1-1/4" x 11-gauge, galvanized, ring shank roofing nails shall be used for concealed fastening into wood.

2.05 Other Materials**A. Sealants and Related Accessories**

1. General: Except as specifically otherwise directed by the Owner's Representative, use only the type of sealants described in this section.
 - a. Silyl-Terminated Polyether (Hybrid) Sealant
 - 1) Approved Products
 - A) Sonolastic 150 VLM by BASF Building Systems
 - B) Approved Equal
 - b. Urethane Sealant
 - 1) Approved Products
 - A) Sonolastic NP-1 by BASF Building Systems
 - B) Approved Equal
2. Cleaner
 - a. Industrial solvent recommended by the sealant Manufacturer, such as Isopropyl Alcohol, Naphta, Mineral Spirits, Xylol, Toluene, MEK, or Manufacturer-supplied cleaner.
3. Primer
 - a. General: Use only those primers that are specifically recommended for this installation by the sealant Manufacturer.
 - b. Primer shall be one of the following:
 - 1) Primer 733 BASF Building Systems
 - 2) Approved Equal
4. Backer Rod
 - a. General: Use only those backup materials that are specifically recommended for this installation by the sealant Manufacturer and that are non-absorbent, non-staining, and non-gassing when punctured. Backup materials must be 1-1/2 times the width of the joint.
 - b. Backer rod shall be one of the following:
 - 1) Soft Backer-Rod by BASF Building Systems
 - 2) Approved Equal

5. High Temperature Resistant Sealant
 - a. Trade Mate[®] Hi-Temp Silicone Sealant by Dow Corning Corporation
 - b. Approved equal
- C. Sealant Tape
 1. Permanently elastic isobutylene tripolymer tape or isobutylene isoprene copolymer tape that will bond to galvanized steel; aluminum; siliconized polyester, and polyvinyl flouride painted metals; as well as wood, concrete, etc., 1/8" x 1" nominal cross section, meeting Federal Specification TT-C 1796A, Type II, Class B, with minimum 20 psi adhesive tensile strength according to ASTM C 907, with a service temperature range of -60° F to 212° F.
 - a. Approved Products
 - 1) Sika Lastomer – 95 Gray by Sika Corp.
 - 2) Sika Lastomer – 93 Black by Sika Corp.
 - 3) Sika Lastomer – 65 White by Sika Corp.

PART THREE – EXECUTION

3.01 Inspection

- A. Examine the areas and conditions under which work of this section will be installed. Correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.
- B. Verify that the work by all other trades has been completed prior to installing roof related sheet metal work.

3.02 Fabrication

- A. Sheet metal shall be formed accurately to sheet shapes as indicated on the drawings and in conformance with details on the approved shop drawings. Contractor shall be responsible for all dimensions.
- B. Counterflashing shall be furnished where indicated on drawings. Form counterflashing sections not less than 8'0" in length, unless otherwise approved prior to fabrication and installation. Counterflashing shall overlap base flashing a minimum of 3".
- C. Coping caps shall be furnished where indicated on drawings. Form coping metal in sections not less than 8'0" in length, unless otherwise approved prior to fabrication and installation.
- D. Where loose lock lap joints are specified on the drawings, adjacent sections of metal shall overlap a minimum of 3".
- E. Where joint covers are specified on the drawings, they shall be slightly larger than the primary component to ensure a proper fit. Edges of joint covers shall be tipped toward primary component to form a compression seal.

- F. Miter all inside and outside corner joints in coping caps, edge metal, and expansion joints. Joints adjacent to inside and outside corners shall be placed exactly 24" each direction from the corner, unless otherwise approved prior to fabrication and installation.
- G. Break counterflashing and coping cap metal sections where they cross building expansion joints, if applicable.
- H. Horizontal flanges of edge metal, lead flashings, pitch pans, lower flanges, pipe jacks, etc., shall be 4" minimum with rounded corners.
- I. All exposed edges of cut sheet metal shall be folded back on concealed surfaces.
- J. Form, fabricate, and install all sheet metal so as to adequately provide for expansion and contraction in the finished work.
- K. Continuous clips shall be fabricated using metal material of greater thickness than the components being secured.
 - 1. Refer to 2.03 Materials Specifications for criteria.
- L. Where a continuous clip is specified on the drawings, the primary component shall be continuously crimped along the bottom edge of the clip.

3.03 Dissimilar Metals

- A. Dissimilar materials in contact, which are subject to electrolysis, shall be protected against such action prior to installation. Protective materials shall not be visible after installation. Protect metals using coatings recommended by Manufacturer, or separate using felt or EPDM membrane.

3.04 Weatherproofing

- A. Finish all sheet metal watertight and weathertight where so required.
- B. Where lap seams do not have a joint cover, lap 3" minimum according to pitch.
- C. Make all lap seams in the direction of the water flow.
- D. Where roof membrane is not already carried over top of parapet wall, expansion joint blocking, etc., the top of each shall be covered with sheet waterproofing underlayment (or the flashing membrane material if the roof system is a single-ply). The membrane shall be adhered to the substrates unless otherwise shown on the drawings, and shall make the wall or curb watertight until the sheet metal components are installed over it. All laps in the membrane material shall be seamed watertight per the Manufacturer's published installation instructions.

3.05 Joints

- A. Join parts with rivets or sheet metal screws where necessary for strength or stiffness.
- B. Provide suitable watertight expansion joints for all sheet metal as required for proper installation in accordance with the schedule of roof related sheet metal and detail drawings.
- C. Sealant application shall be neatly and thoroughly performed for a watertight seal. Sealant

shall be installed within all loose lock joints, under joint cover plates, and in other locations shown on the drawings. All exposed sealant joints shall be dry tooled to the profile shown on the detail drawings. If required, Contractor shall build custom tools on job site to provide the specified profile(s).

- D. Surfaces to receive sealant shall be thoroughly cleaned as recommended by the sealant Manufacturer. All bitumen coating materials, roof cement, adhesive residue, rust, old caulking and/or other contaminants shall be removed down to the substrate to which sealant bonding is intended.
- E. All surfaces to receive sealant shall be primed initially with the sealant Manufacturer's recommended primer.
- F. Provide solder/weld joints where noted on the drawings.

3.06 Fastening

- A. Secure metal as per detail drawings. Do not in any case install exposed fasteners on a horizontal plane, unless specifically shown on a particular detail drawing.
- B. All clips and cleats are to be fastened 6" o.c., unless otherwise noted on the drawings.
- C. On the roof facing side, copings are to be fastened 12" o.c. with EPDM washered fasteners, unless noted otherwise on the drawings.
- D. Do not fasten adjacent coping or counterflashing sections together at laps or at joint covers, so as to limit expansion/contraction ability. Fasten through center of joint cover through butt joint gap between primary component sections.
- E. Embedded metal flanges are to be fastened 3" o.c., staggered.
- F. The specified spacings for all fasteners in perimeter metal work shall be reduced by a factor of two in the corner zones of each roof section. Corner zones shall be as calculated based upon the applicable version of ASCE-7.
- G. For concealed fastening into wood, use annular ring shank roofing nails.
- H. For fastening into concrete, use masonry/concrete anchors with EPDM washers. Use only metal anchors. Plastic or nylon anchors shall not be used.
- I. For exposed fastening into wood, use screws with EPDM washers. Deformed shank nails shall not be used.
- J. Ensure that fasteners are not overdriven such that EPDM washer damage results. Remove and replace all such damaged fasteners, using oversized fasteners.

3.07 Protection

- A. Roof surfaces and flashing shall be adequately protected to prevent damage during the installation of metal work or during storage of the required materials. The Contractor shall replace any damaged construction, at no cost to the Owner.

3.08 Verification

- A. Contractor shall inspect the work described by this section of the specification and shall verify

that all components are complete and properly installed.

- B. Contractor shall correct any deficient work prior to installing subsequent work or notification of completion.

3.09 Cleaning

- A. Debris from sheet metal work shall be frequently removed from building site as it accumulates.
- B. Leave job site absolutely clean at completion of work, and properly dispose of all construction debris such as metal trimmings, fasteners, rivet nails, sealant tube ends, etc.
- C. Refer to Section 02 41 20 – Roof Demolition & Cleanup for additional requirements.

- End of Section -