

# SANTA FE INDEPENDENT SCHOOL DISTRICT

PROJECT MANUAL FOR:

## ROOF REPLACEMENT AT



Date: 5/9/2025

PREPARED BY:

ARMKO INDUSTRIES

DENNIS LEIFRIG

BUILDING ENVELOPE CONSULTANT

MAIN OFFICE: 1320 SPINKS ROAD

FLOWER MOUND, TX 75028



**00 01 10**

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**END OF SECTION 00 01 10**

**CONTRACTOR PROPOSAL FORM**

The purpose of this proposal is for Santa Fe ISD is to complete the replacement of the roof systems across all roof areas listed in the scope of work and the project roof plan.

The proposal by the contractor shall submit one hard copy and one thumb drive to 4133 Warpath Avenue, Santa Fe, TX 77510, via Fed Ex, UPS or USPS to Chris Wheeler, Executive Maintenance Director, by May 27, 2025, 2:00 p.m. Questions regarding the specifications should be directed to Mr. Dennis Leifrig, Armko Industries, dleifrig@armko.com.

The contract for the project will be between Santa Fe ISD and the Roofing Contracting Company.

**CONTRACT DOCUMENTS:** Having examined the Proposal, Contract, General Instructions, Materials, Execution, and Drawings for Project No. 25-1037-42 and conditions for said roofing replacement work, and having examined the premises and circumstances affecting the work, the undersigned offer:

**OFFER:** To furnish all labor, material, tools, equipment, transportation, bonds, insurance certificates, all applicable taxes, incidentals, and other facilities, and to perform all work for the said roofing replacement for the following:

**Project Schedule and Deadlines**

|                                                               |                            |
|---------------------------------------------------------------|----------------------------|
| Notice to Contractors                                         | 05/02/2025                 |
| Pre-Proposal Meeting                                          | 5/09/2025 9:00AM           |
| Deadline for Questions                                        | 5/15/2025 2:00PM           |
| Deadline for Addenda (Min. 7 business days prior to proposal) | 5/20/2025 5:00PM           |
| <b>Deadline for Receipt of Proposals &amp; Bid Opening</b>    | 5/27/2025 2:00PM           |
| Recommendation to the Board                                   | 6/16/2025 6:00PM           |
| Award of Contract                                             | Within 30-days of Bids Due |

**BASE PROPOSAL 1 SANTA FE MAINTENANCE WAREHOUSE:**

- Work shall include all labor and materials to provide a new Multi-ply PVC KEE roof system on the maintenance warehouse. All existing roofing is to be taken down to the existing sloped tectum roof deck. Approximately twenty-four (24) tectum roof panels will be required to be removed and replaced due to storm damage. Any additional will be replaced utilizing the unit cost proposals.
- Contractor to verify existing deck conditions, sweep clean all debris prior to installing new roofing materials
- Contractor to install a new mechanically attached base sheet utilizing fasteners and assembly letter provided by the manufacturer issuing the warranty. All roofing attachments will be required to be approved by the Texas Windstorm Engineer that each contractor will be responsible for scheduling and submission of field reports.
- Contractor to install 1-layer of 2.2-inch Polyisocyanurate insulation fastened to existing sloped tectum deck per manufacturer requirements to meet all local codes.
- Contractor to install 1-layer of 2.2-inch Polyisocyanurate insulation adhered to previous layer utilizing manufacturer specific 2-part low rise adhesive.
- Contractor to install ½-inch gypsum cover board adhered to previous layer of polyisocyanurate insulation utilizing manufacturer specific 2-part low rise adhesive.
- Contractor to install a 90-mil SBS smooth sanded inter-ply sheet, torch applied in field of roof.
- Contractor to install a 60-mil fleece backed PVC KEE roofing membrane installed in low-rise foam adhesive and per manufacturer's requirements. A 50-mil PVC/KEE by Fibertite is allowable to meet ASTM 6754
- All sheet metal copings, counter flashings, pipe bonnets and slip flashings are to be new stainless or Kynar where they occur and visible from the ground.
- Contractor to install new metal structure at all soffit and fascia panels with new stucco wall system materials and per detail.
- Extend existing soil pipes to a height of eight inches (8") above finished roof surface where needed and install manufacturer specific pipe boot with stainless steel bonnets and band clamp

**NOTE: All piping (Gas and/or Electrical) is required to be raised to install the new roofing system. All piping being raised must be raised to at least 14-inches above the new roof system height.**

- Contractor to install new Kynar coated gutters and downspouts, matching size and location with an overflow cutout installed at every downspout. Owner to select color.
- Contractor directed away from the building.
- All measurements and core information are the responsibility of the Contractor for bidding purposes.
- Provide a manufacturer's twenty (20) NDL, No Dollar Limit Warranty.
- Provide a five (5) year Contractor's warranty.
- All mechanical, electrical, plumbing disconnections shall be the responsibility of the contractor. This is considered a turn-key project, Santa Fe ISD is to furnish nothing. All work is the responsibility of the contractor.
- All installation shall be per NRCA, SPRI, ES-1, ASCE 7-16, the specifications and manufacturer's guidelines.

The amount for the complete construction of **Santa Fe ISD- Roof Replacement**, including all general, plumbing, mechanical, and electrical work indicated on the drawings by **Armko Industries, Inc.** dated **5/9/2025**:

**Base Proposal 1** \_\_\_\_\_ Dollars\$ \_\_\_\_\_

Calendar Days \_\_\_\_\_

#### **BASE PROPOSAL 2 – ANNEX BUILDING**

- Work shall include all labor and materials to provide a new architectural shingle roof system on roof area A of Santa Fe ISD Annex. All roof areas are to be taken down to existing plywood decking, contractor to inspect and repair any deteriorated plywood decking prior to installing a mechanically attached synthetic base sheet.
- Contractor to install a new self-adhered waterproofing underlayment at the ridge and over top of a new drip edge prior to new mechanically attached synthetic base sheet mechanically attached to meet local wind requirements to meet ASCE 7-16.
- Install new synthetic base sheet mechanically attached to existing plywood roof deck and nail base insulation.
- Contractor to install new Kynar coated drip edge at all locations, mechanically attached to existing plywood nail base and immediately stripped in with new self-adhered base flashing.
- Contractor to install a new Architectural shingle to match existing color, fastened at 6 nails per shingle for "enhanced" applications or as required to meet local wind zone. TAMKO Titan XT or similar to meet wind warranty requirements
- Any lead flashing boots are to be replaced with new roof jack lead boots primed and set in sealant.
- All measurements are the responsibility of the Contractor for bidding purposes.
- Provide a manufacturer's 40-year Limited warranty manufacturer's defect warranty.
- Provide a Manufacturer's 15-year Wind Warranty up to 160mph with special installation.
- Provide manufacturer's 120-month algae warranty.
- Provide a five (5) year Contractor's warranty.
- This is considered a turn-key project, Santa Fe ISD is to furnish nothing. All work is the responsibility of the contractor.
- All installations shall be per NRCA, SPRI, ES-1, ASCE 7-16, the specifications and manufacturer's guidelines.

The amount for the complete construction of **Santa Fe ISD- Roof Replacement**, including all general, plumbing, mechanical, and electrical work indicated on the drawings by **Armko Industries, Inc.** dated **5/9/2025**:

**Base Proposal 2** \_\_\_\_\_ Dollars\$ \_\_\_\_\_

Calendar Days \_\_\_\_\_

**Unit Price Proposal:**

1. Remove and replace damaged tectum decking panels: \$  per board.
2. Remove and replace deteriorated nailers: \$  per board foot.
3. Remove and replace existing metal gutters to match existing. \$  per linear foot
4. Remove and replace existing metal downspouts to match existing. \$  per linear foot

**ADDENDA – Contractor must list number of Addenda issued.**

Respondent has received the following Addenda to the Request for Proposals, but agrees and understands that it will be responsible for performing the Work in accordance with all terms and conditions in all Addenda issued in connection with the Request for Proposals, and that it's Proposal will be construed to include all requirements of all such Addenda.

Addenda No.1

Addenda No.2

Addenda No.3

**NOTE:** Failure to acknowledge Addenda does not release Contractor from financial obligation to complete all Addenda.

**SUBSTANTIAL COMPLETION DATE**

After Commitment Approval or Notice to Proceed is issued by Santa Fe ISD, all of the work shall be substantially completed within  calendar days. Number of days listed **must** include materials & equipment lead times and construction duration. Final Completion shall be achieved within 30 consecutive calendar days after the date of Substantial Completion as determined by the ODR.

The undersigned Respondent has carefully examined and considered the Project Site and relevant conditions and circumstances for the Work, information and requirements set out in the Request for Proposals, the Drawings and Project Manual/Specifications, and the requirements of the proposed Contract Documents, including the ODR's Agreement, the Uniform General and Supplemental Conditions, Special Conditions, and Tex. Gov. Code pertaining to Prevailing Wages Rates, in making this Proposal. Capitalized terms used but not otherwise defined in this Proposal Form shall have the same meanings as designated in the Request for Proposals.

The undersigned Proposer further agrees to the following conditions:

1. An incomplete Proposal or one having additional information or other modifications or qualifications inscribed thereon, may be cause for rejection of the entire Proposal.
2. That, if accepted by the Owner ODR, this Proposal becomes a part to the Contract Documents upon the signing of the Contract Agreement, and failing to comply with any part of this Bid will be taken as failure of the Proposer to comply with the Contract Documents, and will be just cause for rejection of the Work.

RESPONDENT:

\_\_\_\_\_  
Company

\_\_\_\_\_  
Employer Federal Identification Number (EIN)

By:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Company Phone Number

\_\_\_\_\_  
Date

\_\_\_\_\_  
Company Email or Fax Number

\_\_\_\_\_  
Company Contact and Address for Invoice

\_\_\_\_\_

\_\_\_\_\_

**END OF SECTION**

SAMPLE

**SECTION 00 61 00  
BID BOND**

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned:

\_\_\_\_\_  
As PRINCIPAL, and

\_\_\_\_\_, as SURETY  
(Name of Surety)

are held and firmly bound unto \_\_\_\_\_ hereinafter called the "Owner", in the penal sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_), lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has submitted the accompanying bid, dated \_\_\_\_\_ 20 \_\_\_\_\_, for.

\_\_\_\_\_  
NOW, THEREFORE, if the Principal shall not withdraw said bid within the period specified therein after the opening of the same, or if no period be specified, within forty-five (45) days after the said opening, and shall within the period specified therefore, or, if no period be specified within ten (10) days after the prescribed forms are presented to them for signature, enter into a written contract with the Owner in accordance with the bid as accepted, and give bond with good and sufficient surety or sureties, as may be required, for the faithful performance and proper fulfillment of such contract; or in the event of the withdrawal of said bid within the period specified, or the failure to enter into such contract and give such bond within time specified, if the Principal shall pay the Owner the difference between the amount specified in said bid and the amount for which the Owner may procure the required work or supplies or both, if the latter amount be in excess of the former, then the above obligation shall be void and of no effect, otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument under their several seals this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_\_, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

In Presence Of:

\_\_\_\_\_ (Principal) \_\_\_\_\_ (Seal)

\_\_\_\_\_ (Business Address)

\_\_\_\_\_ (Individual Principal) \_\_\_\_\_ (Seal)

\_\_\_\_\_ (Business Address)

Attest

|       |                       |                            |
|-------|-----------------------|----------------------------|
| _____ | (Corporate Principal) |                            |
|       | (Business Address)    |                            |
|       | By: _____             | Affix<br>Corporate<br>Seal |
| _____ | (Corporate Surety)    |                            |
|       | (Business Address)    |                            |
|       | By: _____             | Affix<br>Corporate<br>Seal |

---

(Power of attorney for person signing for surety company must be attached to bond)

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, \_\_\_\_\_, CERTIFY that I am the \_\_\_\_\_  
Secretary of the corporation named as Principal in the within bond; that \_\_\_\_\_ who  
signed the said bond on behalf of the Principal was then \_\_\_\_\_  
of said corporation; that I know their signature thereto is genuine; and that said bond was duly signed,  
sealed and attested to for and in behalf of said corporation by authority of its governing body.

\_\_\_\_\_ (Corporate  
Seal)

---

NOTE: Other forms of the Bid Bond containing substantially the same provisions as the above form may be  
submitted for approval by the Architect, and used if approved.

**END OF SECTION 00 61 00**

SAMPLE

**SECTION 00 61 13.13  
PERFORMANCE BOND**

(USE STATUTORY FORM APPROVED BY ATTORNEY GENERAL'S OFFICE)  
(REQUIRED IF BID IS OVER \$25,000.00)

MUST BE USED IN COMPLIANCE WITH ARTICLE 5160A, V.A.T.S.  
AS AMENDED BY THE 73RD LEGISLATURE, 1993, CHAPTER 268, EFFECTIVE SEPTEMBER 1, 1993, AND  
CODIFIED AS TEXAS GOVERNMENT CODE, CHAPTER 2253  
And amended by the Acts 2003, 78th Legislature, chapter 1275, § 2(86), effective Sept. 1, 2003

NOW ALL MEN BY THESE PRESENTS, that \_\_\_\_\_

(hereinafter called the Principal), as principal, and \_\_\_\_\_  
\_\_\_\_\_ a Corporation  
organized and existing under the laws of the State of Texas and admitted to write bonds, as surety,  
(hereinafter called the Surety), are held firmly bound unto

\_\_\_\_\_ Dollars  
(\$\_\_\_\_\_) for the payment whereof, the said Principal and Surety bind themselves, and their  
heirs, administrators, executors, successors, and assigns, jointly and severally, firmly by these presents:

WHEREAS, the Principal has entered into a certain contract with the Obligee, dated the  
\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_, for \_\_\_\_\_

which contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at  
length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said  
Principal shall faithfully perform the work in accordance with the plans, specifications and contract  
documents, than this obligation shall be null and void; otherwise to remain in full force and effect;

PROVIDED, HOWEVER that this bond is executed pursuant to the provisions of Article 5160 of the  
Revised Civil Statutes of Texas, as amended by the Acts 2003, 78th Legislature, chapter 1275, §  
2(86), effective Sept. 1, 2003 and all liabilities on this bond shall be determined in accordance with the  
provisions, conditions and limitations of said article to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this  
instrument this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

PRINCIPAL:

By: \_\_\_\_\_

SEAL:

SURETY: \_\_\_\_\_

By: \_\_\_\_\_  
(Attorney-In-Fact)

SAMPLE

**SECTION 00 61 13.16  
PAYMENT BOND**

(USE STATUTORY FORM APPROVED BY ATTORNEY GENERAL'S OFFICE)  
(REQUIRED IF BID IS OVER \$25,000.00)

MUST BE USED IN COMPLIANCE WITH ARTICLE 5160A, V.A.T.S.  
AS AMENDED BY THE 73RD LEGISLATURE, 1993, CHAPTER 268, EFFECTIVE SEPTEMBER 1, 1993, AND  
CODIFIED AS TEXAS GOVERNMENT CODE, CHAPTER 2253  
And amended by the Acts 2003, 78th Legislature, chapter 1275, § 2(86), effective Sept. 1, 2003

NOW ALL MEN BY THESE PRESENTS, that

\_\_\_\_\_  
(hereinafter called the Principal), as principal, and \_\_\_\_\_  
\_\_\_\_\_ a Corporation organized and existing under the laws of  
the State of Texas and admitted to write bonds, as surety, (hereinafter) called the Surety), are held firmly  
bound unto \_\_\_\_\_ Dollars  
(\$\_\_\_\_\_) for the payment whereof, the said Principal and Surety bind themselves, and their  
heirs, administrators, executors, successors, and assigns, jointly and severally, firmly by these presents:

WHEREAS, the Principal has entered into a certain contract with the Obligee, dated the  
\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_, for \_\_\_\_\_

\_\_\_\_\_ which contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at  
length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal  
shall promptly make payments to all claimants as defined in Article 5160, Revised Civil Statutes of Texas, as  
amended by the 73rd Legislature 1993, then this obligation shall be null and void; otherwise to remain in full  
force and effect;

PROVIDED, HOWEVER that this bond is executed pursuant to the provisions of Article 5160 of the  
Revised Civil Statutes of Texas, as amended by the 73rd Legislature, 1993, and all liabilities on this bond shall  
be determined in accordance with the provisions, conditions and limitations of said article to the same extent as  
if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this  
instrument this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

PRINCIPAL:

By: \_\_\_\_\_

SEAL:

SURETY: \_\_\_\_\_

By: \_\_\_\_\_  
(Attorney-In-Fact)

**SECTION 01 10 00  
GENERAL REQUIREMENTS**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specifications Sections, apply to this Section.
- B. Owner: Santa Fe ISD. The term "Owner", "owner", "Owner's Designated Representative (ODR)", or any other reference to the entity with whom the Contractor is bound in contract with, shall be synonymous for the extent of this contract and wherever found in the Contract Documents.

**1.02 QUALIFICATIONS FOR SUBMITTING COMPETITIVE SEALED PROPOSAL**

- A. In submitting this proposal, it is understood that the contractor shall provide part of this proposal and contain the following information:
  - a. Site plan showing staging areas to accomplish the scope of work
  - b. Roof plan showing schedule of construction and location sequence of work
  - c. Name and qualifications of superintendent
  - d. Name and qualifications of Project Manager
  - e. Acknowledgment that Company owner or someone appointed in authority on behalf of the company will attend each weekly meeting

**1.03 DESCRIPTION OF WORK**

- A. Work to be done: The work to be performed under this contract and in accordance with these contract documents shall consist of furnishing all necessary plant, labor, materials, and constructing, installing, and performing all work shown and described in the contract documents, all of which are made a part thereof.
- B. Character of Work and Mechanics: The Work shall be executed in the best and most workmanlike manner by qualified, careful, and efficient mechanics skilled in the trade, and in strict accordance with the contract documents and standards of the industry. Only certified journeymen in respective trades or apprentices under the direct supervision of certified journeymen will be permitted to install, supervise installation of, alter or replace electrical and mechanical systems including but not limited to: pipe, plumbing, HVAC systems, electrical wiring, fire protection systems, welding equipment and devices. A licensed plumber as defined by the Texas Plumbing License Law, section 1301.002-#4, A-D., will accomplish installation, alteration and testing of gas systems. A current plumbing, mechanical and electrical license, as indicated in the Supplemental General Conditions, will be recognized as certification upon approval of the Owners Designated Representative. Licenses shall be available at the pre-construction conference and from plumbers, mechanics and electricians at the job site throughout the contract performance. Work accomplished by unlicensed mechanics shall be removed and reinstalled by the contractor using licensed mechanics at no additional cost to Santa Fe ISD.
- C. Project Title and Location:  
  
Project Title: Santa Fe ISD- Multiple Reroof

Project No.: 25-1037-42  
Project Location: Santa Fe, TX

Santa Fe ISD- Warehouse  
4135 Warpath Ave  
Santa Fe, TX 77510

Santa Fe ISD- Annex  
4131 Warpath Ave  
Santa Fe, TX 77510

D. Contract Documents: Dated May 09, 2025 were prepared for the project by Armko Industries, an Architectural and Engineering Design firm.

E. The Work will be constructed under a general construction contract.

**1.04 PRINCIPAL FEATURES:**

A. The contractor will do all work with the building occupied and the contract work area unoccupied. The contractor shall coordinate all work with the Owner Designated Representative (ODR) and the building occupants.

B. Work of this contract can be summarized as follows:

1. Remove existing roof system to deck. Install new roof system as per specifications to include R25 insulation and 20-year Leak Proof, blister proof warranty to include all sheet metal components and counter flashings.
2. Provide new architectural shingles with required warranties as described in the scope of work to include a 40-year limited warranty, a 15-year 160mph wind warranty and a 10-year algae guard warranty.

**1.05 STARTING WORK:**

A. The Contractor shall not start work until the commitment approval or Notice to Proceed has been issued and all insurance certificates have been submitted, reviewed and accepted by the Owners Designated Representative (ODR).

1. The Contractor shall provide and maintain the insurance coverage, with the minimum amounts required by the contract, until the end of the contract warranty period. The Contractor shall present the ODR a current certificate of insurance prior to performing contract work and any required warranty work.
2. The Contractor shall update all expired policies prior to submission for monthly payment and during the contract warranty period. Failure to update policies shall be reason for withholding of payment until renewal is provided to the ODR.

B. The Contractor shall notify the ODR prior to commencing any contract work.

**1.06 WORK HOURS, UTILITY OUTAGE AND COORDINATION:**

- 1 A. Work Hours: Normal work hours at Santa Fe ISD are 8:00 a.m. to 5:00 p.m., Monday  
2 through Friday. Contract work hours shall be Monday through Friday exclusive of holidays.  
3 Work on Saturday is permitted if required. Work may be permitted on Holidays at the option  
4 of SANTA FE ISD and at no additional cost to SANTA FE ISD, with written notice to SANTA  
5 FE ISD at least 48 hours before the start of the scheduled work.  
6  
7 1. The Contractor may be allowed additional, or varied work hours, with prior approval by  
8 SANTA FE ISD.  
9  
10 B. The Contractor shall limit use of the premises to the work indicated and allow for occupancy  
11 and use during the construction.  
12  
13 C. Utilities:  
14 1. Utility Outage: When a utility outage affecting occupied facilities is necessary to perform  
15 the contract work, the outage shall be performed during non-work hours at no additional  
16 cost to Santa Fe ISD. The contractor shall give written notice to Santa Fe ISD fourteen  
17 (14) days in advance of a scheduled outage. Licensed personnel will perform  
18 disconnection and reconnection of utilities. D. Coordination: Contractor shall coordinate  
19 work with the Owner's Designated Representative, prior to beginning any work on the  
20 project. Additionally, prior to starting work each day, the Contractor's superintendent  
21 shall inform and coordinate with the Owner's Designated Representative.  
22  
23 D. Cranes: When a crane is necessary to perform the contract work, the crane delivery,  
24 placement and lift dates shall be coordinated with the Owner's Designated Representative,  
25 Environmental Health and Safety and others as may be required such as Texas Department  
26 of Transportation and local government. The Contractor shall give written notice to the Santa  
27 Fe ISD fourteen (14) days in advance of a required crane placement and lift. The Contractor  
28 shall submit a Crane Lift Plan with the written notice of crane placement and lift. The lift plan  
29 shall show the proposed crane location during the lift, the area of boom swing proposed for  
30 the lift, location and type of barricades, and affected streets, sidewalks, parking areas and  
31 buildings. The area of boom swing shall be depicted as the arc of the boom for the proposed  
32 swing with a radius of the boom length if the boom were in the horizontal. Contractor shall  
33 comply with OSHA and ANSI safety standards for cranes.  
34  
35 E. Inspection of Work: The Contractor shall not cover up any Work with finishing materials or  
36 other building components prior to an inspection of the Work by the ODR project  
37 inspector/observer. Should corrections of the Work be required for approval, cover-up shall  
38 be delayed until another inspection can be made and approval is granted.  
39 1. The Contractor shall be responsible for providing notification of at least seven (7)  
40 WORKING days, to the ODR project inspector of the anticipated need for a cover-up  
41 inspection. Should the ODR project inspector fail to make the necessary inspection  
42 within the seven (7) working days, the Contractor may not proceed to cover up the Work  
43 until the inspection has been completed.  
44

45 **1.07 BUILDING OCCUPANCY**

- 46  
47 A. Building Occupancy: Santa Fe ISD may occupy the adjacent facilities during the entire  
48 period of the contract operations. Cooperate fully with the district representative during  
49 contract operations to minimize conflicts and to facilitate any usage.  
50

- 1 1.08 PARKING, STORAGE AND SITE RESTRICTIONS: Confine operations at the site to the areas  
2 permitted under the Contract. Portions of the site beyond areas for which work is indicated are  
3 not to be disturbed. Comply with the Owner's requirements concerning the Contractor's  
4 operations and use of the premises, parking, loading and unloading.
- 5 A. Keep existing driveways and entrances serving the adjacent facilities and parking spaces  
6 clear and available to the, visitors, staff and service vehicles at all times. Do not use these  
7 areas for parking or storage of materials.
- 8
- 9 B. Keep all storage areas free of debris, refuse, spills, leaks, stains, splashes and excess  
10 materials. All storage areas shall be maintained in a neat, clean, and safe condition. Do  
11 not unreasonably encumber the site with materials or equipment. Stockpiling of materials  
12 and the locations of storage sheds, trailers or temporary field offices shall be confined to  
13 the area designated by Santa Fe ISD. If additional storage is necessary, obtain and pay  
14 for such storage off site. Use of designated area(s) shall be coordinated with Santa Fe  
15 ISD personnel and the Maintenance Director's office.
- 16
- 17 C. Contractor storage and parking are at the job site in an area to be designated by Santa Fe  
18 ISD. Parking is not allowed on sidewalks, drives, or roadway. Do not block parking  
19 spaces unless given permission.
- 20
- 21 D. Lock automobiles and other mechanized or motorized construction equipment, when  
22 parked and unattended, to prevent unauthorized use. Do not leave vehicles or equipment  
23 unattended with the motor running or the ignition key in place. Contractor shall not allow  
24 any construction equipment to be parked on adjacent streets at night.
- 25
- 26 E. Designated roads shall be used for construction traffic. Contractor shall not close, block, or  
27 otherwise obstruct roads at any time without written permission of Santa Fe ISD and  
28 where required the local government. Contractor shall keep all debris and mud off all  
29 sidewalks and streets. Immediately clean all debris and mud that is a result of contract  
30 operations.
- 31
- 32 1.08 EXISTING FACILITIES AND CONDITIONS: Maintain the existing facilities in a safe condition  
33 throughout the demolition period.
- 34
- 35 A. Areas designated around or near the building will be made available for contractor staging  
36 and dumpsters. Coordinate with ODR and Santa Fe ISD.
- 37
- 38 B. Prior to commencement of contract work, inspect areas in which work will be performed.  
39 Document and photograph existing conditions of structure, surfaces, equipment, and  
40 condition of surrounding properties, which could be misconstrued as damage resulting  
41 from demolition work or other contract operations. Inspection shall be verified, signed by,  
42 and filed with the Owner or Owners Representative prior to starting work."
- 43
- 44 1.09 FIRE REGULATIONS: Comply with National Fire Protection Association, NFPA 241 guidelines.  
45 The contractor shall use no explosives or fire in performing the work. Contractor shall  
46 understand and comply with OSHA welding and cutting requirements.
- 47 A. Coordinate all work on existing fire alarm and fire suppression systems with the ODR  
48 inspector prior to the start of contract work. Any work that could cause dust or fumes must  
49 be coordinated with the ODR prior to commencing so the fire alarm system can be  
50 modified and protected as necessary.

- 1.10 CLEANUP: The contractor shall dispose of all trash, debris, refuse, garbage, etc., which is generated by the contractor during the contract. Building sites shall be cleaned on a daily basis and disposal shall be outside the limits of Santa Fe ISD property. Contractor shall routinely empty dumpsters to prevent wind-blown debris. Disposal shall be by sanitary landfill or other approved methods and shall conform to all local, state, and federal guidelines, criteria, and regulations.
- 1.11 ENERGY CONSERVATION: The contractor shall use good judgment in the conservation of utilities. Prevailing energy conservation practices shall be adhered to and enforced by the contractor.
- 1.12 SPECIAL STORAGE: The following shall apply when required to perform contract operations.
- A Petroleum Storage:
1. The contractor shall store all fuel or petroleum products, whether new or used, in appropriate containers.
  2. The contractor shall keep all other storage areas free of debris, leaks, stains, or splashes. All storage areas shall be maintained in a neat, clean, and safe condition. Any areas that incur contamination by any hazardous substance shall be immediately remediated by the contractor at no additional expense to Santa Fe ISD. Remediation may include subsequent soil analysis if directed by Santa Fe ISD. The contractor shall store all paints, thinners, solvents and other hazardous materials in a contractor supplied trailer or storage unit, which shall be secured when not in use.
- 1.13 SAFETY:
- A. Comply with all applicable Occupational Safety and Health Act (OSHA) Standards and Regulations.
- B. Santa Fe ISD property is Drug, Alcohol, Tobacco, and Gun free zone. Texas Health and Safety Code - HEALTH & SAFETY § 481.134.
- C. Furnish and install all necessary safeguards to provide safety and protection of the public and district property adjacent to the contract work area. Comply with all applicable federal, state, and local laws, regulations, ordinances, policies and standards related to the safety of the public and Santa Fe ISD property while performing contract operations.
- D. Speed Limit: Contractor shall notify all employees and subcontractors of the speed limit of the adjacent streets and ensure all personnel understand and comply with this requirement.
- E. Site Safety: Do not leave the work areas in an unsecured or unsafe condition at any time during contract operations. Contractor personnel and equipment operators shall monitor their surroundings at all times and be alert for people moving in or adjacent to contract work areas. Contractor shall use spotters when moving vehicles through the construction sites and no construction vehicles (i.e. lulls, forklifts, etc.) shall be left unsecured on site. Contractor shall furnish and install temporary fences, barricades, signs and other required items to:
1. Warn/notify adjacent building occupants

2. Protect construction materials
  3. Prevent unauthorized personnel from entering the construction site.
  4. Redirect vehicular and pedestrian traffic flow when required to perform contract operations; comply with paragraph E above, Temporary Traffic Controls.
- G. Prior to spraying paint, coatings or power washing exterior structures the following criteria shall be met:
1. Contractor shall provide ODR and Santa Fe ISD forty eight (48) hours' notice prior to spraying any material, including primer, paint or coatings.
  2. Consider use of dry-fall paint when spray painting large areas of structure (e.g. metal building frames) or materials by conventional or airless spray.
  3. The Contractor shall provide all necessary barricades, signs, warning of spray area as determined in the preconstruction conference. The Contractor shall set these signs out the night before spraying begins.
  4. The Contractor shall be responsible for the removal of signs and barricades at the completion of the job.
  5. The Contractor shall protect any automobile, bicycle, vehicle or other property which is located in a warning area where contact with the Owner has not been made.
  6. The Contractor shall employ approved wind screens, protective shrouds and other protection methods during all paint and coating applications. The Contractor is responsible for all overspray and shall have sole liability where damage occurs as a result of this work.
  7. Spray equipment shall be as recommended by the materials manufacturer. Spray operations shall be performed only during adequate period of calm weather with winds not exceeding 15 miles per hour. Protect all property from overspray or other damage.
  8. To prevent sparking a flammable substance, smoking and other sources of flame near spray painting operations are prohibited and tools shall be properly rated and grounded for work in a spray painting area.
- 1.15 TREES, SHRUBS, AND HEDGES:
- A. Coordinate all tree protection procedures through SANTA FE ISD Grounds Management. Take appropriate measures to prevent injury to plants in or near the project site unless designated to be removed. Do not remove or prune any plants without approval from Santa Fe ISD or designated representative. No tree, shrub or hedge, or portion of a tree, shrub or hedge shall be removed that contains actively nesting birds unless approved by Santa Fe ISD. Actively nesting migratory birds will also require a permit be obtained from the U.S. Fish and Wildlife Service. Plants which are damaged during construction shall be replaced at no expense to Santa Fe ISD. Contractor shall remove all trees, tree branches, shrubs and plants that will interfere, encroach upon, or otherwise obstruct new construction and contract operations at no additional cost to Santa Fe ISD.
- 1.16 ENVIRONMENTAL REQUIREMENTS:

- 1 A. Compliance with Environmental Laws: The contractor shall comply, and assure that all  
2 subcontractors comply with all applicable federal, state, and local laws, regulations,  
3 ordinances, policies and standards related to environmental matters. The contractor shall  
4 also comply, and assure that all subcontractors comply with all applicable specific  
5 instructions, policies, or references contained herein.
- 6 B. Contractors involved in projects that include the removal and/or disposal of polychlorinated  
7 biphenyl (PCB) contaminated light ballasts shall comply with the requirements of  
8 40 CFR 761. PCB containing ballasts are a special waste and must be managed as such.  
9 The contractor shall immediately notify Santa Fe ISD when activities involving the removal  
10 of PCB light ballasts begin.
- 11
- 12 C. Nuisance and Polluting Activity Prohibited: Polluting, dumping, or discharging of any  
13 harmful, nuisance, or regulated materials (such as concrete truck washout, vehicle  
14 maintenance fluids, residue from saw cutting operations, solid waste and hazardous  
15 substances) into building drains, site drains, streams, waterways, holding ponds or to the  
16 ground surface shall not be permitted. The contractor shall be held responsible for any  
17 damages that may result. Further, the contractor shall conduct activities in such a fashion  
18 to avoid creating any legal nuisance, including but not limited to, suppressing noise and  
19 dust, controlling erosion, and implementing other measures as necessary to minimize off-  
20 site impacts of work activities.
- 21
- 22 D. Should the contractor encounter previously unidentified and suspect asbestos-containing  
23 materials (ACM), mold, hazardous or potentially hazardous material or suspected lead  
24 containing paint which must be disturbed to comply with the contract documents, the  
25 contractor shall cease all work that would disturb the suspect material and shall  
26 immediately notify the Owner's Designated Representative. The Owner shall take steps,  
27 as appropriate, to ascertain the material's composition and determine any remedial action  
28 necessary. The Contractor will remove contract work crews from the area of the work site  
29 affected by the suspect materials and continue work on other parts of the project as  
30 feasible. Contractor shall return to abandoned work area after the owner has determined  
31 the composition of the suspect material and completed any required remedial action.
- 32
- 33 E. Contractor is responsible for all materials brought on site, including hazardous materials.  
34 All hazardous waste or special waste generated by the contractor as a result of contract  
35 operations shall be identified, characterized, containerized and transported to a permitted  
36 disposal facility in strict accordance with the requirements of 40 CFR 260-279 (Hazardous  
37 waste and used oil regulations), 30 TAC 324, 330-335 (TCEQ Hazardous and Industrial  
38 Waste Regulations).
- 39

1.17 BID PROPOSAL BONDS

- A. AN ACCEPTABLE SURETY COMPANY BID PROPOSAL BOND or CERTIFIED CHECK for the amount not less than five percent (5%) of the proposal amount shall accompany each proposal. By "Acceptable Surety" is meant an Insurance Company licensed by the Texas State Board of Insurance to act as surety, rated "A" or better, listed in the Federal Register, and having an unblemished record. The check or bond of each unsuccessful Contractor will be returned within ten (10) days after the proposal is awarded. FAILURE OF AN ACCEPTED CONTRACTOR TO ENTER INTO A CONTRACT TO COMPLETE THE SPECIFIED WORK MAY CAUSE FORFEITURE OF HIS SEALED PROPOSAL SECURITY. FAILURE TO SUBMIT PROPER SEALED PROPOSAL SECURITY SHALL CAUSE REJECTION OF THE PROPOSAL.

1.18 PAYMENT AND PERFORMANCE BONDS

- A. Prior to commencement of Work hereunder, Contractor will, if the Contract Price exceeds \$25,000.00, provide an Acceptable Surety Company Payment Bond, and if the Contract Price exceeds \$100,000.00, provide an Acceptable Surety Company Performance Bond, each in principal amount equal to one hundred percent (100%) of the Contract Price, conditioned that Contractor will faithfully perform all its undertakings in this Contract and will fully pay all persons furnishing labor and material in the prosecution of the Work provided for in this Contract. If any surety upon any bond becomes insolvent or otherwise ceases to do business in this State, the Contractor shall promptly furnish equivalent security to protect the interests of Santa Fe ISD and of persons furnishing labor and materials in the prosecution of the Work.

1.19 INSURANCE

- A. The Contractor shall maintain insurance of the kinds and in the amounts specified below and furnish Santa Fe ISD with Certificates of Insurance as evidence thereof in the prescribed form. If any work provided for or to be performed under any Specifications is sub-let (as otherwise permitted by the terms of such Specifications), the Contractor shall require the Subcontractor to maintain and furnish him with satisfactory evidence of Workmen's Compensation, Employer's Liability and such other forms and amounts of insurance which the Contractor deems reasonably adequate.
- B. The Contractor will provide and maintain standard fire, extended coverage perils, vandalism and malicious mischief insurance to protect the interest of both the Contractor and the Owner for materials brought into the job or stored on the premises. Such insurance shall be for one hundred percent (100%) of the insurable value of the work to be performed including all items of labor and materials incorporated therein, materials stored at the job-site to be used in completing the work, and such other supplies and equipment incidental to the work as are not owned or rented by the Contractor, the costs of which are included in the direct cost of the work.
- C. This insurance shall not cover any tools, derricks, machinery, tar buckets, ladders, engines, workmen's quarters, boilers, pumps, wagons, scaffolds, forms, compressors, shanties, or other items owned or rented by the Contractor, the cost of which is not included in the direct cost of the work.

D. In accordance with above items, the Contractor shall maintain the following insurance:

Contractor shall carry throughout the life of this Contract, at his expense, with insurers satisfactory to Santa Fe ISD, insurance of not less than the following limits:

| <u>Coverage</u>                    | <u>Minimum Limit</u> |
|------------------------------------|----------------------|
| Workmen's Compensation             | Statutory            |
| Employer's Liability               | \$100,000            |
| Comprehensive General Liability    |                      |
| Bodily Injury                      |                      |
| Each Occurrence Each Person        | \$500,000            |
| Property Damage                    |                      |
| Each Occurrence                    | \$100,000            |
| Annual Aggregate                   | \$300,000            |
| Comprehensive Automobile Liability |                      |
| Bodily Injury                      |                      |
| Each Person                        | \$300,000            |
| Each Occurrence                    | \$500,000            |
| Property Damage                    |                      |
| Each Occurrence                    | \$100,000            |
| Owner's Protective Liability       |                      |
| Bodily Injury                      |                      |
| Each Occurrence                    | \$500,000            |
| Property Damage                    |                      |
| Each Occurrence                    | \$200,000            |
| Annual Aggregate                   | \$500,000            |
| Builder's Risk                     | Fully Insurable      |
| Value of the Work                  |                      |
| "Umbrella" Liability               | \$1,000,000          |
| Contract Value up to               | \$3,000,000          |

E. This Insurance shall:

1. include coverage for the liability assumed by the Contractor;
2. include completed operation coverage which is to be kept in force by the Contractor for a period of not less than one year after completion of the work provided for or performed under these specifications;
3. not be subject to any of the special property damage liability exclusions commonly referred to as the XCU exclusions pertaining to blasting or explosion, collapse or structural damage and underground property;
4. not be subject to any exclusion of property used by the insured or property in the case, custody or control of the insured or property as to which the insured for any purpose is exercising physical control; and

5. the Certificates of Insurance furnished by the Contractor shall show by specific reference that each of the foregoing items have been provided for.

- F. The Certificates of Insurance furnished by the Contractor as evidence of the insurance maintained by him shall include a clause obligating the Insurer to give Santa Fe ISD ten (10) days prior written notice of cancellation or any material change in the insurance.
- G. Santa Fe ISD, and their employees, agents, and assigns, and Armko Industries, Inc., and their employees, agents, and assigns shall be named as additional insured.

#### 1.20 TAXES

- A. Except as otherwise provided in the Contract Documents the Contract Price includes all applicable federal, state and local taxes. The purchase, lease, rental, storage, use or other consumption of tangible personal property, for the performance of this Contract by the Contractor, is exempted from state and local sales tax pursuant to the provisions of Article 20.04 (Y) of the Texas Limited Sales Excise and Use Tax Act. To claim the benefit of this exemption, the Contractor must comply with such procedures as may be prescribed by the State Comptroller of Public Accounts.

#### 1.21 INDEMNITY

- A. The contractor shall indemnify the Owner and hold Owner harmless from and against any and all loss, cost, damage or expense of every kind and nature (including, without limitation, court costs, expenses and reasonable attorney's fees) arising out of injuries to or death of persons (including, without limitation, the Owner, the contractor and any Subcontractor and their respective employees, agents, licensees and representatives) or damage to or destruction of property (including, without limitations, property of the Owner, the contractor and any Subcontractor and property of their respective employees, agents, licensees and representatives) in any manner except as stated in Insurance sections below, caused by, resulting from, incident to, connected with or growing out of performance of the agreement, unless caused solely by the negligent acts or omissions of the Owner, or its employees, agents, licensees or representatives.
- B. Contractor shall give prompt notice to Owner's representative of all losses, damages or injuries to person or property of Owner, contractor or third person in any way related to this agreement or for which a claim might be made against Owner and shall promptly report to Owner's representative all such claims of which contractor has notice, whether relating to matters insured or uninsured.
- C. No settlement of payment of any claim for loss, injury or damage or other matter as to which Owner may be charged with obligation to make any payment or reimbursement shall be made by contractor without the written approval of Owner.

#### 1.22 ADDENDA

- A. Any verbal statement or inference prior to the proposal opening regarding modification of specifications is invalid unless so stated on an officially issued addendum.

1 1.23 REJECTION OF PROPOSALS

- 2  
3 A. The Owner reserves the right to reject any one or all proposals, to waive any formalities or  
4 irregularities, and to award the contract in the best interest of Santa Fe ISD.  
5

6 1.24 ASSIGNMENT

- 7  
8 A. The contractor shall not assign this agreement, or any part thereof, without approval in  
9 writing of the Owner.  
10

11 1.25 RELATIONSHIP

- 12  
13 A. The relationship of the contractor to the Owner shall be that of an independent contractor,  
14 and the contractor shall have no power to bind the Owner.  
15

16 1.26 TERMINATION

- 17  
18 A. If the contractor shall default in performance of any terms or provisions of this agreement,  
19 then the Owner may, upon seven (7) days prior written notice and without prejudice to any  
20 other right or remedy, terminate the employment of the contractor and take possession of  
21 the premises and all materials and appliances thereon and finish the work by whatever  
22 method the Owner may deem expedient. In such event the contractor shall not be entitled  
23 to receive any further payment hereunder until the work is finished. The total cost to the  
24 Owner of finishing the work shall be paid to Owner or may be deducted from any balance  
25 due the contractor under this agreement.  
26

27 1.27 CANCELLATION

- 28  
29 A. In the event the Owner decides not to proceed with the work, though the contractor is not  
30 at fault and subject to provisions of Liens paragraph above, the Owner may terminate this  
31 agreement at any time upon written notice to the contractor, thereupon the Owner's only  
32 liability shall be to pay to the contractor all costs for labor and materials incorporated in the  
33 work prior to termination and all costs incurred in discharging outstanding obligations of  
34 the contractor at the request of the Owner, and a reasonable overhead and profit, less any  
35 previous payments made hereunder or amount of claims of Owner against contractor.  
36

37 1.28 PERMITS

- 38  
39 A. The Contractor shall obtain and pay for all permits required, give all legal notices and pay  
40 all fees required for the work. Contractor shall comply with all ordinances and laws. Any  
41 and all work done which does not meet requirements of any local authorities must be  
42 properly redone, and incidental work replaced by the Contractor, without cost to the  
43 Owner.  
44

45 1.29 CONTRACT DOCUMENTS

- 46  
47 A. In the event of a conflict between the reroofing specifications and the Owner's contract  
48 documents, the MORE STRINGENT or Owner's contract documents shall take  
49 precedence.  
50

1.30 CONTRACT CONDITIONS

- A. The contractor agrees that he is familiar with the premises, drawings and specifications, accepts the conditions that will exist in performing the work and the price for this agreement was established with full consideration of such acceptance. Contractor shall perform the work under the direction and to the satisfaction of the Owner's representative designated by the Owner. The contractor shall cooperate with Owner's representative and other contractors on the premises and shall carry on the work as to not hinder, delay, or interfere with the operations of the Owner or other contractors.
- B. This roof system shall only be applied by a roofing Contractor previously certified by the roof system manufacturer. Contractor must be able to furnish evidence of this certification.
- C. Installer must be an experienced single firm specializing in the type of removal and replacement work required, having at least ten (10) years successful experience on projects similar in size and scope and acceptable as applicators by the Owner's representative.

1.31 CHANGES FOR EXTRA WORK

- A. No change or addition to specifications and drawings shall be made except upon receipt by the Contractor of a signed order from the Owner authorizing such a change. No claims for an extra to the contract price shall be valid unless so authorized.

1.32 PRE-CONSTRUCTION CONFERENCE

- A. A conference shall be scheduled by the Owner's representative and conducted at the work site prior to start of work. The Contractor's project supervisor or foreman and the Owner's representative shall attend. Job schedule, submittals, existing conditions, and specifications shall be reviewed and any questions arising shall be resolved to the satisfaction of all parties prior to start of work. Contractor shall begin work within five (5) calendar days following Owner's signing of contract and/or issuance of the written notice to proceed with work, weather permitting.

1.33 WORKING TIME

- A. A working day is defined as a calendar day, not including Saturdays, Sundays, or legal holidays, in which weather or other conditions not under the control of the company will permit the performance of the principal units of work underway for a continuous period of not less than seven (7) hours between 7:00 A.M. and 6:00 P.M. For every Saturday on which the company chooses to work, one day will be charged against the working time when weather conditions will permit seven (7) hours of work as delineated above. A principal unit of work shall be that unit which controls the completion time of the agreement. Nothing in this item shall be construed as prohibiting the company from working on Saturdays if it so desires. If Sunday work is permitted by the Owner, working time will be charged on the same basis as weekdays.

1.34 QUALITY ASSURANCE

- A. All work and materials hereinafter specified shall be best of kind described and, unless specified otherwise, shall be new and of best quality. The specified roofing system shall have been used successfully in the United States for a minimum of ten (10) years.
- B. All materials will be securely fastened in place in a watertight, neat and workmanlike manner.
- C. All workmen shall be thoroughly experienced in the particular class of work for which they are employed.
- D. All work shall be done in accordance with these specifications and shall meet the approval in the field of the Owner's representative. Contractor's representative and/or job supervisor shall have a complete copy of specifications and drawings on job site at all times.
- E. Contractor shall plan and conduct the operations of the work so that each section started on one day is complete, details installed and thoroughly protected before the close of work for that day.
- F. Application of materials shall be in strict accordance with the manufacturer's recommendations. In the instance of a conflict between these specifications and those of the manufacturer, the most stringent shall take precedence.
- G. Roofing system manufacturer shall have approval for wind uplift requirements and shall meet Underwriter's Laboratory fire rating.
- H. Roof system shall be installed in accordance with FM Global requirements.
- I. **All Roofing is to be inspected weekly at the request of the windstorm engineer that is employed by the roofing contractor to submit all WPI8's at the end of the project.**

1.35 COLOR AND MATERIAL SELECTIONS:

- A. No color selections and no material selections will be made by Santa Fe ISD until the contractor submits all samples of all materials requiring color selections to Santa Fe ISD. In addition, prior to Santa Fe ISD selecting colors, the contractor shall certify in writing that all colors and samples submitted are current and are acceptable to the contractor for Santa Fe ISD's selection.
- B. Any samples that are not applicable to the contract shall be carefully removed from the submittal by the contractor. The contractor shall submit the manufacturer's full range of applicable colors, patterns, and textures for the various materials that are required by the contract and within the guidelines hereinbefore stated.
- B. In the event that discontinued, non-current or non-applicable colors, textures, or samples are submitted by the contractor and their selection is made by Santa Fe ISD, the contractor shall bear all labor and material correction costs for fabrication, shipping, restocking, removal, repair of damaged materials, and installing of all materials required by Santa Fe ISD to correct the project.

1.36 EXAMINATION OF PREMISES

- A. Before submitting proposals for his work, each contractor shall be held to have examined the premises and satisfied himself as to the existing conditions under which he will be obliged to work.

1.37 PROTECTION OF PERSONS AND PROPERTY

- A. Work: The contractor shall maintain adequate protection of all his work from damage and shall protect the Owner's and adjacent property from injury or loss arising from this contract. He shall provide and maintain at all times any OSHA required danger signs, guards, and/or obstructions necessary to protect the public and his workmen from any dangers inherent with or created by the work in progress. All federal, state, and city rules and requirements pertaining to safety and all EPA standards, OSHA standards, NESHAP regulations pertaining to asbestos as required shall be fulfilled by the contractor as part of his bid.
- B. The contractor shall erect and maintain, as required by existing conditions and performance of the contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent sites and utilities.
- C. The contractor shall comply to all OSHA requirements and any other local, state or federal regulations pertaining to protection and safety of persons or property.
- D. The contractor shall repair, refinish, and make good any damage to the building or landscaping resulting from any of his operation. This shall include, but is not limited to, any damage to plaster, tile work, wall covering, paint, ceilings, floors, or any other finished work. Damage done to the building, equipment, or grounds must be repaired at the successful contractor's expense holding the Owner harmless from any other claims for property damage and/or personal injury. "Grounds" include but are not limited to grass areas, shrubs, sidewalks, parking lot, light fixtures, curbing, etc.
- E. Property: Protect existing planting and landscaping as necessary or required to provide and maintain clearance and access to the work of this contract. Examples of two categories or degrees of protection are generally as follows:
1. Removal, protection, preservation, or replacement and replanting of plant materials.
  2. Protection of plant materials in place, and replacement of any damage resulting from the contractor's operations.
- F. Safety Precautions and Programs: The contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

- 1 G. Safety of Persons and Property: The contractor shall take reasonable precautions for  
2 safety of, and shall provide reasonable protection to prevent damage, injury or loss to:  
3 1. Employees on the work and other persons who may be affected thereby.  
4 2. The work, materials and equipment to be incorporated therein, whether in storage on  
5 or off the site, under care, custody or control of the contractor or the contractor's  
6 Subcontractors or Sub-subcontractors.  
7 3. Other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks,  
8 pavements, roadways, structures and utilities not designated for removal, relocation  
9 or replacement in the course of construction.
- 10
- 11 H. The contractor shall give notices and comply in all respects with provisions and regulations  
12 of any laws, acts, codes, ordinances, rules, regulations, and lawful orders of public  
13 authorities that may be applicable to the performance of the work called for herein, and  
14 that have bearing on the safety of persons or property, or their protection from damage,  
15 injury, or loss.
- 16
- 17 I. Fire Safety: The contractor and all Subcontractors shall take all necessary precautions to  
18 keep the premises free of fire and safety hazards. The contractor shall prevent all agents,  
19 employees, licensees and invitees of the contractor from smoking on the Owner's  
20 premises and from operating or using any flame, spark or explosion hazard producing  
21 devices anywhere on or about the premises without the written approval of the Owner's  
22 representative.
- 23
- 24 J. The contractor shall designate a responsible member of the contractor's organization at  
25 the site whose duty shall be the prevention of accidents. This person shall be the  
26 contractor's superintendent unless otherwise designated by the contractor in writing to the  
27 Owner's representative.
- 28
- 29 K. The contractor shall not load or permit any part of the construction or site to be loaded so  
30 as to endanger its safety.

31  
32 1.38 EMERGENCY CALL

- 33
- 34 A. Twenty-four Hour Call: The contractor shall have personnel on call twenty-four (24) hours  
35 per day, seven (7) days per week for emergencies during the course of a job. The  
36 Owner's project manager is to have the twenty-four (24) hour numbers for the contact.  
37 Contractor must be able to respond to any emergency call and have personnel on-site  
38 within two (2) hours after contact. Numbers available to the Owner's project manager are  
39 to be mobile, home and office numbers for:  
40 1. Job Foreman  
41 2. Job Superintendent  
42 3. Owner or Company Officer

43  
44 1.39 USE OF PREMISES

- 45
- 46 A. The Contractor is advised that the Owner will occupy the building at all times, and the  
47 Contractor must provide all safeguards required to protect personnel and to keep noise  
48 levels as low as reasonably possible for each operation.
- 49

B. The Contractor shall:

1. Coordinate work in such a manner as to not interfere with the normal operation of the building.
2. Assume full responsibility for protection and safekeeping of products stored on premises.
3. Agree to hold the Owner harmless in any and all liability of every nature and description that may be suffered through bodily injuries, including death of any persons by reason of negligence of the Contractor, agents, employees, or Subcontractors.
4. The Contractor and all Subcontractors shall take all necessary precautions to prevent the use of alcoholic beverages on the Owner's premises.

C. Temporary Sanitary Facilities:

1. The contractor shall furnish and maintain temporary sanitary facilities for employees use during this project, including temporary toilets, wash facilities, and drinking water fixtures.
2. Toilet units shall be self-contained, single-occupant, of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material.
3. Facilities shall be installed where they will best service the project's needs, with Owner's/Owner's Representative's approval.
4. Contractor shall provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material.
5. All portable facilities shall comply with local laws, codes, and regulations.
6. Contractor shall be responsible to see that the units are removed in a timely manner after the completion of the project.

1.40 DEMOLITION

- A. All abandoned pitch pans, equipment, vents, curbs, and other such debris shall be removed by the Contractor. Abandoned items that require deck placement shall be marked by the Owner prior to proposal due date and/or the commencement of work. Contractor shall install new decking of like dimensions to provide a suitable substrate in areas where penetrations through the deck are removed.

1.41 JOB CONDITIONS

- A. Coordinate the work of the contractor with the work to be performed by the Owner's personnel, to ensure proper sequencing of the entire work. The Owner's personnel will be erecting interior protection for equipment, if required. The contractor is to schedule his work so that adequate time is allowed for the Owner's personnel to perform this work. No roof work shall be performed until the Owner's personnel have completed erection of the interior protection in that area.
- B. Proceed with roofing work only when weather conditions are in compliance with manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with specifications.
- C. Schedule the work so the building will be left watertight at the end of each day. Do not remove more roofing material than can be reinstalled in any working day.

- 1  
2 D. All surfaces to receive new roofing shall be smooth, dry, and free from dirt, debris, and  
3 foreign material before any of this work is installed. Competent operators shall be in  
4 attendance at all times equipment is in use. Materials shall be stored neatly in areas  
5 designated by the Owner. Load placed on the roof at any point shall not exceed the safe  
6 load for which the roof is designed.  
7  
8 E. The contractor shall take all necessary precautions to protect the roof mat and deck from  
9 damage. The contractor shall be responsible for repairing all new areas of damage  
10 caused by the negligence of the contractor, at the contractor's expense. The Owner's  
11 on-site representative shall determine damage caused by contractor negligence.  
12  
13 F. The contractor shall follow local, state, and federal regulations, safety standards, and  
14 codes for the removal, handling, and disposal of asbestos containing materials, if present.  
15 When a conflict exists, use the stricter document.  
16  
17 G. Follow insurance underwriter's requirements acceptable for use with specified products or  
18 systems.  
19  
20 H. Due caution should be exercised so as not to alter the structural integrity of the deck.  
21 When cutting through any deck, care should be taken so as not to damage the deck or  
22 any part of the deck, such as post tension cables, etc.  
23  
24 I. For further information regarding roofing material manufacturer's recommendations for  
25 project conditions, refer to the manufacturer's published application manual.  
26  
27 J. The contractor is to be aware of the potential for roof leaks on the existing roof as a result  
28 of ruptured blisters and/or roof mat damage caused by the vacuum process, foot traffic, or  
29 material and equipment storage. The contractor is to take all necessary precautions to  
30 prevent damage to the existing roof. All damage to the existing roof that could result in  
31 roof leaks is to be repaired on a daily basis by the roofing contractor.  
32  
33 K. The contractor is to verify the location of all interior ducts, electrical lines, piping, conduit,  
34 and/or similar obstructions. The contractor is to perform all work in such a manner as to  
35 avoid contact with the above-mentioned items.  
36  
37 L. Surface and air temperatures should be a minimum 45° F during applications of cleaner  
38 and waterproof coating and remain above 45° F for a minimum of four (4) hours following  
39 applications. Verify compatibility of cleaner with coatings, paints, primers and joint sealers  
40 specified. Advise Owner's representative of any problems in this regard prior to  
41 commencing cleaning operations.  
42  
43 M. Temporary Sanitary Facilities: The contractor shall furnish and maintain temporary  
44 sanitary facilities for employees use during this project. These will be removed after the  
45 completion of the project. All portable facilities shall comply with local laws, codes, and  
46 regulations.  
47

1.42 CREWS AND EQUIPMENT

- A. Contractor shall provide sufficient crews and equipment so that the project may progress without interruption or unnecessary delay.

1.43 SUBCONTRACTING OF WORK

- A. The Owner shall have the right to accept or reject the use of any subcontractor. The Contractor shall submit a list of proposed Subcontractors with his proposal.

1.44 ON-SITE SUPERVISION

- A. The Contractor is responsible for the management and control of the work. He shall give his personal superintendence of the work or have a competent resident manager or superintendent satisfactory to the Owner on the job site at all times while work is in progress, with full authority to act for the Contractor as his agent.

1.45 INSPECTION OF WORK IN PROGRESS

- A. The Owner's representative will require the material manufacturer's representative to periodically examine the work in progress, as well as on completion, in order to assist in ascertaining the extent the materials and labor procedures conform to the requirements of the specifications.
- B. The authorized material manufacturer's field representative shall be responsible for:
1. Keeping the Owner's representative informed after periodic inspections as to the progress and quality of the work observed.
  2. Calling to the attention of the Contractor those matters observed which are considered to be in violation of the contract requirements.
  3. Reporting to the Owner's representative, in writing, any failure or refusal of the Contractor to correct unacceptable practices called to his attention.
  4. Confirming, after completion of the work and based on his observation and test, that he has observed no application procedures in conflict with these specifications. Final payment will not be released until all specified warranties have been received by the Owner.

1.46 FIELD INSPECTION AND CONTRACTOR RESPONSIBILITY

- A. The Owner's representative shall at all times have access to the job site and work areas. The Contractor will provide proper and safe facilities for such access and inspection.
- B. Any time during the course of the project, an inspection may be deemed necessary by the Owner/Owner's representative to have one or all of the following members of the Contractor's organization present in person to inspect the work along with the Owner/Owner's representative: Owner, a Majority Stockholder, President and/or Chief Executive Officer of the contracting firm.

- 1 C. The Owner/Owner's representative, if deemed necessary, will notify in writing who in the  
2 Contractor's organization they want to inspect the work on the roof in addition to the  
3 Contractor's normal inspection. If the designated person or persons requested by the  
4 Owner/Owner's representative fails to respond within forty-eight (48) hours to the request,  
5 the work may be suspended, payment withheld and/or liquidated damages outlined in the  
6 specifications assessed until such time the individual(s) inspect(s) the work with the  
7 Owner/Owner's representative.  
8  
9 D. Neither the presence nor absence of the Owner's representative nor the manufacturer's  
10 representative, nor an inspection by the manufacturer of the work or operation of the  
11 Contractor, nor any failure by the manufacturer to detect, pinpoint, or object to any defect  
12 in the work completed, nor any deviation from these specifications, nor the acceptance by  
13 the manufacturer of any such defect or the approval of the manufacturer of any such  
14 deviation shall relieve the Contractor, or reduce, or in any way limit or divide, his full  
15 responsibility for the full performance of the work required of him under these  
16 specifications.  
17  
18 E. It shall be understood that such field inspection as the Owner's representative may cause  
19 to be performed by the material manufacturer will be performed by the material  
20 manufacturer solely for the benefit of the Owner and in an attempt to assist with the  
21 requirements of this specification. These requirements bind the Contractor even without  
22 such inspection.  
23  
24 F. No inspection or any act or omission of either the Owner's representative or the  
25 manufacturer's representative in connection with such inspection shall prejudice the  
26 Owner's right to strict conformance, or under any circumstances be construed to excuse or  
27 mitigate any mistake or non-conformance by the Contractor.  
28

29 1.47 MANUFACTURER'S INSPECTION  
30

- 31 A. An inspection shall be made by a representative of the material manufacturer of the  
32 completed project to ensure that said project was installed in accordance with the  
33 manufacturer's specifications and illustrated details. Upon this approval of the project, the  
34 specified warranty or warranties shall be written.  
35

36 1.48 FINAL INSPECTION  
37

- 38 A. Upon job completion, a final inspection will be made by Owner's representative. Final  
39 payment will not be authorized for the work done until such inspection has been made and  
40 all work is found to have been performed in accordance with the specifications and to the  
41 satisfaction of the building Owner, and the specified warranties are issued.  
42  
43 B. The Contractor shall promptly remove any work that does not meet the requirements of  
44 the plans and specifications or is incorrectly installed or otherwise disapproved by the  
45 Owner as failing to meet with the plans and specifications. The Contractor shall promptly  
46 replace any such work without expense to the Owner and shall bear the cost of making  
47 good all work of other contractors or the Owner, destroyed or damaged by such removal  
48 or replacement.  
49

1.49 ROOFTOP EQUIPMENT

- A. All air conditioning units and other rooftop equipment shall be moved by the roofing Contractor as required to install roofing materials complete and in accordance with the plans and specifications. When units or equipment are to be moved, they shall be disconnected and moved by the roofing Contractor to a protected area so as not to damage any part or component thereof, and shall be reset by the roofing Contractor and reconnected at the Contractor's expense, all according to local building codes. All disconnection and reconnection shall be performed by a mechanical and/or electrical company licensed to perform such work and approved by the Owner's representative.
- B. Where mechanical items, conduits, cables, raceways, piping or any other roof-top mounted item must be moved in any manner, or disconnected and reconnected as made necessary by the reroofing of the specified areas at the facility, all roof-top equipment, piping, insulation, wires, fiber optic cable, any information systems components, conduits, panels, motor starters, raceways, switches, antennas, satellite components, etc. shall be replaced or renewed to match existing if damaged by Contractor. NOTE: It is the responsibility of the Contractor to review the condition of any and all of the above noted, or similar, items with authorized Owner personnel to determine condition of said items PRIOR TO START OF WORK. If this review is not completed as prescribed, any and all damage found at the end of the work will be repaired solely at the contractor's expense.
- C. Any action by roofing contractor personnel which causes interruption of the ongoing works of the Owner's facility will be repaired at the sole expense of the roofing contractor. Upon interruption of the Owner's ability to meet required tasks, Owner may immediately, and without the contractor's permission, take such action as necessary to repair said damage so that the Owner's work may be resumed. The Owner has the obligation to notify the contractor of such action as soon as possible, but in all cases must notify the contractor in writing within 48 hours of the occurrence of the incident.
- D. All gas piping to be removed, raised and reconnected shall be retested by a certified Master Plumber and documented to comply with the State of Texas Railroad Commission.

1.50 NAILERS AND ROOF DECK

- A. Contractor shall notify the Owner's representative of unforeseen areas of damaged decking, wet insulation / fill material or deteriorated nailers. Where the damage is serious and extensive, it will be the Owner's prerogative to authorize removal and replacement.
- B. Any areas of unusual deck deflection noticed by the Contractor during the course of the job that will cause an area of ponding water should be brought to the attention of the Owner's representative by the Contractor.
- C. The Contractor shall furnish the Owner with a unit price for removal and replacement of the damaged decking, wet insulation / fill material or deteriorated nailers. All nailers required for the new roofing application shall be provided by the roofing Contractor, and included in the proposal amount. Unit cost for nailers applies only to existing deteriorated nailers. If lumber is required to make "flush" interior parapet wall, cost shall be included in Base Proposal.

1.51 CLEANING AND DISPOSAL OF MATERIALS

- A. Contractor shall keep the job clean and free from all loose materials and foreign matter. Contractor shall take necessary precautions to keep outside walls clean and shall allow no roofing materials to remain on the outside walls.
- B. All waste materials, rubbish, etc., shall be removed from the Owner's premises as accumulated. Rubbish shall be carefully handled to reduce the spread of dust. A suitable scrap chute or hoist must be used to lower any debris. At completion, all work areas shall be left broom clean and all contractor's equipment and materials removed from the site.
- C. All bituminous or roofing related materials shall be removed from ladders, stairs, railings, and similar parts of the building.
- D. Debris shall be deposited at an approved disposal site.

1.52 FUTURE REPAIRS

- A. Contractor certifies by acceptance of this project that any future repairs or alterations might be called upon to execute after the project is complete, will be performed in accordance with the manufacturer's recommended procedures so as to not void the warranty.

**END OF SECTION 01 10 00**

**SECTION 01 21 13  
CASH ALLOWANCES**

**PART 1 - GENERAL**

**1.01 DESCRIPTION**

- A. Work included: To provide adequate budget and bonding to cover items not precisely determined prior to bidding, allow within the proposed Contract Sum the amounts described below.
- B. Related Work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 01 of these Specifications.
  - 2. Other provisions concerning Cash Allowances also may be stated in other Sections of these Specifications.
- C. All work to be performed from any contingency fund must be approved in writing from Owner/Project Manager prior to work commencing.

**1.02 SPECIFIC CASH ALLOWANCES**

- A. Allow the sum of \$25,000.00 for General Contingency, as dictated by the Consultant and Owner.
- B. All RFI's requiring a PCO (Project Change Order) must be submitted in writing for approval prior to any distribution of contingency funds and must be approved in writing by Santa Fe ISD.
- C. Any and all contingency funds not used will be required to be shown as a deductive change order on final billing for the project and shown in the AIA forms G702 and G703.

**END OF SECTION 01 21 13**

SECTION 01 26 63  
CHANGE ORDER PROCEDURES

**PART 1 – GENERAL**

1.01 REQUIREMENTS INCLUDED

- A. Procedures for processing Change Orders.

1.02 SUBMITTALS

- A. Submit name of the individual authorized to accept changes, and to be responsible for informing others in contractor's employ of changes in the work.

- B. Change Order Forms: AIA G701

1.03 DOCUMENTATION OF CHANGE IN CONTRACT SUM AND CONTRACT TIME

- A. Maintain detailed records of work done on a time and material basis.
1. Provide full information required for evaluation of proposed changes, and to substantiate costs of changes in the work.
- B. Document each quotation for a change in costs or time with sufficient data to allow evaluation of the quotation.
- C. Provide data necessary to support computations:
1. Quantities of products, labor, and equipment.
  2. Taxes, insurance and bonds.
  3. Labor burden for labor on a change will be established at 46% maximum allowed of labor cost. Labor burden is to include the cost FICA, workers compensation, state and federal unemployment, and health insurance.
  4. Justification for any change in contract time.
  5. Credit for deletions from contract, similarly documented.
- D. Support each claim for additional costs, and for work done on a time and material basis with additional information:
1. Origin and date of claim. Note: Claims for additional cost must be submitted within 10 days of claim to be considered.
  2. Dates and times work was performed, and by whom.
  3. Time records and wage rates paid.
  4. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

1.04 CONSTRUCTION CHANGE AUTHORIZATION

- A. Consultant/Owner may issue a directive, signed by the Owner, instructing contractor to proceed with a change in the work, for subsequent inclusion in a Change Order.

B. Directive will describe changes in the work, and will designate method of determining any change in contract sum or contract time.

C. Promptly execute the change in work.

1.05 LUMP SUM CHANGE ORDER

A. Will be based on proposal request and contractor's sum quotation, or contractor's request for Change Order as approved by Consultant/Owner.

B. Contractor's overhead and profit shall not exceed 10% of the lump sum cost including bonds and insurance.

1.06 UNIT PRICE CHANGE ORDER

A. For predetermined unit prices and quantities, Change Order will be executed on a lump sum basis.

B. For unit costs or quantities of units of work that are not predetermined, execute work under a construction change authorization.

1. Changes in contract sum or contract time will be computed as specified for time and material Change Order.

C. Contractor's overhead and profit shall not exceed 10% of the unit price cost including bonds and insurance.

1.07 TIME AND MATERIAL CHANGE ORDER

A. Submit itemized account and supporting data after completion of change.

B. Consultant/Owner will determine the change allowable in contract sum and contract time.

C. Contractor's overhead and profit shall not exceed 10% of the total of the time and material cost including bonds and insurance.

1.08 EXECUTION OF CHANGE ORDERS

A. Consultant/Owner will issue Change Orders for signatures of parties.

1.09 CORRELATION OF CONTRACTOR SUBMITTALS

A. Promptly revise schedule of values and application for payment forms to record each authorized Change Order as a separate line item and adjust the contract sum as shown on the Change Order.

- 1           B.   Promptly revise progress schedules to reflect any change in contract time, revise sub-  
2               schedules to adjust times for other items of work affected by the change, and resubmit.  
3  
4  
5  
6

**END OF SECTION 01 26 63**

SECTION 01 32 33  
PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
1. Preconstruction photographs.
  2. Periodic construction photographs.
  3. Final Completion construction photographs.

1.02 SUBMITTALS

- A. Construction Photographs: Submit one print of each photographic view within ten (10) days of taking photographs. Submission shall be on 8.5" by 11" paper, printed two photographs per page.
1. Identification:
    - a) Below each print, provide a description of the view.
    - b) **Date photograph was taken shall be stamped by camera with the exception of Final Completion Construction Photographs.**
  2. Digital Images: With each submittal of prints also submit a complete set of digital image electronic files on CD-ROM or flash drive.

PART 2 - PRODUCTS

2.01 PHOTOGRAPHIC MEDIA

- A. Digital Images: Provide images in JPEG format, produced by a digital camera with minimum sensor size of 12.0 megapixels, and at an image resolution of not less than 3000 by 4000 pixels.

PART 3 - EXECUTION

3.01 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the work. Photographs with blurry or out-of-focus areas will not be accepted.
- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
1. Field Office Images: Maintain one set of images on CD-ROM or flash drive in the field office at project site, available at all times for reference.

- 1 C. Preconstruction Photographs: Before commencement of demolition, take digital  
2 photographs of project site and surrounding properties, including existing items to remain  
3 during construction, from different vantage points, as directed by Project Manager.
  - 4 1. Take ten (10) photographs per facility to show existing conditions of property before  
5 starting the work.
  - 6 2. Take additional photographs as required to record settlement or cracking of adjacent  
7 structures, pavements, and improvements.
- 8  
9 D. Periodic Construction Photographs: Take minimum twenty (20) digital photographs per  
10 facility weekly, with timing each month adjusted to coincide with the cutoff date associated  
11 with each Application for Payment. Select vantage points to show status of construction  
12 and progress since last photographs were taken.
- 13  
14 E. Project Manager-Directed Construction Photographs: From time to time, Project Manager  
15 will instruct photographer about number and frequency of additional digital photographs  
16 with general directions on vantage points to show the status of construction and progress  
17 since last photographs were taken.
- 18  
19 F. Final Completion Construction Photographs: Take ten (10) digital photographs per facility  
20 after date of Substantial Completion for submission as Project Record Documents.  
21 Project Manager will direct photographer for desired vantage points.
  - 22 1. **Do not include date stamp.**
- 23  
24  
25  
26

END OF SECTION 01 32 33

**SECTION 01 33 00**  
**SUBMITTALS AND SUBSTITUTIONS**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Work includes: Make submittals required by the Contract Documents, and revise and resubmit as necessary to establish compliance with the specified requirements.

**1.02 QUALITY ASSURANCE**

- A. Coordination of submittals:
1. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted.
  2. Verify that each item and the submittal for it conform in all respects with the specified requirements.
  3. By affixing the Contractor's signature to each submittal, certify that this coordination has been performed.
- B. Substitutions
1. The contract is based on the standards of quality established in the Contract Documents. Substitutions will be considered only when listed at time of bidding, on the form provided in the bidding documents, and when substantiated by the Contractor's submittal of required data within thirty-five (35) calendar days after award of the Contract.
  2. The following products do not require further approval except for interface within the work:
    - a. Products specified by reference to standard specifications such as ASTM and similar standards.
    - b. Products specified by manufacturer's name and catalog model number.
  3. Where any material is specified by proprietary name, trade name, name of manufacturer, generic name, or catalog number with the addition of such expressions as "or equal"/"or approved equal", it is understood that the material named is intended and no substitution will be allowed without written approval by the Owner's representative three (3) calendar days prior to proposal due date.
  4. Should a specified material not be available, a substitution shall require approval (in writing) of the Owner's representative and the roof system manufacturer issuing the warranty before being utilized on this project.
  5. Unless otherwise indicated, the materials to be used in this specification are those specified and denote the type, quality, performance, etc. required. All proposals shall be based upon the use of specified material.
  6. Do not substitute materials, equipment, or methods unless substitution has been specifically approved in writing for this work by the Project Manager.

C. "Or equal"

1. Where the phrase "or equal", or "or equal as approved by the Project Manager", occurs in the Contract Documents, do not assume that the materials, equipment, or methods will be approved as equal unless the item has been specifically so approved for this work by the Project Manager.
2. A Contractor who proposes to quote on the basis of an "or equal"/"or approved equal" alternate material or system shall submit to the Owner's representative the following information, at least five (5) calendar days prior to scheduled proposal opening. Only one request for substitution will be considered for each material or system. When substitution is not accepted, specified product or system shall be used.
  - a) A five (5) gallon sample of any adhesive, coating, mastic, or sealant and a three foot by five foot (3' x 5') sample of any sheeting or rolled goods as may be specified.
  - b) A certificate from an accredited testing laboratory comparing the physical and performance attributes of the proposed material with those of the specified materials.
  - c) A list of at least three (3) local jobs where the proposed alternate material was used under similar conditions and written documentation showing successful installation in the United States of similar size and scope for a minimum of ten (10) years. These jobs must be available for inspection by the Owner's representative.
  - d) In the event a substitution is acceptable by the Owner, all contractors shall be notified of the acceptable alternate within three (3) calendar days prior to proposal opening.
  - e) During the course of work, the Owner's representative may secure from the containers at the job site, samples of the materials being used and submit the samples to an independent testing laboratory for comparison. If the results of the independent testing laboratory prove that the materials are not comparable and equal to the specified materials, the Contractor shall pay for the testing and the Owner reserves the right to reduce the amount of the proposal by twenty percent (20%) if all work has already been completed before the test results become known. If the contract work is not completed when the test results become known, the Owner shall impose a penalty in proportion to the amount of work already completed, and all remaining work shall be completed with the specified materials.

D. Procedure for Use of Substitution Request Form

1. Substitution request **including all required documentation** must be delivered to the Owner's Representative's office no later than the date indicated in the specifications. Requests submitted late will not be considered.
2. The Individual or Firm requesting a substitution must document that the requested substitution is equal or superior to the specified product. Failure to provide clear, accurate, and adequate documentation will be grounds for rejection.
3. Required documentation shall consist of applicable information which would aid the Project Manager in making an informed decision. Include **side by side product comparisons**, technical data, laboratory test results, product drawings, etc.

4. If use of the proposed product would result in changes to the design of the building, the submittal shall describe fully the changes required to the drawings or specifications. Any cost differences resulting from modifications to the drawings and specifications and the cost of making the changes shall be borne by the Product Supplier.
5. **No** product will be considered "as equal" to the product specified until it has been included as an allowable substitution, in a written Addendum to the project.

#### 1.03 SUBMITTALS

- A. Make submittals of Shop drawings, samples, Substitution Requests, and other items in accordance with the provisions of this section.
- B. Upon receipt of Notice of Acceptance of this proposal, the Contractor shall submit the following items. All submittals shall be submitted to the Owner/Owner's representative within ten (10) calendar days of the date on the Notice of Acceptance and prior to the award of contract.
  1. Contractor's executed insurance certificate.
  2. Material manufacturer's approval/acceptance of the specifications and details as written or noted for this project, fastener pattern layout, insulation, fasteners and all related materials.
  3. Contractor's executed payment and performance bonds as required.
  4. Shop drawings of all perimeter and projection details, and sheet metal details approved by manufacturer, for Owner's approval if proposed details differ from those included with this proposal package. These drawings shall be approved by the membrane manufacturer and submitted at the preconstruction conference for Owner review and approval prior to work start.
  5. Approved applicator must submit a roof drawing which will be employed in the project if proposed drawing differs from that included with this proposal package.
  6. Detailed project sequencing, staging, material loading, manpower plans, and detailed project construction schedule for approval.
  7. Copy of warranty application that has been sent to manufacturer.
  8. Sample of warranty that is to be issued upon project completion.
  9. Submit list of all mechanical, electrical, rigging, sheet metal, and other Subcontractors with evidence of Subcontractor's insurance coverage in compliance with contract requirements.
  10. Project superintendent's resume and project experience list for proposed system.
  11. Contractor shall submit written statement that their company or any Subcontractor they may use is not employing workers classified as undocumented workers on this project.
  12. Samples of all materials not supplied or prior approved by the roofing membrane manufacturer shall be submitted to the manufacturer for written approval prior to installation start.
  13. Submit waterproofing product data, including detailed test results of material applied to surfaces similar to requirements of this Section. Submit manufacturer's instructions for methods and application procedures.
- C. Samples and Manufacturer's Submittals: Submit prior to delivery or installation.
  1. Samples of all roofing system components including all specified accessories.

2. Submit samples of proposed warranty complete with any addenda necessary to meet the warranty requirements as specified.
3. Submit latest edition of manufacturer's specifications and installation procedures. Submit only those items applicable to this project.
4. A written statement from the roofing materials manufacturer approving the installer, specifications and drawings as described and/or shown for this project and stating the intent to guarantee the completed project.
5. Manufacturer's Equiviscous Temperatures (EVT) for the specified bitumens.
6. Submit shop drawings, product data and mockups of all sheet metal.

- D. Samples and Manufacturer's Submittals for Sheet Metal and Miscellaneous Accessories: Submit prior to deliver or installation.
1. Submit shop drawings, product data and mockups of all sheet metal.

## PART 2 – PRODUCTS

### 2.01 SHOP DRAWINGS

- A. Scale and measurements: Make Shop Drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the work.
- B. Shop Drawings: Provide manufacturer's approved details of all perimeter conditions, projection conditions, and any additional special job conditions which require details other than indicated in the drawings.
- C. Shop Drawings and Product Data:
1. Manufacturer's Details: All termination details and other details normally required by the membrane manufacturer's Technical Specifications, including both standard details and special details, shall be furnished by the Contractor and shall be approved in writing by the manufacturer, the company project manager, and the Owner's representative prior to final installation.
  2. As-built Drawings: Contractor shall supply the Owner with a full set of "as-built" drawings depicting location, size, nomenclature and manufacturer of all replaced roof slabs. One set of reproducible drawings, twenty-four inches by thirty-six inches (24" x 36"), shall be supplied along with one set of copies. Contractor shall also supply Owner with "as-built" roofing details as approved by the appropriate manufacturer with original manufacturer's seals and signatures thereon. Owner must have "as-built" drawings in hand prior to release of final payment to the Contractor.
  3. Initially submit three prints of each drawing, including fabrication, erection, layout and setting drawings, and other such drawings as required under various sections of the specifications until final approval is obtained.
  4. Date and mark shop drawings to show name of project, Owner, Contractor, origination Subcontractor, manufacturer or supplier, and separate details as pertinent.
  5. Shop drawings shall completely identify specification sections and locations at which materials or equipment are to be installed.
  6. Minimum drawing size shall be eight and one-half inches by eleven inches (8-1/2" x 11").

7. Submit sufficient copies of manufacturer's descriptive data including catalog sheets for materials, equipment and fixtures, showing dimensions, performance characteristics and capacities, diagrams and controls, schedules, and other pertinent information required.
  8. Submit brochures and other submittal data that cannot be reproduced economically, in such quantities to allow the Owner to retain one copy of each after review. Mark product data to show the name of project, Owner, Contractor, originating Subcontractor, manufacturer or supplier, and separate details if pertinent.
  9. Product data shall completely identify specification sections and locations at which materials or equipment are to be installed.
  10. Accompany each submittal with a separate transmittal letter in duplicate, containing date, project title and number, Contractor's name and address, number of each shop drawing, product data and samples submitted, and notification of deviations from Contract Documents.
  11. One (1) set of prints and will be returned to the Owner for record. The cost of all printing is the responsibility of the Contractor.
- D. Provide manufacturer's approved details, or all perimeter conditions, project conditions, and any additional special job conditions which require details other than indicated in the drawings.
- E. Review comments of the Project Manager will be shown on the copies when it is returned to the Contractor. The Contractor may make and distribute marked copies as are required for his purposes.
- F. Fax submittals **are not acceptable**.
- 2.02 MANUFACTURER'S LITERATURE
- A. Where contents of submitted literature from manufacturers includes data not pertinent to the submittal, clearly show which portions of the contents is being submitted for review.
- B. Submit the number of copies which are required to be returned, plus one copy which will be retained by the Project Manager.
- 2.03 MAINTENANCE PROCEDURES
- A. Maintenance Procedures: Within ten days of the date of Substantial Completion of the project, deliver to the Owner three copies of the manufacturer's printed instructions regarding care and maintenance of the roof.
- 2.04 SAMPLES
- A. Provide sample or samples identical to the precise article proposed to be provided. Identify as described under "Identification of Submittals" below.
- B. Number of samples required:
1. Unless otherwise specified, submit samples in the quantity which is required to be returned, plus one which will be retained by the Project Manager.

2. By pre-arrangement in specific cases, a single sample may be submitted for review and, when approved, be installed in the work at a location agreed upon by the Project Manager.

2.05 COLORS AND PATTERNS

- A. Unless the precise color and pattern are specifically called out in the Contract Documents, and whenever a choice of color or pattern is available in the specified products, submit accurate color and pattern charts to the Project Manager for selection.
- B. Contractor shall hold **ALL** color samples until all items requiring color selections are received. **Only** then should the actual color samples be submitted for selections. Each sample shall be properly labeled with the name of the project, contractor, manufacturer, and date of submission. Incomplete color submittal **will be** returned to the Contractor.
- C. The Contractor shall allow four weeks **after all** colors are submitted for final Owner approval.

PART 3 – EXECUTION

3.01 IDENTIFICATION OF SUBMITTALS

- A. Consecutively number all submittals.
- B. Accompany each submittal with a letter of transmittal showing all information required for identification and checking.
1. When material is re-submitted for any reason, transmit under a new letter of transmittal and with a new transmittal number.
2. On re-submittals, cite the original submittal number for reference.
- C. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.
- D. Maintain an accurate submittal log for the duration of the work, showing current status of all submittals at all times. Make the submittal log available to the Project Manager for his review upon request.

3.02 TIMING OF SUBMITTALS

- A. Make submittals far enough in advance of scheduled dates for installation to provide time required for reviews, for securing necessary approvals, for possible revisions and re-submittals, and for placing orders and securing delivery.

1           B.   Revisions:

- 2           1.   Make revisions required by the Project Manager.
- 3           2.   If the Contractor considers any required revision to be a change, he shall so notify
- 4           the Project Manager.
- 5           3.   Make only those revisions directed or approved by the Project Manager.
- 6
- 7
- 8
- 9

**END OF SECTION 01 33 00**

**SECTION 01 50 00  
TEMPORARY FACILITIES**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. This section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security and protection.
- B. Temporary utilities which may be required include but are not limited to:
  - 1. Water service and distribution
  - 2. Temporary electric power and light
  - 3. Telephone service
- C. Temporary construction and support facilities which may be required include but are not limited to:
  - 1. Temporary heat
  - 2. Storage sheds
  - 3. Sanitary facilities
  - 4. Temporary enclosures
  - 5. Hoists and temporary elevator use
  - 6. Temporary Project identification signs and bulletin boards
  - 7. Waste disposal services
  - 8. Construction aids and miscellaneous services and facilities
- D. Security and protection facilities which may be required include but are not limited to:
  - 1. Temporary fire protection
  - 2. Barricades, warning signs, lights
  - 3. Sidewalk bridge or enclosure fence for the site
  - 4. Environmental protection

**1.02 SUBMITTALS**

- A. Temporary Utilities: Submit reports of tests, inspections, meter readings and similar procedures performed on temporary utilities.
- B. Implementation and Termination Schedule: Submit a schedule indicating implementation and termination of each temporary utility within fifteen (15) days of the date established for commencement of the work.

**1.03 QUALITY ASSURANCE**

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:
  - 1. Building Code requirements
  - 2. Health and safety regulations
  - 3. Utility company regulations
  - 4. Police, Fire Department and Rescue Squad rules

5. Environmental protection requirements

- B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library, "Temporary Electrical Facilities."

1. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", prepared jointly by ABG and ASC, for industry recommendations.

- C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.04 PROJECT CONDITIONS

- A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of the permanent service.

- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: Provide new materials. If acceptable to the Architect, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.
- B. Lumber and Plywood: Comply with requirements in Division 6 – Rough Carpentry section.
1. For job-built temporary offices, shops and sheds within the construction areas, provide UL labeled, fire treated lumber and plywood for framing, sheathing and siding.
  2. For signs and directory boards, provide exterior type, Grade B-B High Density Concrete Form Overlay Plywood conforming to PS-1, of sizes and thickness indicated.
  3. For fences and vision barriers, provide exterior type, minimum three-eighths inch (3/8") thick plywood.
  4. For safety barriers, sidewalk bridges and similar uses, provide minimum five-eighths inch (5/8") thick exterior plywood.

2.02 EQUIPMENT

- A. General: Provide new equipment. If acceptable to the Architect, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.

- 1 B. Water Hoses: Provide three-fourths inch (3/4") heavy-duty, abrasion-resistant, flexible  
2 rubber hoses one hundred feet (100') long, with pressure rating greater than the maximum  
3 pressure of the water distribution system. Provide adjustable shut-off nozzles at hose  
4 discharge.  
5  
6 C. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion  
7 of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with  
8 ground-fault circuit interrupters, reset button and pilot light, for connection of power tools  
9 and equipment.  
10  
11 D. Electrical Power Cords: Provide grounded extension cords. Use "hard-service" cords  
12 where exposed to abrasion and traffic. Provide waterproof connectors to connect  
13 separate lengths of electric cords if single lengths will not reach area where construction  
14 activities are in progress.  
15  
16 E. Temporary Storage Sheds: Provide fabricated or mobile units with lockable entrances.  
17 Provide heated units on foundations adequate for normal loading.  
18  
19 F. Temporary Toilet Units: Provide self-contained single-occupant toilet units of the  
20 chemical, aerated recirculation, or combustion type, properly vented and fully enclosed  
21 with a glass fiber reinforced polyester shell or similar nonabsorbent material.  
22  
23 G. First Aid Supplies: Comply with governing regulations.  
24  
25 H. Fire Extinguishers: Provide hand-carried, portable UL-rated, Class A fire extinguishers for  
26 temporary offices and similar spaces. In other locations provide hand-carried, portable,  
27 UL-rated, Class ABC dry chemical extinguishers, or a combination of extinguishers of  
28 NFPA recommended classes for the exposures.  
29 1. Comply with NFPA 10 and 241 for classification, extinguishing agent and size  
30 required by location and class of fire exposure.  
31  
32

### 33 PART 3 - EXECUTION

#### 34 3.01 INSTALLATION

- 35  
36  
37 A. Use qualified personnel for installation of temporary facilities. Locate facilities where they  
38 will serve the Project adequately and result in minimum interference with performance of  
39 the work. Relocate and modify facilities as required.  
40  
41 B. Provided each facility ready for use when needed to avoid delay. Maintain and modify as  
42 required. Do not remove until facilities are no longer needed, or are replaced by  
43 authorized use of completed permanent facilities.  
44

#### 45 3.02 TEMPORARY UTILITY INSTALLATION

- 46  
47 A. Use Charges: Cost or use changes for temporary facilities are not chargeable to the  
48 Owner or Architect, and will not be accepted as a basis of claims for a Change Order.  
49

- 1 B. Water Service: Install water service and distribution piping of sizes and pressures  
2 adequate for construction until permanent water service is in use.  
3 1. Sterilization: Sterilize temporary water piping prior to use.  
4  
5 C. Temporary Electric Power Service: Provide weatherproof, grounded electric power  
6 service and distribution system of sufficient size, capacity, and power characteristics  
7 during construction period. Include transformers, overload protected disconnects,  
8 automatic ground-fault interrupters and main distribution switch gear.  
9 1. Power Distribution System: Install wiring overhead, and rise vertically where least  
10 exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts,  
11 AC 20 ampere rating, and lightning circuits may be nonmetallic sheathed cable  
12 where overhead and exposed for surveillance.  
13

14 3.03 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION  
15

- 16 A. Locate field offices, storage sheds, sanitary facilities and other temporary construction and  
17 support facilities for easy access.  
18 1. Maintain temporary construction and support facilities until Final Completion.  
19 Remove prior to final application for payment. Where temporary construction or  
20 facilities interfere with the Owner's use or occupation of the work after Substantial  
21 Completion, remove, relocate or modify temporary construction and facilities as  
22 required to permit Owner's use and occupancy.  
23 2. Provide insulated, weathertight offices of sufficient size to accommodate required  
24 office personnel at the Project Site.  
25  
26 B. Storage and Fabrication Sheds: Install storage and fabrication sheds, sized, furnished  
27 and equipped to accommodate materials and equipment involved, including temporary  
28 utility service.  
29  
30 C. Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures.  
31 Comply with regulations and health codes for the type, number, location, operation and  
32 maintenance of fixtures and facilities. Install where facilities will best service the Project's  
33 needs.  
34 1. Provide toilet tissue, paper towels, paper cups and similar disposable materials for  
35 each facility. Provide covered waste containers for used material.  
36 2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of  
37 pit-type privies will not be permitted.  
38 3. Wash Facilities: Install wash facilities supplied with portable water at convenient  
39 locations for personnel involved in handling materials that require wash-up for a  
40 healthy and sanitary condition. Dispose of drainage properly. Supply cleaning  
41 compounds appropriate for each condition.  
42  
43 D. Drinking Water Fixtures: Provide drinking water fountains where required for compliance  
44 with regulations and health codes, including paper supply.  
45  
46 E. Temporary Enclosures: Provide temporary enclosure for protection of construction in  
47 progress and completed, from exposure, foul weather, other construction operations and  
48 similar activities.

1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosure where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
  2. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of twenty-five (25) square feet or less with plywood or similar materials.
  3. Close openings through floor or roof decks and horizontal surfaces with load-bearing wood-framed construction.
  4. Where temporary wood or plywood enclosure exceeds one hundred (100) square feet in area, use UL-labeled fire-retardant treated material for framing and main sheathing.
- F. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- G. Project Identification and Temporary Signs: Display no signs without approval of the Architect. Do not permit installation of unauthorized signs.
- H. Project Identification Signs: Engage an experienced sign painter to apply graphics. Comply with the following drawings, attached herein.
- I. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than seven (7) days during normal weather or three (3) days when the temperature is expected to rise above 80° F. Handle hazardous, dangerous or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner.
- 3.04 SECURITY AND PROTECTION FACILITIES INSTALLATION
- A. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers," and NFPA 241 "Standard for Safeguarding Construction, Alternations and Demolition Operations."
- B. Barricades, Warning Signs and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.
- C. Enclosure Fence: When excavation begins, install an enclosure fence with lockable entrance gates. Locate where indicated, or enclose the entire site or the portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs and other animals from easily entering the site, except by the entrance gates.
1. Provide open-mesh, chain-link fencing with posts set in a compacted mixture of gravel and earth.

- 1 D. Security Enclosure and Lockup: Install substantial temporary enclosure of partially  
2 completed areas of construction. Provide locking entrances to prevent unauthorized  
3 entrance, vandalism, theft and similar violations of security.  
4
- 5 E. Storage: Where materials and equipment must be stored, and are of value or attractive for  
6 theft, provide a secure lockup. Enforce discipline in connection with the installation and  
7 release of materials to minimize the opportunity for theft and vandalism.  
8
- 9 F. Environmental Protection: Provide protection, operate temporary facilities and conduct  
10 construction in ways and by methods that comply with environmental regulations, and  
11 minimize the possibility that air, waterways and subsoil might be contaminated or polluted,  
12 or that other undesirable effects might result. Avoid use of tools and equipment which  
13 produce harmful noise. Restrict use of noise making tools and equipment to hours that  
14 will minimize complaints from persons or firms near the site.  
15

16 3.05 OPERATION, TERMINATION AND REMOVAL  
17

- 18 A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of  
19 temporary facilities to essential and intended uses to minimize waste and abuse.  
20
- 21 B. Termination and Removal: Unless the Architect requires that it be maintained longer,  
22 remove each temporary facility when the need has ended, or when replaced by authorized  
23 use of a permanent facility, or no later than Substantial Completion. Complete or, if  
24 necessary, restore permanent construction that may have been delayed because of  
25 interference with the temporary facility. Repair damaged work, clean exposed surfaces  
26 and replace construction that cannot be satisfactorily repaired.
- 27 1. Materials and facilities that constituted temporary facilities are property of the  
28 Contractor. The Owner reserves the right to take possession of Project identification  
29 signs.
- 30 2. At substantial Completion, clean and renovate permanent facilities that have been  
31 used during the construction period, including but not limited to:  
32 a) Replace air filters and clean inside of ductwork and housings.  
33 b) Replace significantly worn parts and parts that have been subject to unusual  
34 operating conditions.  
35 c) Replace lamps that are burned out or noticeably dimmed by substantial hours of  
36 use.  
37  
38  
39  
40

END OF SECTION 01 50 00

**SECTION 01 74 13  
CONSTRUCTION CLEANING**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes: Cleaning and disposal of waste materials, debris, and rubbish during construction.

**1.02 QUALITY ASSURANCE**

- A. Regulatory Requirements:
1. Hazard Control: Store volatile waste in covered metal containers and remove from premises daily.
  2. Pollution Control: Conduct cleaning and disposal operations to comply with local codes, ordinances, and anti-pollution laws.

**PART 2 - PRODUCTS**

**2.01 EQUIPMENT**

- A. Provide acceptable covered containers for deposit of waste materials, debris and rubbish.
- B. Use only cleaning materials which will not create hazards to health and property, and which will not damage surfaces.
- C. Use only those cleaning materials recommended by manufacturer of surface to be cleaned.
- D. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

**PART 3 - EXECUTION**

**3.01 CLEANING DURING CONSTRUCTION**

- A. Execute daily "broom-clean" construction cleaning to keep Work, site and adjacent properties free from accumulations of waste materials, rubbish and debris. Maintain site in a clean and orderly condition including the following:
1. Remove debris and rubbish from pipe chases, plenums, attics, craw spaces and other closed or remote spaces, prior to enclosing the space.
  2. Broom and vacuum clean interior areas prior to start of surface finishing and continue cleaning to eliminate conditions that could effect final finishing.
  3. Open free-fall chutes not permitted. Terminate closed chutes into appropriate containers with lids.
  4. Provide on-site dump containers for collection of waste materials, rubbish and debris.

5. Do not allow waste materials, rubbish and debris to accumulate and become an unsightly and hazardous condition. Provide additional collection and dispose of debris whenever periodic schedule is inadequate to prevent accumulation.

B. At not less than every week during progress of Work, clean up site and access, and legally dispose of waste materials, rubbish, and debris away from site.

C. Do not overload trucks to prevent spillage on access and haul routes. Periodically examine traffic areas and maintain clear routes.

### 3.02 DUST CONTROL

A. Sprinkle dusty debris with water.

B. Vacuum clean interior building areas, including floors, ledges, pipes, ducts and other places where dust can accumulate, in conjunction with gypsum board installation and sanding operations, and when ready to receive finish painting.

C. Combine vacuum cleaning on an as-needed basis until building is ready for acceptance or occupancy.

D. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet and newly painted surfaces.

E. Clean floors prior to installation of final floor coverings.

F. Provide Tarp coverings over areas inside the facility that are deemed critical and cannot be exposed to falling dust and debris.

### 3.03 DISPOSAL

A. Remove waste materials, debris, and rubbish from site daily and dispose off-site.

B. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary sewer. Comply with requirements of NEPA 241 for removal of combustible waste material and debris. Enforce requirements strictly.

C. Do not hold materials more than seven (7) days during normal weather or three (3) days when temperature is expected to rise above 80° F.

D. Handle hazardous, dangerous or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in lawful manner.

E. Do not dispose of wastes into streams or waterways. Do not burn or bury rubbish and waste material on Project site.

F. Disposal of waste in Owner's containers on-site is not permitted.

**END OF SECTION 01 74 13**

**SECTION 01 78 00**  
**PROJECT CLOSEOUT**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. This section specifies administrative and procedural requirements for project closeout, including but not limited to:

1. Observation procedures
2. Project record document submittal
3. Operating and maintenance manual submittal
4. Submittal of warranties
5. Final cleaning

**1.02 SUBSTANTIAL COMPLETION**

- A. Preliminary Procedures: Before requesting observation for certification of Substantial Completion, complete the following. List exceptions in the request.
1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show one hundred percent (100%) completion for the portion of the work claimed as substantially complete. Include supporting documents for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
  2. If one hundred percent (100%) completion cannot be shown, include a list of incomplete items, the value of incomplete construction and reasons the work is not complete.
  3. Advise Owner of pending insurance change-over requirements.
  4. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
  5. Obtain and submit releases enabling the Owner unrestricted use of the work and access to services and utilities; include occupancy permits, operating certificates and similar releases.
  6. Submit record drawings, maintenance manuals, final project photographs, damage or settlement survey, property survey and similar final record information.
  7. Deliver tools, spare parts, extra materials and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable. Extra materials include but are not necessarily limited to those listed in the "Summary of Extra Materials" following this section.
  8. Make final change-over of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of change-over in security provisions.
  9. Complete start-up testing of systems, and instruction of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups and similar elements.

- B. Observation Procedures: On receipt of a request for observation, the Project Manager will either proceed with observation or advise the Contractor of unfilled requirements. The Project Manager will prepare the Certificate of Substantial Completion following observation, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
1. The Project Manager will repeat observation when requested, and be assured by the Contractor in writing, that the work has been substantially completed.
  2. Results of the completed observation will form the basis of requirements for final acceptance.

#### 1.03 FINAL ACCEPTANCE

- A. Preliminary Procedures: Before requesting final observation for certification of final acceptance and final payment, complete the following. List exceptions in the request.
1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
  2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
  3. Submit a certified copy of the Project Manager's final observation list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Project Manager.
  4. Submit consent of surety to final payment.
  5. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  6. Complete final clean up requirements, including touchup painting. Touchup and otherwise repair and restore marred exposed finishes.
- B. Re-observation Procedure: The Project Manager will re-observe the work upon receipt of notice that the work, including observation list items from earlier observations, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Project Manager.
1. Upon completion of re-observation, the Project Manager will prepare a certificate of final acceptance, or advise the Contractor of work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
  2. If necessary, re-observation will be repeated.
  3. Should the Project Manager perform re-observations, due to failure of the work to comply with the claims of status of completion made by the Contractor, the Owner shall compensate the Project Manager for additional services; and the Owner shall deduct the amount of the compensation from the final payment to the Contractor.

#### 1.04 RECORD DOCUMENT SUBMITTALS

- A. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Project Manager's reference during normal working hours.

- 1 B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of  
2 Contract Drawings and Shop Drawings. Mark the set to show the actual installation where  
3 the installation varies substantially from the work as originally shown. Mark whichever  
4 drawing is most capable of showing conditions fully and accurately. Where Shop  
5 Drawings are used, record a cross-reference at the corresponding location on the Contract  
6 Drawings. Give particular attention to concealed elements that would be difficult to  
7 measure and record at a later date.
- 8 1. Mark record sets with colored erasable pencil, and use other colors to distinguish  
9 between variations in separate categories of the work. Use the following color code:  
10 a) Red for Architectural work  
11 b) Blue for Structural work  
12 c) Green for Plumbing work  
13 d) Orange for HVAC work  
14 e) Brown for Electrical work  
15 f) Black for other written notations
- 16 2. Mark new information that is important to the Owner, but was not shown on Contract  
17 Drawings or Shop Drawings.
- 18 3. Note related Change Order numbers where applicable.
- 19 4. At completion of project, transfer all Project Record Data to one complete set of  
20 mylar sepias using mylar compatible colored pencils or ink. Organize record drawing  
21 sheets into manageable sets, bind with durable paper cover sheets, and print  
22 suitable titles, dates and other identification on the cover of each set. Deliver one  
23 complete set of mylar sepias of all drawings to the Project Manager for the Owner's  
24 records. The cost of printing the mylar sepias shall be paid by the Contractor.
- 25
- 26 C. Record Specifications: Maintain one complete copy of the Project Manual, including  
27 addenda, and one copy of other written construction documents such as Change Orders  
28 and modifications issued in printed form during construction. Mark these documents to  
29 show substantial variations in actual work performed in comparison with the text of the  
30 Specifications and modifications. Give particular attention to substitutions, selection of  
31 options and similar information on elements that are concealed or cannot otherwise be  
32 readily discerned later by direct observation. Note related record drawing information and  
33 Product Data.
- 34 1. Upon completion of the work, submit record Specifications to the Project Manager for  
35 the Owner's records.
- 36
- 37 D. Record Product Data: Maintain one copy of each Product Data submittal. Mark these  
38 documents to show significant variations in the actual work performed in comparison with  
39 information submitted. Include variations in products delivered to the site, and from the  
40 manufacturer's installation instructions and recommendations. Give particular attention to  
41 concealed products and portions of the work which cannot otherwise be readily discerned  
42 later by direct observation. Note related Change Orders and mark-up of record drawings  
43 and Specifications.
- 44 1. Upon completion of mark-up, submit complete set of record Product Data to the  
45 Project Manager for the Owner's records.
- 46

- 1 E. Record Sample Submitted: Immediately prior to the date or dates of Substantial  
2 Completion, the Contractor will meet at the site with the Project Manager and the Owner's  
3 personnel to determine which of the submitted Samples that have been maintained during  
4 progress of the work are to be transmitted to the Owner for record purposes. Comply with  
5 delivery to the Owner's Sample storage area.  
6
- 7 F. Miscellaneous Record Submittals: Refer to other Specification sections for requirements  
8 of miscellaneous record-keeping and submittals in connection with actual performance of  
9 the work. Immediately prior to the date or dates of Substantial Completion, complete  
10 miscellaneous records and place in good order, properly identified and bound or filed,  
11 ready for continued use and reference. Submit to the Project Manager for the Owner's  
12 records.  
13
- 14 G. Maintenance Manuals: Organize operating and maintenance data into suitable sets of  
15 manageable size. Bind properly indexed data in individual heavy-duty two inch (2"),  
16 three-ring vinyl-covered binders, with pocket folders for folded sheet information. Mark  
17 appropriate identification on front and spine of each binder. Include the following types of  
18 information:  
19 1. Emergency instructions  
20 2. Spare parts list  
21 3. Copies of warranties  
22 4. Wiring diagrams  
23 5. Recommended "turn around" cycles  
24 6. Observation procedures  
25 7. Shop Drawings and Product Data  
26 8. Fixture lamping schedule  
27  
28

## 29 PART 2 - PRODUCTS

### 30 31 2.01 CLEANING AGENTS

- 32
- 33 A. Use cleaning materials and agents recommended by the manufacturer or fabricator of the  
34 surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health  
35 or property, or that might damage finished surfaces.  
36  
37

## 38 PART 3 - EXECUTION

### 39 40 3.01 CLOSEOUT PROCEDURES

- 41
- 42 A. Operating and Maintenance Instructions: Arrange for each installer of equipment that  
43 requires regular maintenance to meet with the Owner's personnel to provide instruction in  
44 proper operation and maintenance. If installers are not experienced in procedures,  
45 provide instruction by manufacturer's representatives. Include a detailed review of the  
46 following items:  
47 1. Maintenance manuals  
48 2. Record documents  
49 3. Spare parts and materials  
50 4. Hazards

5. Cleaning
6. Warranties and bonds
7. Maintenance agreements and similar continuing commitments

3.02 FINAL CLEANING

- A. General: General cleaning during construction is required by the General Conditions and included in "Temporary Facilities" section.
- B. Cleaning: Employ experienced cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
  1. Complete the following cleaning operations before requesting Certification of Substantial Completion.
  2. Remove labels that are not permanent labels.
  3. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
  4. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
  5. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
  6. Clean the site, including landscape development areas, of rubbish, litter and foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.
- C. Removal of Protection: Remove temporary protection and facilities installed for protection of the work during construction.
- D. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials to the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.
  1. Where extra materials of value remaining after completion of associated work have become the Owner's property, arrange for disposition of these materials as directed.

END OF SECTION 01 78 00

**SECTION 06 10 53  
ROUGH CARPENTRY**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. This Section includes the following:
1. Framing with dimension lumber.
  2. Rooftop equipment bases and support curbs, as required.
  3. Wood blocking, cants, and nailers.
  4. Wood furring.
  5. Sheathing.
  6. Plywood backing panels.

**1.02 DEFINITIONS**

- A. Rough Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise specified.

**1.03 SUBMITTALS**

- A. All submittals shall be in compliance with Section 01 33 00 Submittals Procedures.

**1.04 QUALITY ASSURANCE**

- A. Testing Agency Qualifications: To qualify for approval, an independent testing agency must demonstrate to Structural Engineer 's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.
- B. Single-Source Responsibility for Engineered Wood Products: Obtain each type of engineered wood product from one source and by a single manufacturer.
- C. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria".
1. Dimension lumber.
  2. Miscellaneous lumber.
  3. Interior wood trim.
  4. Shelving and clothes rods.
  5. Plywood.
  6. Oriented strand board.
  7. Particleboard underlayment.
  8. Hardboard underlayment.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Keep materials under cover and dry. Protect from weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels. Provide for air circulation within and around stacks and under temporary coverings.
1. For lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.

## PART 2 – PRODUCTS

### 2.01 MANUFACTURERS

- A. Available Manufacturers (for Wood Sources outside the Scope Requirements for Fire-Treated Plywood): Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Wood-Preservative-Treated Materials:
- a) J. H. Baxter Co.
  - b) Chemical Specialties, Inc.
  - c) Continental Wood Preservers, Inc.
  - d) Hickson Corp.
  - e) Hoover Treated Wood Products, Inc.
  - f) Osmose Wood Preserving, Inc.
2. Metal Framing Anchors:
- a) Cleveland Steel Specialty Co.
  - b) Harlen Metal Products, Inc.
  - c) Silver Metal Products, Inc.
  - d) Simpson Strong-Tie Company, Inc.
  - e) Southeastern Metals Manufacturing Co., Inc.

### 2.02 LUMBER - GENERAL

- A. Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.
- B. Inspection Agencies: Inspection agencies, and the abbreviations used to reference them, include the following:
- 1. NELMA - Northeastern Lumber Manufacturers Association.
  - 2. NLGA - National Lumber Grades Authority (Canadian).
  - 3. RIS - Redwood Inspection Service.
  - 4. SPIB - Southern Pine Inspection Bureau.
  - 5. WCLIB - West Coast Lumber Inspection Bureau.
  - 6. WWPA - Western Wood Products Association.
- C. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
1. For exposed lumber, furnish pieces with grade stamps applied to ends or back of each piece, or omit grade stamps and provide grade-compliance certificates issued by inspection agency.

- D. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
1. Provide dressed lumber, S4S, unless otherwise indicated.
  2. Provide dry lumber with 19% maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.
  3. Provide dry plywood with 15% maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.

#### 2.03 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. General: Where lumber or plywood is indicated as preservative treated or is specified to be treated, comply with applicable requirements of AWPAC2 for lumber and AWPAC9 for plywood. Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC's Board of Review.
1. Do not use chemicals containing chromium or arsenic.
  2. For exposed items indicated to receive stained finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes, and mark end or back of each piece.
  3. Do not use material that is warped or does not comply with requirements for untreated material.
- B. Pressure treat aboveground items with waterborne preservatives to a minimum retention of 0.25 lb/cu. ft. After treatment, kiln-dry lumber and plywood to a maximum moisture content of 19% for lumber and 15% plywood. Treat indicated items and the following:
1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
- C. Complete fabrication of treated items before treatment, where possible. If cut after treatment, apply field treatment complying with AWPAC4 to cut surfaces. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

#### 2.04 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, provide materials that comply with performance requirements in AWPAC20 for lumber and AWPAC27 for plywood. Identify fire-retardant-treated wood with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.
1. Use treatment for which chemical manufacturer publishes physical properties of treated wood after exposure to elevated temperatures, when tested by a qualified independent testing agency according to ASTM D 5664 for lumber and ASTM D 5516 for plywood.
  2. Use treatment that does not promote corrosion of metal fasteners.
  3. Use Exterior type for exterior locations and where indicated.
  4. Use Interior Type A High Temperature (HT), unless otherwise indicated.

- B. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

2.05 DIMENSION LUMBER

- A. General: Provide dimension lumber of grades indicated according to the ALSC National Grading Rule (NGR) provisions of the inspection agency indicated.
- B. Framing Other than Non-Load-Bearing Partitions: Provide framing of the following grade and species:
1. Grade: No. 2.
  2. Species: Spruce-pine-fir south; NELMA.
- C. Ceilings (Non-Load-Bearing): For ceiling framing that does not support a floor, roof, or attic, provide the following grade and species:
1. Grade: No. 2.
  2. Species: Spruce-pine-fir south; NELMA.
- D. Other Framing Not Listed Above: Provide the following grades and species:
1. Grade: No. 2.
  2. Species: Spruce-pine-fir south; NELMA.

2.06 MISCELLANEOUS LUMBER

- A. General: Provide lumber for support or attachment of other construction, the following:
1. Rooftop equipment curbs and support bases
  2. Cant strips
  3. Bucks
  4. Nailers
  5. Blocking
  6. Furring
  7. Grounds
  8. Stripping
- B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.
- C. Moisture Content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.
- D. Grade: For dimension lumber sizes, provide No. 3 or Standard grade lumber per ALSC's NGRs of any species. For board-size lumber, provide No. 3 Common grade per NELMA, NLGA, or WWPA; No. 2 grade per SPIB; or Standard grade per NLGA, WCLIB or WWPA of any species.
- E. All wood nailers, structural cants, curbs, and other miscellaneous rough carpentry, shall be lumber as recommended by NRCA, and Underwriters Laboratory guidelines.

- F. Vertical Wall Shimming Material: Shall be exterior grade plywood, gypsum core board, or concrete core board unless otherwise accepted by Architect. Thickness shall be as required for attachment or to make material flashing flush or level with offsets and/or transitions, minimum three-fourths inch (3/4"). Proper selection of material is required to achieve UL guidelines.

#### 2.07 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide Type 304 stainless steel.
- B. Use fasteners of appropriate type and length. Predrill members when necessary to avoid splitting wood.
- C. Nails, Wire, Brads, and Staples: FS FF-N-105.
- D. Power-Driven Fasteners: CABO NER-272.
- E. Wood Screws: ASME B18.6.1.
- F. Lag Bolts: ASME B18.2.1.
- G. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
- H. Fastener for Wood Deck: Shall be a #14 fastener, fluorocarbon coated, with CR-10 coating. A minimum .200 diameter shank and .250 diameter thread. To be used with round pressure plates or bar, and having a fluorocarbon CR-10 coating, when subjected to thirty (30) Kesternich cycles (DIN 50018) shows less than 10% red rust which surpasses FM Global Approval Standard 4470, or approved equal. Fasteners, plates, and/or bars shall be listed in the FM Global Approval Guide.

#### 2.08 METAL FRAMING ANCHORS

- A. General: Provide galvanized steel framing anchors of structural capacity, type, and size indicated and as follows:
1. Research or Evaluation Reports: Provide products for which model code research or evaluation reports exist that are acceptable to authorities having jurisdiction and that evidence compliance of metal framing anchors for application indicated with building code in effect for Project.
2. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis, and demonstrated by comprehensive testing performed by a qualified independent testing agency.

- B. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653, G60 coating designation; structural, commercial, or lock-forming quality, as standard with manufacturer for type of anchor indicated.
- C. Joist Hangers: U-shaped joist hangers with 2-inch- long seat and 1-1/4-inch- wide nailing flanges at least 85 percent of joist depth.
1. Thickness: 0.052 inch.
  2. Thickness: 0.064 inch.
- D. Top Flange Hangers: U-shaped joist hangers, full depth of joist, formed from metal strap with tabs bent to extend over and be fastened to supporting member.
1. Strap Width: 1-1/2 inches.
  2. Strap Width: 2 inches.
  3. Thickness: 0.052 inch.
  4. Thickness: 0.064 inch.
- E. Bridging: Rigid, V-section, nailless type, 0.064 inch thick, length to suit joist size and spacing.

#### 2.09 VERTICAL WALL SHIMMING MATERIAL

- A. Shall be one of the following unless otherwise accepted by Owner's representative: OSB, exterior grade plywood, gypsum core board or concrete core board. Proper selection of material is required to achieve FM Global and UL guidelines.

### PART 3 – EXECUTION

#### 3.01 INSTALLATION, GENERAL

- A. Discard units of material with defects that impair quality of rough carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.
- B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.
- C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.
- D. Apply field treatment complying with AWPAC M4 to cut surfaces of preservative-treated lumber and plywood.
- E. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
1. CABO NER-272 for power-driven staples, P-nails, and allied fasteners.
  2. Published requirements of metal framing anchor manufacturer.
  3. "Recommended Nailing Schedule" of referenced framing standard and with AFPA's "National Design Specifications for Wood Construction."
  4. "Table 2305.2--Fastening Schedule" of the BOCA National Building Code.

- 1 F. Use common wire nails, unless otherwise indicated. Use finishing nails for finish work.  
2 Select fasteners of size that will not fully penetrate members where opposite side will be  
3 exposed to view or will receive finish materials. Make tight connections between  
4 members. Install fasteners without splitting wood; predrill as required.  
5  
6 G. Use stainless-steel nails where rough carpentry is exposed to weather, in ground contact,  
7 or in area of high relative humidity or where fasteners are in contact with pressure treated  
8 lumber.  
9  
10 H. Countersink nail heads on exposed carpentry work and fill holes with wood filler.  
11

12 3.02 ROUGH CARPENTRY  
13

- 14 A. Nailers shall be installed according to NRCA, Underwriters Laboratory, and IBC  
15 guidelines.  
16  
17 B. Wooden nailers shall be installed at gravel stops, drip edges, expansion joints, and on  
18 outside perimeter of building.  
19  
20 C. Gravel stop and drip edge nailers shall be the same height as the new insulation being  
21 installed where required.  
22  
23 D. Nailers shall be raised if necessary, by anchoring an additional nailer of appropriate height  
24 to the existing nailer if the existing nailer is not to be replaced.  
25  
26 E. Expansion joint nailers shall extend upward a minimum of eight inches (8") above finish  
27 roof height.  
28  
29 F. Where parapet wall exists, specified vertical wall shimming material shall be installed  
30 beginning at roof height up to a minimum of twelve inches (12") above finished roof  
31 surface, or as detailed, to provide substrate for horizontal termination of roof to wall  
32 flashing system.  
33

34 3.03 NAILERS  
35

- 36 A. Wooden nailers shall be installed at gravel stops, drip edges, and expansion joints on  
37 outside perimeter of building according to NRCA, Underwriters Laboratory and IBC  
38 guidelines.  
39  
40 B. All Construction: Nailers shall be the same height as the new SPF insulation being  
41 installed where required. Nailers shall be raised if necessary, by anchoring an additional  
42 nailer of appropriate height to the existing nailer if the existing nailer is not to be replaced.  
43 Nailers shall be anchored to resist a pull-out force of one hundred seventy-five pounds  
44 (175#) per foot. Fasteners shall be no less than two (2) per nailer and be spaced at three  
45 feet (3') on center maximum.  
46  
47 C. Expansion joint nailers shall extend upward a minimum of eight inches (8") above finish  
48 roof height.  
49

3.04 STRUCTURAL WOOD CANTS

- A. Toe of cant shall be level with the surface to receive new roof membrane and in all cases anchored according to NRCA, Underwriters Laboratory, and IBC guidelines.
- B. Provide full 45-degree cant strips (no partials) at all intersections of vertical and horizontal surfaces, such as walls, parapet walls, curbs, expansion joints, etc., and as recommended by membrane manufacturer.
- C. Cants shall provide a four inch (4") rise above the roof's surface and extend a minimum of four inches (4") horizontally.
- D. Toe of cant shall be level with the surface to receive new roof membrane and in all cases anchored according to NRCA, Underwriters Laboratory, and IBC guidelines.
- E. Cant strips shall be installed at the intersection of the deck and all vertical surfaces.
- F. If a wood cant is used where insulation exists, cant shall be toe nailed into treated wood nailer under cant the same height as insulation.

3.05 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

- A. Install wood grounds, nailers, blocking, and sleepers where required for screeding or attaching other work. Form to shapes shown and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.
- C. Install permanent grounds of dressed, preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.06 WOOD FRAMING, GENERAL

- A. Framing Standard: Comply with AFPA's "Manual for Wood Frame Construction," unless otherwise indicated.
- B. Install framing members of size and at spacing indicated.
- C. Do not splice structural members between supports.
- D. Firestop concealed spaces of wood-framed walls and partitions at each floor level and at ceiling line of top story. Where firestopping is not inherent in framing system used, provide closely fitted wood blocks of 2-inch nominal- thickness lumber of same width as framing members.

**END OF SECTION 06 10 53**

**SECTION 07 22 16**  
**ROOF BOARD INSULATION**

**PART 1 – GENERAL**

**1.01 REFERENCES (INCLUDING LATEST REVISIONS)**

- A. Comply with governing local, state, and federal regulations, safety standards, and codes.
- B. Testing Laboratory Services: Test results shall meet or exceed established standards.
- C. Underwriters Laboratories, Inc. (Roofing Covering): Class A fire hazard classification.
- D. American Society of Testing Materials (ASTM)
  - 1. C 177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
  - 2. C 209 Methods of Testing Insulating Board (Cellulosic Fiber), Structural and Decorative
  - 3. C 728 Perlite Thermal Insulation Board
  - 4. D 41 Asphalt Primer Used in Roofing and Waterproofing
  - 5. D 312 Asphalt Used in Roofing
  - 6. D 1621 Test Method for Compressive Properties of Rigid Cellular Plastics
  - 7. D 4601 Asphalt Coated Glass Fiber Base Sheet Used in Roofing
- E. The National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual
- F. American National Standards Institute/Single Ply Roofing Industry (ANSI/SPRI)
- G. American Society of Civil Engineers - ASCE 7-16 Minimum Design Loads for Buildings and Other Structures (for wind uplift criteria)

**1.02 QUALITY ASSURANCE**

- A. Regulatory Requirements
  - 1. Classified by Underwriter's Laboratories (UL) as Class A roof covering.
  - 2. Follow local, state, and federal regulations, safety standards, and codes.
- B. Installation
  - 1. Installation shall be in accordance with manufacturer's current published application procedures, NRCA general recommendations, and ASCE 7-16 wind uplift criteria.
  - 2. Roof system manufacturer's technical specifications shall be considered part of this specification and shall be used as reference for specific application procedures.
- C. Contract Documents
  - 1. In the case of an inconsistency between the drawings and specifications or within either document not clarified by addendum, the better quality or greater quantity of work shall be provided in accordance with the Project Manager's/Architect's interpretation.

1.03 SUBMITTALS

- A. Product Data: Submit Manufacturer's product data sheets for each product.
- B. Shop Drawings: Layout of roof plan showing tapered design, tapered insulation pattern, direction of slope, amount of slope, spot elevations indicating thicknesses at high and low points.
- C. Certification: Submit roof manufacturer's certification in writing that insulation is acceptable as substrate for application of specified roof system.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Store materials in accordance with manufacturer's recommendations.
- B. When stored outdoors:
  - 1. Tarp and shield insulation from moisture and ultraviolet rays.
  - 2. Elevate insulation above substrate four inches minimum.
  - 3. Secure insulation to resist high winds.
  - 4. Distribute insulation stored on roof deck to prevent concentrated loads that would impose excessive stress or stain on deck or structural members. Verify that structure can accommodate additional loading.
  - 5. Wet insulation, or insulation that has been wet but which has dried, may not be used and shall be removed completely and immediately from the job site.
  - 6. Do not double stack bundles of insulation on the roof top.

1.05 SEQUENCING AND SCHEDULING

- A. Substrate Acceptance: Roof system manufacturer's representative shall inspect roof deck and associated substrates and provide written acceptance of conditions.
- B. Manufacturer's approved roofing contractor shall inspect and approve deck and substrates.
- C. Plan roof layout with respect to roof deck slope to prevent rainwater drainage into completed roofing.
- D. Do not install more insulation than can be covered with complete roof system in same day.

1.06 PRODUCT CONDITIONS

- A. Environmental Requirements:
  - 1. Apply roofing and insulation in dry weather.
  - 2. Do not proceed with roof construction during inclement weather or when precipitation is predicted 40% or more possibility.
  - 3. Do not apply insulation over wet or moist deck or in foggy conditions.
  - 4. Days with wind speeds of 30 mph or greater shall be considered "Bad Weather" days.
- B. Emergency Equipment: Maintain on-site equipment and material necessary to apply emergency temporary seals in the event of sudden storms or inclement weather.

- C. Costs for emergency roofing shall be borne by Contractor.

## PART 2 – PRODUCTS

### 2.02 INSULATION – FLAT STOCK

- A. All insulation shall be approved in writing by the membrane manufacturer as to thickness, type, and manufacturer. All insulation must be approved for the specific application, Underwriters Laboratory approved.
- B. Polyisocyanurate Roof Insulation: Insulation shall be two layers of rigid polyisocyanurate foam board; meeting Federal Specification No. HH-I-1972/1 or 2 with 20 psi minimum compressive strength and 2.0 pcf minimum density. First layer shall be a minimum thickness of 2.2-inches. R-value over each roof area shall meet or exceed R-25. Board shall be surfaced on two (2) sides with non-asphaltic facer material.

### 2.03 INSULATION – TAPERED

- A. Factory Tapered Polyisocyanurate Crickets: Factory cut twenty-four inch by forty-eight inch (24" x 48") polyisocyanurate board cut to one-half inch (1/2") per foot slope used in conjunction with standard thickness of polyisocyanurate board to provide positive slope.
1. Tapered Crickets can be applied with sprayed polyurethane foam to direct slope to roof drains.
- B. Factory Tapered Polyisocyanurate Edge: Factory cut polyisocyanurate board, tapered one and one-half inches (1-1/2") to zero inch, twenty-four inches (24") wide.

### 2.05 COVER BOARD

- A. Shall be non-structural glass mat faced, non-combustible, moisture resistant, silicone treated gypsum core panel, manufactured to conform to ASTM C1177. Thickness shall be 1/2" with a nominal board size of 4' x 4', DensDeck Prime® as manufactured by Georgia Pacific, Dekcell or approved equal. Manufacturer's assembly letter to dictate required size.

| <u>Test</u>              | <u>Typical Value</u>               | <u>Test Method</u> |
|--------------------------|------------------------------------|--------------------|
| Fire Resistance          | Class A                            | UL 790             |
| Permeance                | ≤ 30                               | ASTM C473          |
| Surface water absorption | ≤ 1.6 nominal grams                | ASTM C473          |
| Water resistance         | Maximum 10% weight percentage gain |                    |
| Mold Resistance          | Minimum rating of "10"             | ASTM D3273         |

### 2.06 ASPHALT ROOF PRIMER- if required

- A. Quick-dry asphalt-based primer for priming of asphalt roof surfaces, as manufactured by or approved by the manufacturer issuing the warranty.

|                                  |              |
|----------------------------------|--------------|
| Applicable Federal Specification | SS-A-701B    |
| ASTM                             | D 41         |
| Flash Point                      | 105° F       |
| Viscosity at 80° F (ASTM D 217)  | 50-60 K.U.   |
| Weight per gallon                | 7.4 pounds   |
| Drying time (to touch)           | Min. 4 hours |

2.07 COLD INSULATION ADHESIVE

- A. Shall be a single component, moisture-cured polyurethane adhesive, free of conventional solvents; Insta-Stik® as manufactured by The Dow Chemical Company or approved equal.

2.08 COLD INSULATION ADHESIVE

- A. Shall be a dual component, reaction cure polyurethane adhesive, meeting the following physical properties, OlyBond 500™, as manufactured by OMG, or approved equal.

|                                   |                  |                        |
|-----------------------------------|------------------|------------------------|
| Density                           | ASTM D-1622      | 3.2 lb/cf              |
| Compressive Strength              | ASTM D-1621      | 38 psi @ 6% deflection |
| Tensile Strength                  | ASTM D 1623      | 35 psi                 |
| Water Absorption                  | ASTM D 2842      | 5.1%                   |
| Closed Cell Content               | ASTM D 6226      | 90% min.               |
| R-Value                           | ASTM C 518       | 3.8/inch               |
| Weight/Gallon (Liquid Components) | Part 1 Component | 10.32 lbs.             |
|                                   | Part 2 Component | 8.54 lbs.              |

2.09 FASTENERS

- A. Fasteners and fastening plates and/or termination bars shall be FM Approved and shall be listed in the FM Global Approval Guide, and as recommended by the insulation/fastener manufacturer for the specific application to meet the minimal requirements for wind uplift as required by the local jurisdiction.
- B. Heavy Duty Fastener for Steel Applications for 18-22 gauge Steel and Wood Substrates: Shall be a #14 fastener with a minimum .190 diameter shank and a thread diameter of .245 with ten (10) threads per inch and a 30 degree spade point. Fasteners shall be fluorocarbon coated with CR-10 corrosion resistant coating when subjected to 30 Kesternich cycles (DIN 50018) shows less than 15% red rust which surpasses FM Global Approval Standard 4470, as manufactured by OMG Roofing Products, or approved equal. All fasteners shall be used in conjunction with the manufacturers approved round pressure plate. Fasteners and plates shall be approved by the manufacturer issuing the warranty and providing wind uplift documentation.
- C. Base Sheet Fastener for Tectum / Cementitious Cane Fiber Substrates: Shall be a precision formed from galvalume (AZ-55) coated steel with a 1.7" dual shank with fine angular point, to be used with 2.7" diameter rib reinforced disk as manufactured by ESProducts, or approved equal.

- D. Base Sheet Fastener for Gypsum / Tectum / Cementitious Cane Fiber Substrates: Shall be two (2") inch head, NTB, glass-filled nylon auger fastener with a major thread diameter of .750 built-in one two (2") inch head and locking wire barbs as manufactured by OMG Roofing Products, or approved equal. Minimum fastener embedment into the deck should be one and one-half inches (1-1/2") although two inches (2") is recommended. Fasteners and plates shall be approved by the manufacturer issuing the warranty and providing wind uplift documentation.

### PART 3 – EXECUTION

#### 3.01 PROTECTION OF ROOFING

- A. Provide special protection from traffic on yet to be removed roofing.
- B. Provide special protection from traffic on completed work.

#### 3.02 EXAMINATION AND PREPARATION

- A. Do not install until defects are corrected and deck substrate meets roof system manufacturer's requirements.
- B. Do not apply insulation unless asphalt application temperature, EVT of approximately 375° F to 425° F, can be maintained or when water or moisture is present on substrate. Do not heat asphalt above flashing point, or 525° F. Examine substrate and related surfaces, and verify that there are no conditions such as inadequate anchorage, foreign materials, moisture, ridges, depressions, or other conditions which would prevent satisfactory installation of roof system.
- C. Start of work constitutes acceptance of deck substrate and site conditions.
- D. Sweep deck substrate clean of dust and debris immediately prior to installation of tapered insulation system at all levels of application.
- E. ANY and ALL debris must be removed prior to membrane application. Failure to do so will result in membrane removal and reinstall.

#### 3.04 APPLICATION OF INSULATION – GENERAL INSTRUCTIONS

- A. Manufacturer's Instructions: In regard to attachment, the manufacturer's instructions or specifications shall determine the suitability for an application. Installation must meet ASCE 7-16 criteria and meet local governing building codes.
- B. Precautions: The surface of the insulation must not be ruptured due to overdriving of fasteners.
- C. Thermal insulation boards shall be laid on the substrate in parallel rows with end joints staggered and butted as close as possible. All joints shall be tight and at the roof perimeter and roof penetrations, insulation shall be cut neatly and fitted to reduce openings to a minimum. All openings one-fourth inch (1/4") or larger shall be filled with insulation.

- D. Insulation shall be tapered or feathered at drains and scuppers to provide proper drainage (if applicable).
- E. No more insulation shall be installed than can be covered by the completed roof system by the end of the day or the onset of inclement weather.
- F. Tapered insulation and crickets, when specified, shall be placed in accordance with the drawings and/or as required to minimum of NRCA standards.

3.05 CEMENTITIOUS WOOD FIBER DECKS

- 1. Damaged planks caused by membrane removal, moisture or deflection shall be replaced with planks similar in type and size in strict accordance with the deck manufacturer's recommendations.
- 2. All planks must be securely anchored to the supporting members in strict accordance with the deck manufacturer's recommendations.
- 3. Dry rosin-sized sheathing paper shall be tacked into place over the deck to prevent asphalt from dripping into the building.
- 4. It is required that insulation board be mechanically fastened to the deck with suitable fasteners as recommended by the manufacturer of the insulation. The insulation board is used to isolate the deck from the membrane.

3.06 CATEGORY II (NON-FRIABLE) ASBESTOS CONTAINING MATERIALS (ACM) REMOVAL

- A. Owner and Contractor agree to exonerate, indemnify, defend, and hold harmless the roofing material manufacturer from and against all claims, demands, lawsuits, damages, expenses and losses incurred by Contractor's removal of asbestos-containing materials from Owner's building and work site. Contractor must conduct its operations according to applicable requirements including but not limited to those established by:
  - 1. Occupation Safety and Health Administration (OSHA).
  - 2. Environmental Protection Agency (EPA).
  - 3. Department of Transportation (DOT).
  - 4. State or Local Air Pollution Control Authorities/Agencies.
  - 5. State or Local Solid Waste or Hazardous Waste Authorities/Agencies.
  - 6. State or Local Health Department(s).
  - 7. State or Local Building Code Authorities.
  - 8. Other federal, state or local agencies or authorities.
- B. Contractor or Owner shall perform appropriate inspections, surveys and file timely notifications to proper authorities prior to starting roof renovation or demolition activities. Inspectors, project planners, project managers, contractors and workers involved in the roof project shall have appropriate training, licenses and registrations. Contractor and Owner shall be responsible for determining and implementing regulatory compliance activities, including but not limited to work practices, engineering controls, personal protection, air monitoring, testing, hazard communication, material handling, record retention, and arranging for waste disposal/handling.
- C. Contractor must file a Uniform Hazardous Waste Manifest from proper landfill site for each load of asbestos containing material removed. Copies must be sent to Owner and material manufacturer/specifier. Transportation of waste shall be in accordance with

applicable Department of Transportation (DOT) requirements.

3.07 ROUGH CARPENTRY

- A. Refer to specification Section 06 10 53 Miscellaneous Carpentry For further information.
- B. Nailers shall be installed according to NRCA, Underwriters Laboratory, and IBC guidelines.

3.08 CANTS

- A. Provide full 45 degree cant strips (no partials) at all intersections of vertical and horizontal surfaces, such as walls, parapet walls, curbs, expansion joints, etc., and as recommended by membrane manufacturer.
- B. Cants shall provide a four (4) inch rise above the roof's surface.
- C. Toe of cant shall be level with the surface to receive new roof membrane and in all cases anchored according to NRCA, Underwriters Laboratory, and IBC guidelines.
- D. Cant strips shall be installed at the intersection of the deck and all vertical surfaces.
- E. If a wood cant is used where insulation exists, cant shall be toe nailed into treated wood nailer under cant the same height as insulation.

3.09 MECHANICALLY FASTENED BASE SHEET OVER SUBSTRATE

- A. Substrate shall be covered with specified base sheet mechanically fastened as follows:
  - 1. Securement shall conform to the ASCE 7 criteria for wind uplift as dictated by wind zone applicable to location of project. Fasteners and fastening patterns shall be determined by building height, location and geographical area of the United States. It is the contractor's responsibility to consult current codes, publications, literature, and bulletins of IBC and the fastener manufacturer that are in effect at the time of this project.
- B. If slope dictates, underlayment plies shall be installed using the strapped method going with the slope as required by membrane manufacturer.

3.10 ADJUSTING

- A. Remove insulation which has been damaged (broken, cracked, punctured, wet, etc.) and install acceptable new units before installation of roof system.

3.11 CLEANING

- A. Remove debris and material wrappers from jobsite. Leave insulation clean and dry, ready to receive roofing membrane.

**END OF SECTION 07 22 16**

**SECTION 07 31 15**  
**DIMENSIONAL SHINGLE ROOF SYSTEM**

**PART 1 GENERAL**

**1.01 AREAS COVERED**

- A. Refer to roof plans for areas to be included in the scope of work.

**1.02 DEFINITIONS**

|        |                                                                   |
|--------|-------------------------------------------------------------------|
| ACM    | Asbestos Containing Materials                                     |
| ANSI   | American National Standards Institute                             |
| ASCE   | American Society of Civil Engineers                               |
| ASTM   | American Society for Testing and Materials                        |
| EPA    | Environmental Protection Agency                                   |
| EPDM   | Ethylene Propylene Diene Monomer                                  |
| EPS    | Expanded Polystyrene                                              |
| EVT    | Equiviscous Temperatures                                          |
| FM     | Factory Mutual                                                    |
| IBC    | International Building Code                                       |
| KEE    | Ketone Ethylene Ester                                             |
| NDL    | No Dollar Limit                                                   |
| NESHAP | National Emissions Standards for Hazardous Air Pollutants         |
| NRCA   | National Roofing Contractors Association                          |
| OSHA   | Occupational Safety & Health Administration                       |
| SBS    | Styrene-Butadiene-Styrene                                         |
| SDI    | Steel Deck Institute                                              |
| SMACNA | Sheet Metal and Air Conditioning Contractors National Association |
| SPRI   | Single Ply Roofing Industry                                       |
| UL     | Underwriters Laboratories, Inc.                                   |

Refer to Specification Section 01 42 13 for Abbreviations and Symbols for further reference

**1.03 REFERENCES (INCLUDING LATEST REVISIONS)**

- A. Comply with governing local, state, and federal regulations, safety standards, and codes.
- B. Testing Laboratory Services: Test results shall meet or exceed established standards.
- C. Underwriters Laboratories, Inc. (Roofing Covering): Class A fire hazard classification.
- D. American Society for Testing and Materials (ASTM)
- E. The National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual
- F. Sheet Metal and Air Conditioning Contractors National Association (SMACNA) - Architectural Sheet Metal Manual

G. American Society of Civil Engineers – ASCE 7-16

1.04 INSTALLER QUALIFICATIONS

A. Roofing installer must be:

1. Currently prequalified with the Owner in accordance with Owner's prequalification requirements.
2. Currently in good standing with the manufacturer.
3. Installer must be an experienced single firm specializing in the type of roofing repair and/or removal and replacement work required, employing only experienced workers for the class of work in which they are employed, having at least five (5) years successful experience on projects similar in size and scope and acceptable as applicators by the Architect.
4. Contractor must have successfully completed previous projects warranted by the manufacturer.

B. It shall remain each Bidder's responsibility to determine his current status with the manufacturer's certification plan.

1.05 MANUFACTURER QUALIFICATIONS

A. A qualified manufacturer is one that is UL listed and has FM approvals for a membrane roofing system similar to that used for this project for a minimum of fifteen (15) years.

1.06 CONTRACT DOCUMENT QUALITY ASSURANCE

A. In the case of an inconsistency between the drawings and specifications or within either document not clarified by addendum, the better quality or greater quantity of work shall be provided in accordance with the Architect's interpretation.

1.07 SUBMITTALS

A. Refer to Specification Section 01 33 00 for Submittal requirements

B. Shop Drawings: Provide manufacturer's approved details of all perimeter conditions, projection conditions, and any additional special job conditions which require details other than indicated in the drawings.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened containers and rolls with all labels intact and legible including labels indicating appropriate warnings, storage conditions, lot numbers, and usage instructions. Materials damaged in shipping or storage shall not be used.

B. Manufacturer's packaging and/or roll plastic is not acceptable for exterior storage. Tarpaulin with grommets shall be minimum acceptable for exterior coverings. All materials stored as above shall be a minimum of four inches (4") off the substrate, and the tarpaulin tied off with rope.

- C. Deliver materials requiring fire resistance classification to the job with labels attached and packaged as required by labeling service.
- D. Deliver materials in sufficient quantity to allow continuity of work.
- E. Handle and store material and equipment in such a manner as to avoid damage. Liquid products shall be delivered sealed, in original containers.
- F. Handle rolled goods so as to prevent damage to edge or ends.
- G. Select and operate material handling equipment so as not to damage existing construction or applied roofing.
- H. Moisture-sensitive products shall be maintained in dry storage areas and properly covered. Provide continuous protection of materials against wetting and moisture absorption. Store roofing and flashing materials on clean raised platforms with weather protective covering when stored outdoors.
- I. Store rolled goods on end.
- J. Protect materials against damage by construction traffic.
- K. The proper storage of materials is the sole responsibility of the contractor and any wet or damaged roofing materials shall be discarded, removed from the project site, and replaced prior to application.
- L. Comply with fire and safety regulations, especially with materials which are extremely flammable and/or toxic. Use safety precautions indicated on labels.
- M. Products liable, such as emulsions, to degrade as a result of being frozen shall be maintained above 40° F in heated storage.
- N. No storage of materials shall be permitted on roof areas other than those materials that are to be installed the same day. Any exception must be in written form.
- O. The contractor is to erect a temporary chain link fence, minimum six feet (6') in height, around work area stage. Fence is to be secured on a daily basis.

#### 1.10 SITE CONDITIONS

- A. Job Condition Requirements:
  - 1. Coordinate the work of the contractor with the work to be performed by other trades, to ensure proper sequencing of the entire work. The contractor is to schedule his work so that adequate time is allowed for other trades to perform their work.
  - 2. Apply roofing in dry weather.
  - 3. Do not apply roofing when ambient temperature is below 45° F.
  - 4. Proceed with roofing work only when weather conditions are in compliance with manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with specifications.

5. Schedule the work so the building will be left watertight at the end of each day. Do not remove more roofing materials than can be reinstalled in any working day.
6. Load placed on the roof at any point shall not exceed the safe load for which the roof is designed.
7. All surfaces to receive new roofing shall be smooth, dry, and free from dirt, debris, and foreign material before any of this work is installed. Competent operators shall be in attendance at all times equipment is in use. Materials shall be stored neatly in areas designated by the Architect.
8. The contractor is to be aware of the potential for roof leaks on the existing roof as a result of ruptured blisters and/or roof mat damage caused by the vacuum process, foot traffic, or material and equipment storage. The contractor is to take all necessary precautions to prevent damage to the existing roof. All damage to the existing roof that could result in roof leaks is to be repaired on a daily basis by the roofing contractor.
9. The contractor shall follow local, state, and federal regulations, safety standards, and codes for the removal, handling, and disposal of asbestos containing materials, if present. When a conflict exists, follow the stricter document.
10. Due caution should be exercised so as not to alter the structural integrity of the deck. When cutting through any deck, care should be taken so as not to damage the deck or any part of the deck, such as post tension cables, etc.
11. All kettles shall have a fume recovery system, automatic thermostat control, and visible temperature gauge all in working order.
12. The contractor is to verify the location of all interior ducts, electrical lines, piping, conduit, and/or similar obstructions. The contractor is to perform all work in such a manner as to avoid contact with the above-mentioned items.
13. Surface and air temperatures should be a minimum 40° F during applications of cleaner and waterproof coating and remain above 40° F for a minimum of four (4) hours following applications. Verify compatibility of cleaner with coatings, paints, primers and joint sealers specified. Advise Architect of any problems in this regard prior to commencing cleaning operations.
14. Temporary Sanitary Facilities:
  - a. The contractor shall furnish and maintain temporary sanitary facilities for employees use during this project, including temporary toilets, wash facilities, and drinking water fixtures.
  - b. Toilet units shall be self-contained, single-occupant, of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material.
  - c. Facilities shall be installed where they will best service the project's needs, with Owner's/Owner's Representative's approval.
  - d. Contractor shall provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material.
  - e. All portable facilities shall comply with local laws, codes, and regulations.
  - f. Contractor shall be responsible to see that the units are removed in a timely manner after the completion of the project.

B. Protection of Work and Property:

1. Work: The contractor shall maintain adequate protection of all his work from damage and shall protect the Owner's and adjacent property from injury or loss arising from this contract. Contractor shall provide and maintain at all times any OSHA required danger signs, guards, and/or obstructions necessary to protect the public and his workmen from any dangers inherent with or created by the work in progress. All federal, state, and city rules and requirements pertaining to safety and all EPA standards, OSHA standards, NESHAP regulations pertaining to asbestos as required shall be fulfilled by the contractor as part of his proposal.
2. Property: Protect existing planting and landscaping as necessary or required to provide and maintain clearance and access to the work of this contract. Examples of two categories or degrees of protection are generally as follows: a) removal, protection, preservation, or replacement and replanting of plant materials; b) protection of plant materials in place, and replacement of any damage resulting from the contractor's operations.
3. Finished roof areas shall be protected from damage by the contractor during construction.
4. Twenty-four Hour Call: The contractor shall have personnel on call 24 hours per day, seven (7) days per week for emergencies during the course of a job. The Owner and Architect is to have the 24-hour numbers for the contact. Contractor must be able to respond to any emergency call and have personnel on-site within two (2) hours after contact. Numbers available to the Owner and Architect are to be mobile, home and office numbers for:
  - a) Job Foreman
  - b) Job Superintendent
  - c) Owner or Company Officer

C. Damage to Work of Others: The contractor shall repair, refinish, and make good any damage to the building or landscaping resulting from any of his operation. This shall include, but is not limited to, any damage to plaster, tile work, wall covering, paint, ceilings, floors, or any other finished work. Damage done to the building, equipment, or grounds must be repaired at the successful contractor's expense holding the Owner harmless from any other claims for property damage and/or personal injury.

D. Measurements: It will be the contractor's responsibility to obtain and/or verify any necessary dimensions by visiting the job site, and the contractor shall be responsible for the correctness of same. Any drawings supplied are for reference only.

E. Use of Premises:

1. The contractor is advised that the Owner will occupy the building at all times, and the contractor must provide all safeguards required to protect personnel and to keep noise levels as low as reasonably possible for each operation.
2. The contractor shall:
  - a) Coordinate work in such a manner as to not interfere with the normal operation of the building.

- b) Assume full responsibility for protection and safekeeping of products stored on premises.
- c) Agree to hold the Owner harmless in any and all liability of every nature and description which may be suffered through bodily injuries, including death of any persons by reason of negligence of the contractor, agents, employees, or subcontractors.

F. Cleaning and Disposal of Materials:

1. Contractor shall keep the job clean and free from all loose materials and foreign matter. Contractor shall take necessary precautions to keep outside walls clean and shall allow no roofing materials to remain on the outside walls.
2. All waste materials, rubbish, etc., shall be removed from the Owner's premises as accumulated. Rubbish shall be carefully handled to reduce the spread of dust. A suitable scrap chute or hoist must be used to lower any debris. At completion, all work areas shall be left broom clean and all contractor's equipment and materials removed from the site.
3. All bituminous or roofing related materials shall be removed from ladders, stairs, railings, and similar parts of the building.
4. Debris shall be deposited at an approved disposal site.

1.11 SEQUENCING AND SCHEDULING

- A. Coordinate roofing schedule with work of other trades.
- B. Plan lay up of roofing membrane with respect to deck slope. Avoid situations where excessive drainage could pass into completed roofing.
- C. Maintain communication with roofing manufacturer's representative to inform of progress and to schedule periodic inspections.
- D. All penetrations shall be made in roof prior to beginning with roof installation.

1.12 PERFORMANCE REQUIREMENTS

- A. Roofing System: Shall prevent water migration into roof assembly or building interior through the roof membrane and/or membrane base flashing.

1.13 QUALITY ASSURANCE

- A. Work of this Section to conform to these specifications, and to the roofing material manufacturer's application instructions. In the event of conflicts between the two, the more stringent requirement shall be observed.
- B. Maintain one copy of each document on site.

C. Factory Technical Representative: Roofing Contractor is to arrange and schedule the manufacturer's technical representative to be on site the first day of the installation of manufacturer's roofing system. The manufacturer's technical representative shall inspect the work of the contractor at least one time each week during the installation of the roofing system. The manufacturer's technical representative shall perform with the owner's representative and the roofing contractor a final inspection of the roofing system. At the completion of the final inspection, provide to the roofing contractor a list of punch list items (if any) to be correct before technical acceptance of the roofing project and prior to issuance of manufacturer's Twenty (20) Year Full System Warranty. Field reports shall be provided after each inspection within five (5) days of site visit.

D. Pullout Tests: Conduct pullout test on deck using appropriate fastener prior to roof system installation. Submit pullout results for manufacturer's review to determine specific fastening pattern for this project, minimum uplift requirements shall conform to current ASCE 7-16 criteria.

#### 1.14 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacture of the products specified, with five (5) years documented experience in the uninterrupted, and unmodified manufacture of the roofing system and component elements of the roofing system specified herein.

B. Applicator: Company specializing in the work of this Section, having a minimum of five (5) years documented experience applying modified bitumen roofing systems, and approved by the Manufacturer for not less than three (3) years to install the specified roof system so as to achieve a twenty (20) year no dollar limit warranty.

#### 1.15 REGULATORY REQUIREMENTS

A. Conform to all applicable local codes for roof assembly fire hazard requirements.

B. Provide certification of inspection confirming approval of design and installation by authority having jurisdiction.

C. Fire Hazard Classifications: UL Class A.

#### 1.16 PRE-INSTALLATION CONFERENCE

A. Convene a preinstallation conference two weeks prior to commencing the Work.

B. Require attendance of parties directly affecting the Work of this Section.

C. Review condition of roof deck and installation, installation procedures and coordination with related work.

#### 1.17 ENVIRONMENT REQUIREMENTS

A. Do not apply roofing during inclement weather.

B. Do not apply roofing membrane to damp or frozen deck or substrate.

1.18 WARRANTY

- B. Roofing - Manufacturer: Project shall be installed in such a manner that the roofing material manufacturer will furnish a written forty (40) year written Limited Material Warranty printed by manufacturer agreeing to refund or replace, on a prorated basis, asphalt shingles that fail in materials or manufacturing workmanship within the specified warranty period. A non-prorated IronClad Protection Coverage to repair or replace defective shingles due to manufacturing defects for the first seven (7) years, exclusive of tear-off costs or sheet metal removal will be included in the warranty coverage.
- B. Submit a fifteen (15) year written Limited Wind Resistance Warranty printed by manufacturer agreeing to replace asphalt shingles that fail due to wind blow-offs for winds up to a maximum of (160) miles per hour installing six (6) nails per shingle and hand-sealed.
- C. Submit a ten (10) year, 120-month written Pro-rated Limited Algae Resistance Warranty printed by manufacturer agreeing to replace or clean asphalt shingles manufactured with Algae Resistant (AR) treatment.
- D. Roofing - Contractor: The contractor, jointly with any subcontractors employed by him, shall guarantee the work required and performed under this contract will be free from defects in workmanship and materials, and that the building will be and remain waterproof for a five (5) year warranty period, after the Owner accepts the work as substantially complete. The warranty shall be in approved notarized written form, to obligate the contractor and his subcontractors, if any, to make good the requirements of the warranty.
- E. Warranty repairs shall be performed by a certified installer. The repairs shall be performed in accordance with the manufacturer's written instructions and recommended procedures so as to not void the warranty (if applicable). Repair of the system, including materials and labor, shall be done at no cost to the Owner.
- F. Manufacturer's warranty shall cover above deck roofing components against wind uplift resulting from wind pressures based on the requirements of ASCE 7-16.

**PART 2 – PRODUCTS**

2.01 GENERAL

- A. All materials shall be furnished and as specified by the manufacturer and shall be the color as determined by the Owner.
- B. Approved manufacturers for this project are:
  - a. Tamko Titan XT
  - b. Certainteed
  - c. Other manufacturers able to commit to warranty requirements

2.02 MATERIALS

- A. Asphalt Shingles:
  - 1. Dimensional heavy weight laminated asphalt shingles.
  - 2. Fiberglass base, mineral surfaced granular type, two-ply laminated.

3. Exposure: Five inches (5").
  4. Exceeds 270 pounds per one hundred (100) square feet (approximately).
  5. Size: Thirteen and three-eighths inches (13-3/8") by forty inches (40") (approximately).
  6. Algae Resistance inhibitor: AR Copper Granules.
  7. Color: As selected by Owner/Architect from manufacturer's full range of colors.
  8. Product meets requirements of ASTM D3018, D3161 & D3462.
  9. Product meets criteria for Class A Fire Resistance Rating as per UL 790 (ASTM E108).
  10. Product has Class 4 Hail Resistance Rating as per UL 2218.
  11. Wind Classification to UL 997, minimum wind resistance rating to a **160 mph** wind.
  12. Coverage: 25 square feet per bundle (four bundles per roofing square).
- B. Hip and Ridge Shingle:
1. Modified Hip & Ridge Shingles.
  2. Ridges, eaves, and rakes shall be vented.
  3. Fiberglass base, mineral surfaced granular type.
  4. Conforms to ASTM D 3018, D 3161 & D 3462
  5. Size: Fourteen and three-eighths inches (14-3/8") by thirty-nine and three-sixteenths inches (39-3/16")
  6. Exposure: Six and one-eighths inches (6-1/8")
  7. Algae Resistance Inhibitor- AR Copper Granules
  8. Color: As selected by Owner/Architect from manufacturer's full range of colors.
  9. Product meets criteria for Class A Fire Resistance Rating as per UL 790 (ASTM E108).
  10. Product has Class 4 Hail Resistance Rating as per UL 2218.
  11. Coverage: 30.6 linear feet of ridge per bundle.
- C. Synthetic Base underlayment is required on complete roof tear offs:
- a) Approved by manufacturer issuing the warranty
- D. Fasteners: Equal to a Do-All Loc-Nail, as manufactured by Loadmaster, or approved equal. Fasteners should be long enough to sink into and hold in a sound nailing base installed per shingle manufacturer recommendations.
- a. fastened at **6 nails** per shingle for "enhanced" and steep slope applications.
- E. Plastic Cement: Cutback asphaltic type with mineral fiber components, as recommended for sealing and coating flashings in buildings.
- F. Self-Adhesive Ice and Water Protector: Rubberized asphaltic sheet laminated to a polypropylene film meeting the requirements of ASTM D 1970, 40 mil minimum total thickness, thirty-six inch (36") width at all valley/eaves/rakes and ridges.
- a. Ice and Water or approved equal
- 2.03 FLASHING AND ACCESSORIES
- A. Sheet Metal Flashings: Shall be prefinished galvanized sheet steel, 24-gauge flat stock, prefinished with Kynar finish meeting ASTM A 446, forty-five and one-half inches to forty-eight inches width by one hundred twenty inches in length (45-1/2" - 48" x 120") for

use as new metal edge drip edge, cover plates, downspouts, gutters, coping and miscellaneous metal.

B. Provide sheet flashing for use in the following locations:

1. Drip edge.

C. Penetration Flashings: Sheet lead, 4 lb/sf minimum weight or rubber boot skirt, with appropriate pipe diameter for penetrations encountered.

D. Bituminous Paint: Metal back paint black color to ASTM.

E. Nails: Standard round wire roofing type of hot-dipped zinc-coated steel; minimum nineteen/sixty-four-inch (19/64") head diameter and 0.104 inch shank diameter; of sufficient length to penetrate through roof sheathing.

F. Sealants: One component, chemical curing elastomer, conforming to Federal Spec TT-S-00230C and ASTM C 920. Color to match sheet metal counter flashings as closely as possible. Cleaners and primers shall be as recommended by the sealant manufacturer.

### PART 3 – EXECUTION

#### 3.01 EXAMINATION

A. Verify deck surfaces are dry, free of ridges, warps, or voids.

B. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surface.

C. Verify that roof openings are correctly framed.

#### 3.02 PREPARATION

A. Roof deck must be firm, smooth, dry and securely nailed.

B. At Decks:

1. Remove existing roof down to top layer of nailbase.

2. Clear deck free to debris.

3. Verify fastening pattern of existing nailbase to meet the current uplift code.

#### 3.03 INSTALLATION – GENERAL

A. Install asphalt shingle roofing in accordance with manufacturer's instructions over dry surfaces, free of ridges, warps, and voids.

B. Coordinate installation of roof mounted components or work projecting through roof. Verify roof openings are appropriately framed, sized, and located prior to installing work of this Section.

C. Completed installation to provide weathertight surface.

- D. Completely cover deck with two plies of asphalt impregnated underlayment. Succeeding courses should overlap existing courses a minimum of eighteen inches (18"). Continue laying underlayment parallel to eaves. Begin by fastening a full thirty-six inch (36") wide sheet along eaves. Make end laps minimum four inches (4") and space end laps in succeeding courses a minimum six feet (6') apart. Lap asphalt shingle underlayment six inches (6") from both sides over hip and ridges, unless ridge vents are required. Secure felt with only enough nails to hold in place.

#### 3.04 FLASHING FABRICATION

- A. Form flashings to profiles indicated on Drawings and to protect roof assembly and shed water. Form sections square, true, and accurate to profile, in maximum possible lengths, free from distortion and other defects detrimental to appearance or performance.
- B. Hem exposed edges of flashings minimum one-fourth inch (1/4") on underside.
- C. Apply bituminous paint on concealed surfaces of flashings if required to prevent electrolysis.
- D. Caulk all leading horizontal edges of metal counter flashings with suitable sealant.

#### 3.05 SELF-ADHESIVE MEMBRANE

- A. For slopes 4/12 to 12/12: Starting from eave edge, lay thirty-six inch (36") wide strip of smooth coated roll roofing over the underlayment to produce a one (1) ply membrane. Weather lap plies minimum nineteen inches (19") and nail in place. Lap ends minimum two inches (2") and cement horizontal joint. Stagger end joints of each consecutive ply. Extend from the eave edge to a point at least twenty-four inches (24") beyond the inside wall and cement to underlayment.
- B. For slopes 2/12 to 4/12: Begin by fastening a nineteen inch (19") wide strip of asphalt shingle underlayment placed along eaves. Next, apply a full thirty-six inch (36") wide sheet, also along the eaves, completely overlapping starter roll. Place succeeding courses of thirty-six inch (36") wide sheets positioned to overlap preceding course by nineteen inches (19"). Make end laps twelve inches (12") wide minimum. Cement laps in underlayment courses from eaves to a point at least twenty-four inches (24") beyond interior wall line of building.
- C. Install self-adhesive membrane protector at ambient temperatures above 15° F. Membrane is to be installed at all, ridges, and rake conditions.
- D. Install using methods recommended by manufacturer in accordance with local building code.
1. On all roofs between 2/12 and 4/12 (low slopes), install eave protection membrane up the slope from eave edge over the whole roof area; lap ends six inches (6") and bond.
  2. On all roofs greater than 4/12 slope, install eave protection membrane up the slope from eave edge a full thirty-six inches (36") or to at least twenty-four inches (24") beyond the interior "warm wall"; lap ends six inches (6") and bond.

- 1  
2 D. Self-adhesive eave protection to be installed to substrate in manageable lengths,  
3 approximately six and one-half feet (6-1/2').  
4  
5 E. Remove a portion of the release paper, approximately eight inches (8") from the back of  
6 membrane prior to installation. Position membrane for installation and begin installation at  
7 the base of the wall. Apply sufficient hand pressure or use a roller to ensure adhesion to  
8 the substrate.  
9  
10 F. Remove the release paper pulling from behind and parallel to the membrane. Continue to  
11 apply sufficient pressure to ensure adequate adhesion to the substrate during removal of  
12 the release paper.  
13  
14 G. Install successive courses of membrane ensuring that all end laps are six inches (6"), and  
15 all side laps are two and one-fourth inches (2-1/4"). All end and side laps shall be sealed  
16 by applying hand pressure or using a roller.  
17  
18 H. Underlayment: Install two layers of asphalt impregnated underlayment over entire area  
19 not protected by eave or valley membrane; run sheets horizontally lapped so water sheds;  
20 nail in place.  
21 1. On roofs sloped at more than 4/12, lap horizontal edges at least two inches (2") and  
22 at least two inches (2") over eave protection membrane.  
23 2. Lap ends at least four inches (4") stagger end laps of each layer at least thirty-six  
24 inches (36").  
25 3. Lap underlayment over valley protection at least six inches (6").  
26  
27 I. Vent Pipes: Install a twenty-four inch (24") square piece of eave protection membrane  
28 lapping over roof deck underlayment; seal tightly to pipe.  
29 J. Vertical Walls: Install eave protection membrane extending at least six inches (6") up the  
30 wall and twelve inches (12") on to the roof surface lapping over roof deck underlayment.  
31  
32 K. Roof Curbs: Install eave protection membrane from under the built-in counter flashing and  
33 twelve inches (12") on to the roof surface lapping over roof deck underlayment.  
34  
35 L. Do not expose the membrane to ultraviolet radiation (sunlight) for more than 14 days.  
36  
37 M. At rake edges, install metal edge flashing over eave protection membrane and roof deck  
38 underlayment; set tight to rake boards; lap joints at least two inches (2") and seal with  
39 plastic cement; secure with nails.  
40

41 3.06 METAL DRIP EDGE  
42

- 43 A. Place metal drip edge tight with fascia boards at all rake and eave edges and extend three  
44 inches (3") back from roof edge bend downward over the fascia boards. Weather lap  
45 joints two inches (2"). Fasten in place with nails spaced eight to ten inches (8" -10") apart.  
46  
47 B. At eaves, place drip edge directly onto deck below underlayment. At rakes, place drip  
48 edge over underlayment.  
49

3.07 VALLEY PROTECTION INSTALLATION

- A. Woven: Comply with ARMA recommendations. Extend shingles on both slopes across valley in a weave pattern and fasten. Extend shingles a minimum of twelve inches (12") beyond valley centerline to achieve woven valley, concealing the valley protection.

3.08 FLASHING INSTALLATION

- A. Weather lap joints minimum twelve inches (12") in a weathertight manner. Secure in place with nails, spaced at manufacturer's recommended intervals. Conceal fastenings.
- B. Flash and seal work projecting through roofing with plastic cement. Provide weathertight installation.
- C. Install Step flashings against vertical side walls and around chimneys as outlined in the ARMA Laminated Shingles Application Guide.
- D. Lead Flashing: Install new lead flashing to soil pipes on roof, minimum eight inches (8") in height.

3.09 ASPHALT SHINGLE INSTALLATION

- A. STARTER COURSE: Install conventional strip shingles (3-tab or 3 in 1) as starter course at eaves. Project starter course of shingles minimum one-fourth inch to three-eighths inch (1/4"-3/8") beyond rake edge and eaves.
- B. Prepare starter course by cutting off the tabs of a line level with the tops of the cut outs.
- C. Begin starter course with a shingle cut four inches (4") short so that joints will not coincide with the joints in the first course of shingles. Install starter course across the eave of the roof.
- D. FIRST COURSE: Start with a complete shingle applied flush with starter course. Use four (4) nails per shingle placed in nail line (seven and three-fourths inches (7-3/4") below the top edge), one inch (1") in from each end and equally spaced along the full length of the shingle. Drive nails straight so head is flush with BUT not cutting into shingle surface. Nail shingles in place through double thickness area designated by nail line. SUFFICIENT CHALK LINES SHOULD BE STRUCK TO ENSURE ACCURATE VERTICAL AND HORIZONTAL ALIGNMENT OF SHINGLES.
- E. SECOND COURSE: Trim off ten inches (10") from the left end of the starting shingle and apply to overhang rake edge one-fourth inch to three-eighths inch (1/4"-3/8"). Align the bottom edge of the shingle with the tops of the sawtooth of the shingles in the preceding course (five inch (5") exposure) and continue across the roof.
- F. THIRD COURSE: Trim off twenty inches (20") from the left end of the starting shingle and apply to overhang rake edge one-fourth inch to three-eighths inch (1/4"-3/8"). Align the bottom edge of the shingle with the tops of the sawtooth of the shingles in the preceding course (five inch (5") exposure) and continue across the roof.

- 1 G. FOURTH COURSE: Trim off thirty inches (30") from the left end of the starting shingle  
2 and apply to overhang rake edge one-fourth inch to three-eighths inch (1/4" - 3/8"). Align  
3 the bottom edge of the shingle with the tops of the sawtooth of the shingles in the  
4 preceding course (five inch (5") exposure) and continue across the roof.  
5  
6 H. FIFTH AND SUCCEEDING COURSES: Start fifth course with a full shingle to overhang  
7 the rake edge one-fourth inch to three-eighths inch (1/4 - 3/8"). Align as noted above and  
8 continue across the roof. For succeeding courses, repeat the application method as noted  
9 in the preceding steps.

10  
11 3.10 HIP, RIDGE, AND RAKE SHINGLE INSTALLATION  
12

- 13 A. Cap hips and ridges with specified manufacturer's hip and ridge shingles, maintaining six  
14 and one-eighths inch (6-1/8") weather exposure. Install first shingle on ridge at the end of  
15 the roof away from the prevailing winds.  
16  
17 B. Cut hip and ridge shingles into thirds, using the perforated marks as a cutting guide.  
18  
19 C. Bend each shingle over the hip or ridge and nail six and five-eighths inches (6-5/8") above  
20 the butt edge, one inch (1") in from each edge, exposing each piece six and one-eighth  
21 inches (6-1/8") to the weather.  
22  
23 D. Note: To obtain a three-dimensional effect, apply hip and ridge shingles in a double  
24 thickness (approximately one-half inch (1/2") exposure) by stacking two (2) pieces on top  
25 of the other.  
26 E. The final shingle should be set in plastic cement.  
27 F. Prior to application in cold weather, storing the shingles in a heated area will allow for  
28 easier bending.  
29

30 3.11 TERMINATION OF NEW ROOF TO EXISTING  
31

- 32 A. Roofing will be required to be completed in one day including tear-off and installation of  
33 designed system  
34  
35

36 3.12 FIELD QUALITY CONTROL  
37

- 38 A. Owner reserves the right to have finished Work inspected using infrared thermography or  
39 other appropriate, non-destructive means to establish satisfactory conditions of completed  
40 Work.  
41  
42 B. Correct identified defects or irregularities. Cut out and repair membrane defects before  
43 end of each day.  
44

45 3.13 MANUFACTURER'S FIELD SERVICES  
46

- 47 A. Provide manufacturer's field services as required to qualify for specified warranty.  
48  
49 B. Roofing materials manufacturer's representative shall visit the site and observe the  
50 progress of the Work at a rate of not less than one time per week.

1. Site visits shall be followed up by a written report of findings which is to be transmitted to the Owner's Representative within five (5) days of the site visit.

#### 3.14 CLEANING

- A. Remove bituminous markings from finished surfaces.
- B. In areas where finished surfaces are marred, or soiled by Work of this Section, consult manufacturer of soiled surface for cleaning advice and conform to their written instructions.
- C. Repair or replace defaced or disfigured finishes caused by Work of this Section.

#### 3.15 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provision of application Section.
- B. Where traffic must continue over finished roof installation, protect surfaces with manufacturer approved material so as not to damage newly installed shingles.
- C. At all adjacent parapet and metal coping cap conditions, provide additional layer of self-adhered underlayment for temporary protection over all parapet and coping caps conditions once roofing has been completed and prior to installation of wood nailers and metal coping cap. Self-adhered underlayment is to cover cavity conditions from roof side of parapet framing to outside of exterior finish to protect cavity from moisture prior to completing parapet cap framing.

**END OF SECTION 07 31 15**

**SECTION 07 54 19**  
**ADHERED MULTI PLY PVC ROOF SYSTEM**

**PART 1 - GENERAL**

**1.01 INSTALLER QUALIFICATIONS**

- A. Roofing Installer must be:
  - 1. Currently prequalified with the Owner in accordance with Owner's prequalification requirements.
  - 2. Currently in good standing with the manufacturer.
- B. It shall remain each Contractor's responsibility to determine his current status with the manufacturer's certification plan.

**1.02 QUALITY ASSURANCE**

- A. Applicator/Installer:
  - 1. Acceptable to roof material manufacturer for the manufacturer's warranty requirements.
  - 2. Five (5) years successful experience on projects similar in size and scope.
  - 3. Experienced in the type of roofing work required.
  - 4. Successfully completed previous projects warranted by the manufacturer.
- B. Testing Laboratory Services: Test results shall meet or exceed established standards.
- C. Underwriters Laboratory (Roofing Covering): Class A fire hazard classification.
- D. Comply with governing local, state, and federal regulations, safety standards, and codes.

**1.03 REFERENCES (INCLUDING LATEST REVISIONS)**

- A. American Society for Testing and Materials:
  - 1. ASTM B 209, Specification for Aluminum and Aluminum Alloy Sheet and Plate
  - 2. ASTM C 719, Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cycle Movement (Hockman Cycle)
  - 3. ASTM C 794, Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
  - 4. ASTM C 920, Specification for Elastomeric Joint Sealants
  - 5. ASTM D 312, Specification for Asphalt Used in Roofing
  - 6. ASTM D 1863, Specification for Mineral Aggregate Used on Built-up Roofs
  - 7. ASTM D 2178, Specification for Asphalt Glass Felt Used in Roofing and Waterproofing
  - 8. ASTM D 2824, Specification for Aluminum - Pigmented Asphalt Roof Coatings
  - 9. ASTM D 4586, Specification for Asphalt Roof Cement, Asbestos Free
  - 10. ASTM A 361, Sheet Steel, Zinc-Coated (Galv.) by the Hot-Dip Process for Roofing and Siding
  - 11. ASTM C 177, Test for Thermal Laboratory Services
  - 12. ASTM C 728, Perlite Thermal Insulation Board

B. Federal Specifications:

1. LLL-I-535B
2. SS-A-701B
3. SS-C-153
4. SS-C-153C
5. SS-R-620B
6. TT-C-498C
7. TT-P-320D
8. TT-S-00227E
9. TT-S-00230C
10. SS-S-001534 (GSA-FSS)
11. L-P-375

C. Industry Standards:

1. The National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual
2. Single-ply Roofing Institute (SPRI) - A Professional Guide to Specifications Manual
3. Sheet Metal and Air Conditioning Contractors National Association (SMACNA) - Architectural Sheet Metal Manual
4. American Society of Civil Engineers – ASCE 7

1.04 INSTALLER QUALIFICATIONS

A. Roofing installer must be:

1. Currently certified or an approved applicator that is in good standing with the manufacturer.
2. Installer must be an experienced single firm specializing in the type of roofing repair and/or removal and replacement work required, employing only experienced workers for the class of work in which they are employed, having at least five (5) years successful experience on projects similar in size and scope and acceptable as applicators by the Project Manager.
3. Contractor must have successfully completed previous projects warranted by the manufacturer.

B. It shall remain each Bidder's responsibility to determine his current status with the manufacturer's certification plan.

1.05 MANUFACTURER QUALIFICATIONS

A. A qualified manufacturer that has been UL Listed and has FM Approvals for membrane roofing system similar to that used in this project for a minimum of fifteen (15) years.

1.06 CONTRACT DOCUMENT QUALITY ASSURANCE

- A. In the case of an inconsistency between the drawings and specifications or within either document not clarified by addendum, the better quality or greater quantity of work shall be provided in accordance with the Project Manager's interpretation.

1.07 SUBMITTALS

- A. Shop Drawings: Provide manufacturer's approved details of all perimeter conditions, projection conditions, and any additional special job conditions which require details other than indicated in the drawings.
- B. Refer to Specification Section 01 33 00 for Submittal requirements

1.08 SUBMITTALS

- A. Samples and Manufacturer's Submittals: Submit prior to delivery or installation.
1. Samples of all roofing system components including all specified accessories.
  2. Submit samples of proposed warranty complete with any addenda necessary to meet the warranty requirements as specified.
  3. Submit latest edition of manufacturer's specifications and installation procedures. Submit only those items applicable to this project.
  4. A written statement from the roofing materials manufacturer approving the installer, specifications and drawings as described and/or shown for this project and stating the intent to guarantee the completed project.
  5. Manufacturer's Equiviscous Temperatures (EVT) for the specified bitumens.
- B. Shop Drawings: Provide manufacturer's approved details of all perimeter conditions, projection conditions, and any additional special job conditions which require details other than indicated in the drawings.
- C. Maintenance Procedures: Within ten days of the date of Substantial Completion of the project, deliver to the Owner three copies of the manufacturer's printed instructions regarding care and maintenance of the roof.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened containers and rolls with all labels intact and legible including labels indicating appropriate warnings, storage conditions, lot numbers, and usage instructions. Materials damaged in shipping or storage shall not be used.
- B. Deliver materials requiring fire resistance classification to the job with labels attached and packaged as required by labeling service.
- C. Deliver materials in sufficient quantity to allow continuity of work.
- D. Handle and store material and equipment in such a manner as to avoid damage. Liquid products shall be delivered sealed, in original containers.

- E. Handle rolled goods so as to prevent damage to edge or ends.
- F. Select and operate material handling equipment so as not to damage existing construction or applied roofing.
- G. Moisture-sensitive products shall be maintained in dry storage areas and properly covered. Provide continuous protection of materials against wetting and moisture absorption. Store roofing and flashing materials on clean raised platforms with weather protective covering when stored outdoors.
- H. Store rolled goods on end.
- I. Protect materials against damage by construction traffic.
- J. The proper storage of materials is the sole responsibility of the contractor and any wet or damaged roofing materials shall be discarded, removed from the project site, and replaced prior to application.
- K. Comply with fire and safety regulations, especially with materials which are extremely flammable and/or toxic. Use safety precautions indicated on labels.
- L. Products liable, such as emulsions, to degrade as a result of being frozen shall be maintained above 40° F in heated storage.
- M. No storage of materials shall be permitted on roof areas other than those materials that are to be installed the same day.
- N. The contractor is to erect a temporary chain link fence, minimum six feet (6') in height, around work area stage and kettles. Fence is to be secured on a daily basis.

#### 1.10 SITE CONDITIONS

- A. Job Condition Requirements:
  - 1. Coordinate the work of the contractor with the work to be performed by other trades, to ensure proper sequencing of the entire work. The contractor is to schedule his work so that adequate time is allowed for other trades to perform their work.
  - 2. Apply roofing in dry weather.
  - 3. Do not apply roofing when ambient temperature is below 45° F.
  - 4. Proceed with roofing work only when weather conditions are in compliance with manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with specifications.
  - 5. Schedule the work so the building will be left watertight at the end of each day. Do not remove more roofing materials than can be reinstalled in any working day.
  - 6. Load placed on the roof at any point shall not exceed the safe load for which the roof is designed.
  - 7. All surfaces to receive new roofing shall be smooth, dry, and free from dirt, debris, and foreign material before any of this work is installed. Competent operators shall be in attendance at all times equipment is in use. Materials shall be stored neatly in areas designated by the Project Manager.

8. The contractor is to be aware of the potential for roof leaks on the existing roof as a result of ruptured blisters and/or roof mat damage caused by the vacuum process, foot traffic, or material and equipment storage. The contractor is to take all necessary precautions to prevent damage to the existing roof. All damage to the existing roof that could result in roof leaks is to be repaired on a daily basis by the roofing contractor.
  9. The contractor shall follow local, state, and federal regulations, safety standards, and codes for the removal, handling, and disposal of asbestos containing materials, if present. When a conflict exists, follow the stricter document.
  10. Due caution should be exercised so as not to alter the structural integrity of the deck. When cutting through any deck, care should be taken so as not to damage the deck or any part of the deck, such as post tension cables, etc.
  11. All kettles shall have a fume recovery system, automatic thermostat control, and visible temperature gauge all in working order.
  12. The contractor is to verify the location of all interior ducts, electrical lines, piping, conduit, and/or similar obstructions. The contractor is to perform all work in such a manner as to avoid contact with the above mentioned items.
  13. Surface and air temperatures should be a minimum 45° F during applications of cleaner and waterproof coating and remain above 45° F for a minimum of four (4) hours following applications. Verify compatibility of cleaner with coatings, paints, primers and joint sealers specified. Advise Project Manager of any problems in this regard prior to commencing cleaning operations.
  14. Temporary Sanitary Facilities:
    - a. The contractor shall furnish and maintain temporary sanitary facilities for employees use during this project, including temporary toilets, wash facilities, and drinking water fixtures. Sanitary facilities shall be secured to prevent tipping or movement.
    - b. Toilet units shall be self-contained, single-occupant, of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material.
    - c. Facilities shall be installed where they will best service the project's needs, with Owner's/Owner's Representative's approval.
    - d. Contractor shall provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material.
    - e. All portable facilities shall comply with local laws, codes, and regulations.
    - f. Contractor shall be responsible to see that the units are removed in a timely manner after the completion of the project.
- B. Protection of Work and Property:
1. Work: The contractor shall maintain adequate protection of all his work from damage and shall protect the Owner's and adjacent property from injury or loss arising from this contract. Contractor shall provide and maintain at all times any OSHA required danger signs, guards, and/or obstructions necessary to protect the public and his workmen from any dangers inherent with or created by the work in progress. All federal, state, and city rules and requirements pertaining to safety and all EPA standards, OSHA standards, NESHAP regulations pertaining to asbestos as required shall be fulfilled by the contractor as part of his proposal.

2. Property: Protect existing planting and landscaping as necessary or required to provide and maintain clearance and access to the work of this contract. Examples of two categories or degrees of protection are generally as follows: a) removal, protection, preservation, or replacement and replanting of plant materials; b) protection of plant materials in place, and replacement of any damage resulting from the contractor's operations.
  3. Finished roof areas shall be protected from damage by the contractor during construction.
  4. Twenty-four Hour Call: The contractor shall have personnel on call 24 hours per day, seven (7) days per week for emergencies during the course of a job. The Owner/Project Manager is to have the 24 hour numbers for the contact. Contractor must be able to respond to any emergency call and have personnel on-site within two (2) hours after contact. Numbers available to the Owner/Project Manager are to be mobile, home and office numbers for:
    - a) Job Foreman
    - b) Job Superintendent
    - c) Owner or Company Officer
- C. Damage to Work of Others: The contractor shall repair, refinish, and make good any damage to the building or landscaping resulting from any of his operation. This shall include, but is not limited to, any damage to plaster, tile work, wall covering, paint, ceilings, floors, or any other finished work. Damage done to the building, equipment, or grounds must be repaired at the successful contractor's expense holding the Owner harmless from any other claims for property damage and/or personal injury.
- D. Measurements: It will be the contractor's responsibility to obtain and/or verify any necessary dimensions by visiting the job site, and the contractor shall be responsible for the correctness of same. Any drawings supplied are for reference only.
- E. Use of Premises:
1. The contractor is advised that the Owner will occupy the building at all times, and the contractor must provide all safeguards required to protect personnel and to keep noise levels as low as reasonably possible for each operation.
  2. The contractor shall:
    - a) Coordinate work in such a manner as to not interfere with the normal operation of the building.
    - b) Assume full responsibility for protection and safekeeping of products stored on premises.
    - c) Agree to hold the Owner harmless in any and all liability of every nature and description which may be suffered through bodily injuries, including death of any persons by reason of negligence of the contractor, agents, employees, or subcontractors.
- F. Cleaning and Disposal of Materials:
1. Contractor shall keep the job clean and free from all loose materials and foreign matter. Contractor shall take necessary precautions to keep outside walls clean and shall allow no roofing materials to remain on the outside walls.

2. All waste materials, rubbish, etc., shall be removed from the Owner's premises as accumulated. Rubbish shall be carefully handled to reduce the spread of dust. A suitable scrap chute or hoist must be used to lower any debris. At completion, all work areas shall be left broom clean and all contractor's equipment and materials removed from the site.
3. All bituminous or roofing related materials shall be removed from ladders, stairs, railings, and similar parts of the building.
4. Debris shall be deposited at an approved disposal site.

#### 1.11 SEQUENCING AND SCHEDULING

- A. Coordinate roofing schedule with work of other trades.
- B. Plan lay up of roofing membrane with respect to deck slope. Avoid situations where excessive drainage could pass into completed roofing.
- C. Maintain communication with roofing manufacturer's representative to inform of progress and to schedule periodic inspections.
- D. All penetrations shall be made in roof prior to beginning with roof installation.

#### 1.12 PERFORMANCE REQUIREMENTS

- A. Roofing System: Shall prevent water migration into roof assembly or building interior through the roof membrane and/or membrane base flashing.

#### 1.13 QUALITY ASSURANCE

- A. Work of this Section to conform to these specifications, and to the roofing material manufacturer's application instructions. In the event of conflicts between the two, the more stringent requirement shall be observed.
- B. Maintain one copy of each document on site.
- C. Factory Technical Representative: Roofing Contractor is to arrange and schedule the manufacturer's technical representative to be on site the first day of the installation of manufacturer's roofing system. The manufacturer's technical representative shall inspect the work of the contractor at least one time each week during the installation of the roofing system. The manufacturer's technical representative shall perform with the owner's representative and the roofing contractor a final inspection of the roofing system. At the completion of the final inspection, provide to the roofing contractor a list of punch list items (if any) to be correct before technical acceptance of the roofing project and prior to issuance of manufacturer's Twenty (20) Year NDL. Field reports shall be provided after each inspection within five (5) days of site visit.
- D. Pullout Tests: Conduct pullout test on deck using appropriate fastener prior to roof system installation. Submit pullout results for manufacturer's review to determine specific fastening pattern for this project, minimum uplift requirements shall conform to current ASCE 7-16 criteria.

1.14 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacture of the products specified, with five (5) years documented experience in the uninterrupted, and unmodified manufacture of the roofing system and component elements of the roofing system specified herein.
- B. Applicator: Company specializing in the work of this Section, having a minimum of five (5) years documented experience applying modified bitumen roofing systems, and approved by the Manufacturer for not less than three (3) years to install the specified roof system so as to achieve a twenty (20) year no dollar limit warranty.

1.15 REGULATORY REQUIREMENTS

- A. Conform to all applicable local codes for roof assembly fire hazard requirements.
- B. Provide certification of inspection confirming approval of design and installation by authority having jurisdiction.
- C. Fire Hazard Classifications: UL Class A.

1.16 PRE-INSTALLATION CONFERENCE

- A. Convene a preinstallation conference two weeks prior to commencing the Work.
- B. Require attendance of parties directly affecting the Work of this Section.
- C. Review condition of roof deck and installation, installation procedures and coordination with related work.

1.17 ENVIRONMENT REQUIREMENTS

- A. Do not apply roofing during inclement weather.
- B. Do not apply roofing membrane to damp or frozen deck or substrate.

1.18 WARRANTY

- A. Roofing - Manufacturer: Project shall be installed in such a manner that the roofing material manufacturer will furnish a written Twenty (20) Year NDL
- B. Warranty: The complete roofing system (from top of deck/substrate up) shall be guaranteed for a minimum of twenty (20) years from the date of Substantial Completion for this project. Guarantee responsibilities shall be as follows:
- C. Roofing - Contractor: The contractor, jointly with any subcontractors employed by him, shall guarantee the work required and performed under this contract will be free from defects in workmanship and materials, and that the building will be and remain waterproof for a five (5) year warranty period, after the Owner accepts the work as substantially complete. The warranty shall be in approved notarized written form, to obligate the contractor and his subcontractors, if any, to make good the requirements of the warranty.

- 1 D. The materials manufacturer shall guarantee the entire roofing system as supplied by  
2 system manufacturer for a total period of twenty (20) years from the date of substantial  
3 completion.  
4
- 5 E. Membrane manufacturer shall provide the written warranty as specified.  
6
- 7 F. The entire roofing system (from top of deck/substrate up) shall be guaranteed to be  
8 watertight and against any failures of workmanship and materials. Repair of the system,  
9 including materials and labor, shall be done at no cost to the Owner.  
10
- 11 G. Warranty repairs shall be performed by a certified installer. The repairs shall be performed  
12 in accordance with the manufacturer's written instructions and recommended procedures  
13 so as to not void the warranty.  
14
- 15 H. During the proposal period each Contractor shall make arrangements with the materials  
16 manufacturer to provide the required warranty. Refer to SUBMITTALS paragraph in this  
17 section for requirements concerning submittals of warranty.  
18  
19

## 20 PART 2 - PRODUCTS

### 21 2.01 GENERAL

- 22 A. Compatibility: Provide materials that are recommended by manufacturers to be fully  
23 compatible with indicated substrates, or provide separation materials as required to  
24 eliminate contact between incompatible materials.  
25
- 26 B. Materials herein specified shall be supplied or approved in writing by the manufacturer  
27 issuing the warranty.  
28
- 29 C. The white polyester reinforced fleece backed adhered roofing system shall only be applied  
30 by manufacturer approved and trained roofing contractors.  
31
- 32 D. The manufacturer shall have 15 years UL listing for the membrane to be used on the  
33 project. Membrane manufacturer shall have a minimum of 15 years FM approval, and  
34 15 years manufacturing experience with the roofing membrane specified for this project.  
35
- 36 E. All roofing and roof accessories shall be installed in compliance with manufacturer's  
37 current specifications and details.  
38
- 39 F. All materials used on the project shall be asbestos free.  
40
- 41 G. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.  
42  
43  
44

2.02 ROOFING MEMBRANE

- A. Shall be a Elvaloy based PVC membrane reinforced with DuPont Elvaloy KEE resin modifier polyester reinforced membrane, white, minimum thickness 50-mil for meeting ASTM 6754 by Fibertite.
- B. (OPTIONAL) Shall be a PVC based membrane reinforced with DuPont Elvaloy KEE resin modifier polyester reinforced membrane, white, minimum thickness 60-mil for meeting ASTM 4434.
- C. Contractor Note: ONLY membrane allowed at 50-mil is provided by Fibertite membrane. All other membranes shall be 60-mil or larger not including thickness for the fleeceback.
- D. Roof Membrane:
1. Firestone PVC KEE by Elevate
  2. EverGuard PVC XK FB by GAF
  3. JM PVC KEE by Johns-Manville
  4. FTR SM or XT Membrane by Fibertite Roofing
  5. Sure Flex Kee HP by Carlisle Syntec
  6. TremPly KEE by Tremco
- E. The white 60 mil polyester reinforced fleece backed Elvaloy® membrane shall have the following minimum physical properties.

| <u>Property</u>                     | <u>Test Procedure</u> | <u>Physical Properties</u> |
|-------------------------------------|-----------------------|----------------------------|
| Color                               |                       | White                      |
| Thickness                           | ASTM D 751            | 60 mil min                 |
| Roll Size                           |                       | 76" x 90'                  |
| Breaking Strength                   | ASTM D 751            | 325 x 324 lbf              |
| Tear Strength                       | ASTM D 751            | 89 x 109 lbf               |
| Seam Strength                       | ASTM D 751            | 295 lbf                    |
| Elongation                          | ASTM D 751            | 50% x 42%                  |
| Heat Aging                          | ASTM D 3045           | >90 %                      |
| Low Temp Bend                       | ASTM D 2136           | Pass (-40° F)              |
| Static Puncture Resistance          | ASTM D 5602           | Pass                       |
| Dynamic Puncture Resistance         | ASTM D 5635           | Pass                       |
| Permeance                           | ASTM E 96             | 0.003 Perms                |
| Dimensional Stability               | ASTM D 1204           | 0.3%                       |
| Weight Change after Water Immersion | ASTM D 570            | 1.20%                      |
| Accelerated Weathering              | ASTM G 155            | Pass                       |
| Fungi Resistance                    | ASTM G 21             | No growth                  |
| Solar Reflectivity                  | ASTM C 1549           | 0.82 (white)               |
| Emissivity                          | ASTM C 1371           | 0.91 (white)               |
| Solar Reflectance Index (SRI)       | ASTM E 1980           | 109 (white)                |
| Underwriters Laboratory             | Class A               | Approved                   |
| Factory Mutual                      | Class 1-90            | Exceeds                    |
| Thermoplastic Membrane              | ASTM D 4434           | Exceeds                    |

2.03 FLASHING MEMBRANE

- A. The flashing membrane shall be a white Elvaloy® polyester reinforced flexible sheet.

| <u>Property</u>               | <u>Test Procedure</u> | <u>Physical Properties</u> |
|-------------------------------|-----------------------|----------------------------|
| Color                         |                       | White                      |
| Thickness                     | ASTM D 751            | 60 mil min                 |
| Breaking Strength             | ASTM D 751            | 298 x 278 lbf              |
| Seam Strength                 | ASTM D 751            | 286 lbf                    |
| Tear Strength                 | ASTM D751             | 89 x 109 lbf               |
| Elongation                    | ASTM D 751            | 35% x 34%                  |
| Heat Aging                    | ASTM D 3045           | >90%                       |
| Static Puncture Resistance    | ASTM D 5602           | Pass                       |
| Dynamic Puncture Resistance   | ASTM D 5635           | Pass                       |
| Low Temperature Bend          | ASTM D 2136           | Pass @ -40°F               |
| Permeance                     | ASTM E 96             | 0.003 Perms                |
| Dimensional Stability         | ASTM D 1204           | 0.3%                       |
| Wt. Change after Immersion    | ASTM D 570            | 1.20%                      |
| Accelerated Weathering        | ASTM G 155            | Pass                       |
| Fungi Resistance              | ASTM G 21             | Pass                       |
| Solar Reflectivity            | ASTM C 1549           | 0.82                       |
| Solar Emissivity              | ASTM C 1371           | 0.91                       |
| Solar Reflectance Index (SRI) | ASTM E 1980           | 109                        |
| Underwriters Laboratory       |                       | Class A                    |
| Factory Mutual                |                       | Class 1-90                 |

2.04 FLASHING MEMBRANE

- A. The flashing membrane shall be a polyester reinforced flexible sheet, as supplied by the roof membrane manufacturer.

2.05 NON-REINFORCED MEMBRANE

- A. The non-reinforced membrane shall have the following minimum properties, as supplied by the roof membrane manufacturer, or approved equal.
1. Description: Non-reinforced thermoplastic membrane, thickness approximately 45 mils.
  2. Use: Inside/outside corners, multiangled intersections, sealant pockets and other conditions where molding of the membrane is required.

2.06 ROOFING INSULATION ADHESIVE

- A. All insulation adhesive shall be in compliance with Section 07 22 16 Roof Board Insulation.

2.07 INTERPLY MEMBRANE

- A. Shall be SBS 90-mil (min) Smooth sanded base sheet, tested in accordance with ASTM D 5147 as listed under alternate of related roof areas and approved by manufacturer issuing the warranty.

2.08 INSULATION

- A. All insulation shall be in compliance with Section 07 22 16 Roof Board Insulation.

- B. All insulation shall be supplied by the membrane manufacturer as to thickness, type, and manufacturer. All insulation must be approved for the specific application, Underwriters Laboratory approved

2.09 SUBSTRATE BOARDS

- A. All substrate boards shall be in compliance with Section 07 22 16 Roof Board Insulation.

2.10 CANT STRIP

- A. Structural: Shall be wood where used for structural purposes meeting NRCA, FM Global and Underwriters Laboratory guidelines.
- B. Non-structural: Shall be wood fiber where used for non-structural purposes, conforming to ASTM C208 and C209.

2.11 ROUGH LUMBER

- A. Refer to Specification Section 06 10 53 Miscellaneous Carpentry for further information.
- B. All wood nailers, structural cants, curbs, and other miscellaneous rough carpentry, shall be lumber as recommended by NRCA, and Underwriters Laboratory guidelines.
- C. Vertical Wall Shimming Material: Shall be exterior grade plywood unless otherwise accepted by Project Manager. Thickness shall be as required for attachment or to make material flashing flush or level with offsets and/or transitions, minimum three-fourths inch (3/4"). Proper selection of material is required to achieve UL guidelines.
- D. Where plywood is not used on the back of the parapet contractor to provide a continuous 22 ga. Sheet metal strap over the face of the studs at the through wall flashing location to accommodate the flashing fasteners.

2.12 SEALANTS

- A. One-part Urethane Sealant: Sealant for use at coping joints, reglet joints, etc., shall be a one-component, high performance, non-priming, non-sag, gun grade elastomeric polyurethane sealant designed for use in active exterior joints, ASTM C 920, shall meet the following physical and performance properties, SONOLASTIC® NP 1™ as manufactured by BASF Construction Chemicals, LLC, or approved equal.

| <u>Properties</u>                                                | <u>Results</u> | <u>Test Methods</u> |
|------------------------------------------------------------------|----------------|---------------------|
| Movement capability, %                                           | ±35            | ASTM C719           |
| Tensile strength, psi (MPa)                                      | 350 (2.4)      | ASTM D412           |
| Tear strength, pli                                               | 50             | ASTM D1004          |
| Ultimate elongation at break, %                                  | 800            | ASTM D412           |
| Rheological, at 120° F (49° C)<br>(sag in vertical displacement) | No sag         | ASTM C639           |
| Extrudability, 3 seconds                                         | Passes         | ASTM C603           |
| Hardness, Shore A                                                |                | ASTM C661           |
| At standard conditions                                           | 25 – 30        |                     |

|    |                                                    |                           |                     |
|----|----------------------------------------------------|---------------------------|---------------------|
| 1  | After heat aging (max Shore A: 50)                 | 25                        |                     |
| 2  | Weight loss, after heat aging                      | 3%                        | ASTM C792           |
| 3  | Cracking and chalking, after heat aging            | None                      | ASTM C792           |
| 4  | Tack-free time, hrs, (maximum 72 hrs)              | Passes                    | ASTM C679           |
| 5  | Stain and color change                             | Passes (no visible stain) | ASTM C510           |
| 6  | Bond durability,* on glass, aluminum,              | Passes                    | ASTM C719           |
| 7  | and concrete $\pm 35\%$ movement                   |                           |                     |
| 8  | Adhesion* in peel, pli (min. 5 pli)                | 30                        | ASTM C794           |
| 9  | Adhesion* in peel after UV radiation               | Passes                    | ASTM C794           |
| 10 | through glass (min. 5 pli)                         |                           |                     |
| 11 | Artificial weathering, Xenon arc, 250 hours        | Passes                    | ASTM C793           |
| 12 | Artificial weathering, Xenon arc, 3,000 hours      |                           | No surface cracking |
| 13 |                                                    | ASTM G26                  |                     |
| 14 | Water immersion, 122° F (50° C)                    | Passes 10 weeks with      | ASTM C1247          |
| 15 |                                                    | movement cycling          |                     |
| 16 | *Primed for water immersion dictated by ASTM C920. |                           |                     |

- B. Silyl-terminated Polyether Sealant: Sealant shall be a thermosetting, solvent free, non-slump, self-fixturing, multipurpose structural sealant which shall meet the following physical and performance properties, M-1 as manufactured by Chem Link, Inc., or approved equal.

Properties

|                                  |                                                       |
|----------------------------------|-------------------------------------------------------|
| Specific Gravity                 | 1.62 (13.5 lbs./gallon)                               |
| Viscosity                        | 800,000+ cps Brookfield RTV, TF spindle, 4 rpm 73° F. |
| Shear Strength (ASTM D-1002)     | 400 psi+ (7 day ambient cure)                         |
| Elongation @ break (ASTM D-412)  | 400-550% (7 day ambient cure)                         |
| Hardness Shore A (ASTM C-661)    | 45 $\pm$ 3                                            |
| Tack free time (ASTM C-679)      | 20 minutes                                            |
| Low temperature flex ASTM D-816) | Minus 10° F pass 1/4" mandrel                         |
| Slump (sag) (ASTM C-697)         | Zero slump                                            |
| Shrinkage (ASTM D-2453)          | No measurable shrinkage (after 14 days)               |
| Service temperature              | -40° F to 200° F continuous service                   |

## 2.13 BONDING ADHESIVE FOR FLASHING

- A. Description: Adhesive is a bonding cement of synthetic rubber for fully adhering membranes to various substrates, Shall be Supplied by the membrane manufacturer

Typical Liquid Properties (Room Temperature)

|                     |                                                |
|---------------------|------------------------------------------------|
| Color               | Amber/Yellow                                   |
| Base Product        | Neoprene                                       |
| Solids              | 25%                                            |
| Specific Gravity    | .87                                            |
| Pounds/Gallon       | 7.25                                           |
| Viscosity (CPS)     | 2500                                           |
| Solvents            | Ketone, Toluene, Aliphatic Hydrocarbon, Zylene |
| Estimated Coverage  |                                                |
| 2 Sided Application | 55/70 sq. ft. (2/2.5 mils dry)                 |
| DOT Label Required  | Flammable Liquid                               |
| Code - 584661       |                                                |

- B. Handling: Contains ingredients which could be harmful if mishandled. Contact with skin and eyes should be avoided and necessary protective equipment and clothing should be worn.

2.14 TRIM STRIP

- A. The trim strip shall have the following minimum properties, Shall be Supplied by the membrane manufacturer
  - 1. Six inch (6") wide non-reinforced 45 mil thermoplastic used for capping butted ends of rolls.
  - 2. The trim strip is seamed with the use of hot-air welding.

2.15 CORNERS

- A. Inside and outside corners shall be supplied by the membrane manufacturer and shall be of the same base material as the roof membrane.

2.16 PIPE BANDS

- A. Stainless steel bands with self-locking heads.
- B. Tighten with hand tool for tension control and flush cut off.

2.17 PRE-MOLDED BOOTS

- A. Non-reinforced thermoplastic tapered molds for various pipes, heat welded to field membrane and sealed at top with stainless steel pipe bands and seam sealer.
- B. Must be supplied by the roofing system manufacturer and no field wraps will be allowed.

2.18 PITCH PAN SEALANT

- A. Shall be one-part, self-leveling, polyurethane sealant for use in new pitch pans, Shall be supplied by the membrane manufacturer.

2.19 PIPE SUPPORTS

- A. All pipe supports shall be replaced by new units.
- B. Pipe support system shall be a prefabricated, engineered support system designed specifically for use on roofing without adhesive, roof penetrations, flashings, or damage to roofing system. Supports shall be as recommended by manufacturer as suitable for size and type of conduit or pipe being supported or approved equal.
- C. Refer to Specification Section 07 72 00 Roof Accessories for further information.

2.20 WALKWAY PAD

- A. The walkway pad shall have the following minimum physical properties, and be applied with edges heat or solvent welded, Shall be Supplied by the membrane manufacturer

| <u>Property</u>        | <u>Test Procedure</u> | <u>Physical Properties</u> |
|------------------------|-----------------------|----------------------------|
| Color                  |                       | Gray                       |
| Size                   |                       | 36" wide x 60' long        |
| Thickness              | ASTM D 638            | .080" nominal              |
| Reinforcement          |                       | 1000 Denier Polyester      |
| Tear Strength          | ASTM D 751            | 210 X 200 lbf              |
| Puncture Resistance    |                       | 96 lbs                     |
| Cold Resistance        | ASTM D 1043           | -40° C                     |
| Shore A Durometer      |                       | 85                         |
| Hydrostatic Resistance |                       | 400 psi                    |
| Dimensional Stability  | ASTM D 1240           | ≤ 1%                       |
| Ultraviolet Stability  |                       | 12,000 hrs. Excellent      |

2.21 TERMINATION/PRESSURE BARS

- A. Aluminum strip shall be extruded channel bar with a mill finish, width one inch (1"), thickness 0.100" ± .008", leg height one-fourth inch (1/4") top and bottom, leg angle ninety degrees (90°), for perimeter and curb anchorage, having predrilled holes six inches (6") on center, Shall be Supplied by the membrane manufacturer.

2.22 T- JOINT COVERS

- A. Supplied by the membrane manufacturer as a secondary covering to all T – Joints in the installation of thermoplastic roof systems consisting of waterproofing coverings equal to or greater than 60 mils in thickness.
- B. No field cut T-joint covers are allowed

2.23 DELIVERY AND STORAGE

- A. All materials shall be delivered with appropriate carton and can labels indicating appropriate warnings, storage conditions, lot numbers, and usage instructions. Materials damaged in shipping or storage shall not be used.

2.24 PRECAUTIONS

- A. Some of the indicated materials are extremely flammable and/or toxic. Use precautions indicated on can and carton labels.

2.25 MISCELLANEOUS MATERIALS

- A. Other materials shall be as specified, or of the best grade for the proposed use, as recommended by the manufacturer of said product.

2.26 SELF-ADHERED UNDERLAYMENT FOR TEMPORARY WATERPROOFING

- A. A premium heavyweight, minimum 60-mil, high temperature 260-degree self-adhering underlayment to use as temporary waterproofing.

2.27 MISCELLANEOUS MATERIALS

- A. Other materials shall be as specified or of the best grade for the proposed use as recommended by the manufacturer.

2.28 ROOF PLAQUE

- A. Contractor shall provide a sixteen inch by sixteen inch (16" x 16") metal plaque which shall contain the information listed below. Fasteners to attach plaque shall be stainless steel, short enough to not penetrate outer surface of hatch or door where mounted. Location of plaque to be determined by Project Manager.

1. Building Envelope name, phone number, contact person.
2. School district phone number, contact person.
3. School district emergency phone number.
4. Contractor name, phone number, contact person.
5. Subcontractor name, phone number, contact person.
6. Roof Consultant, name, phone number, contact person.
7. Roof system, warranty information.
8. Roof Manufacturer, phone number, contact person.

**PART 3 - EXECUTION**

3.01 REFERENCE

- A. The manufacturer's Technical Specifications shall be considered a part of this specification and should be referred to for more specific application procedures and recommendations.
- B. Application of materials shall be in strict accordance with the manufacturer's recommendations except where more stringent requirements are shown or specified. In the instance of a conflict between these specifications and those of the manufacturer, the more stringent specifications shall take precedence.
- C. General Installation:
1. Protect adjacent areas with tarpaulin or other durable materials.
  2. Contractor shall prevent overspray, and be responsible for parking lot areas and/or adjoining areas not part of this contract.
  3. Contractor shall be responsible for sealing, as required, all openings that may allow bitumen migration or drippage, i.e. pitch dams, envelopes, and filler strips.
  4. Prepare surfaces according to manufacturer's or applicator's published instructions. All metal that is to receive bitumen, or come in contact with bitumen or adhesive, shall be first primed with appropriate primer. Any prefinished sheet steel that is to receive bitumen, or come in contact with bitumen or adhesive, shall be scored, scuffed or abraded prior to receiving primer.
  5. Use cleaning materials or primers necessary to render an acceptable surface/substrate.

6. All surfaces/substrates shall be clean and dry prior to application of materials.
7. Prior to application of felts and membrane, all foreign matter, gravel, etc., shall be removed from the insulation and/or substrate. Gravel or debris between the insulation/substrate and plies is not acceptable.
8. Ambient temperature shall be 45° F and rising.
9. Insulate hot transport lines if required.
10. Wrinkles, buckles, kinks, and fishmouths are not acceptable when laying membrane.
11. Where deteriorated base flashing is removed, primed cant strips shall be installed at the intersection of the deck and the vertical surfaces. All flashings shall be mechanically top-fastened with a termination bar a minimum of six inches (6") on center at the top leading edge, and be a minimum of eight inches (8") in height from finished membrane.
12. Provide a water test of each roof section prior to substantial completion. The test should simulate rainfall of one inch (1") per hour minimum.
13. On slopes greater than one inch (1") in twelve inches (12"), refer to NRCA and/or manufacturer's guidelines for backnailing procedures and follow the more stringent guidelines for all specified materials.

### 3.02 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive the Work of this Section.
- B. Verify that deck is secure, that it is clean and smooth, free of depressions, waves, abrupt elevation change, protrusions, or projections and properly sloped to drains.
- C. Verify that deck surfaces are dry and free of frost, dew or other moisture.
- D. Verify that roof openings, curbs, sleeves and vents through the roof are solidly set and ready to receive this Work.

### 3.03 SUBSTRATE PREPARATION

- A. Remove all roofing materials from all roof areas and install new materials to meet specifications and manufacturer requirements. Substrate shall be smooth, free of debris, sharp edges and other surface irregularities prior to work starting. Remove and replace all metal copings and counterflashings on the areas within the work scope and replace to a minimum of NRCA standards.

### 3.04 ROUGH CARPENTRY

- A. Refer to specification Section 06 10 53 Miscellaneous Carpentry For further information.
- B. Nailers shall be installed according to NRCA, Underwriters Laboratory, and IBC guidelines.

### 3.05 CANTS

- B. Provide full 45 degree cant strips (no partials) at all intersections of vertical and horizontal surfaces, such as walls, parapet walls, curbs, expansion joints, etc., and as recommended by membrane manufacturer.

- 1 B. Cants shall provide a four (4) inch rise above the roof's surface.  
2  
3 C. Toe of cant shall be level with the surface to receive new roof membrane and in all cases  
4 anchored according to NRCA, Underwriters Laboratory, and IBC guidelines.  
5  
6 D. Cant strips shall be installed at the intersection of the deck and all vertical surfaces.  
7  
8 E. If a wood cant is used where insulation exists, cant shall be toe nailed into treated wood  
9 nailer under cant the same height as insulation.  
10

11 3.06 INSULATION

- 12  
13 A. All insulation shall be in compliance with Section 07 22 16 Roof Board Insulation.  
14  
15 B. All insulation shall be approved in writing by the membrane manufacturer as to thickness,  
16 type, and manufacturer. All insulation must be approved for the specific application,  
17 Underwriters Laboratory approved  
18

19 3.07 SUBSTRATE BOARDS

- 20  
21 A. All substrate boards shall be in compliance with Section 07 22 16 Roof Board Insulation.  
22

23 3.08 APPLICATION OF BASE MEMBRANE

- 24  
25 A. Cover board shall be covered with one (1) layer of specified modified base membrane  
26 torched applied.  
27  
28 B. Base membrane shall be applied in accordance with the manufacturer's recommendations  
29 and in accordance with general practices as set forth by the NRCA Roofing Manual.  
30  
31 C. Contractor shall utilize a weighted water roller for all applications of membrane with at  
32 least 100lbs working weight.  
33 1. Water roller should be clean from all debris to minimize contamination and damage to  
34 the SBS inter-ply membrane.  
35 2. Utilize water roller after the membrane has been laid into prescribed 2-part foam  
36 adhesive per the manufacturer recommendations to smooth out any area the  
37 membrane is not laid flat.  
38  
39 D. If slope dictates, base membrane shall be installed using the strapped method going with  
40 the slope as required by membrane manufacturer.  
41  
42 E. Safety:  
43 1. Follow all OSHA safety regulations and requirements.  
44 2. Superintendent and foreman should be trained in OSHA safety regulations and  
45 requirements.  
46 3. Keep two fully charged fire extinguishers at the kettle and two near the work area.  
47 4. During torch application, a fully charged fire extinguisher must be within ten feet (10')  
48 of the work area and two fully charged extinguishers near the work area.  
49 5. All fire extinguishers must have been inspected and certified within the past six (6)  
50 months and shall have the inspection tag attached to the extinguisher.

6. The contractor shall provide a non-working employee, who is CERTA certified, and who will monitor torch-applied material during and following application. The employee shall use an infrared thermometer to determine if a hot-spot is present in the recently torch-applied material. The infrared thermometer shall be a minimum of 8:1 distance to spot ratio and shall have a minimum upper temperature range of 900° F.
7. The contractor shall provide a four (4) hour fire watch following completion of work each day. The CERTA certified employee shall monitor the area applied during that day's work with an infrared thermometer. The employee shall monitor the area every thirty (30) minutes to look for hot-spots in the applied material.
8. If a hot-spot is located, the employee must contact the fire department immediately. The employee shall then contact the emergency number for Round Rock Independent School District. The employee shall then contact the Roof Consultant. Any hot-spot located shall be opened up immediately and corrective measures taken to prevent fire from entering the building. Two (2) fully charged fire extinguishers and two (2) 5-gallon pails of water must be within reach of the employee during each monitoring event.

3.09 COLD APPLIED FLEECE BACKED MEMBRANE

- A. Adhered Application: Adhere membrane to acceptable substrate with cold-process adhesive applied at the rate specified by the manufacturer.
  1. The roof surface must be clean, dry and free of foreign material.
  2. Position sheets as indicated on approved shop drawings.
- B. Lap Seaming Procedure: Overlap membrane for attachment method specified and hot-air welded with manufacturer's approved equipment.
  1. All surfaces to be weld shall be clean, dry and free of foreign material.
  2. All seams must then be checked with a needle probe and any voids repaired with the heat gun.
  3. All seams are to be probed daily (NO EXCEPTIONS)
  4. Fold one end of the membrane on top of itself until both ends meet. Apply substrate adhesive to the prepared roof surface so that the substrate is coated in a pattern slightly larger than the first sheet being applied. The sheet can then be pulled and laid into the bonding material using care not to create any wrinkles.
  5. Carefully push into place from fold line to overlap, avoiding wrinkles and air pockets. Roll membrane flat with a water roller that weighs a minimum of 100 lbs
  6. Repeat procedure for other sheet half.
  7. Ensure that the membrane lays flat in the cold adhesive. There shall be complete adhesion between the membrane and the cold adhesive. Broom the plies to assure that the membrane adheres solidly to the cold adhesive. Apply extra pressure to avoid creating open channels where three or more membranes are lapped.
  8. Lap seams shall be done by lapping the two inch (2") selvedge edge over the non-selvedge edge of the previous roll. The selvedge edge seam shall be made with the heat gun method.
  9. Roll ends are butted together and capped with a six inch (6") wide trim strip. The trim strip is then seamed with the heat gun.
  10. T-joint covers are required over all T-joints on installations of thermoplastic roofing membranes equal to or greater than 60 mils in thickness. Center T-joint cover over the T-joint and completely hot air weld the cover to the field membrane.

3.10 FLASHING - GENERAL

- A. Flash all penetrations, metal edge systems, walls, curbs, expansion joints, drains as shown on details and approved shop drawings with white reinforced non-fleece flashing membrane.
  - 1. Use prefabricated flashing accessories or components such as sealant pockets, premolded vent/pipe flashing.
  - 2. Mechanically fasten flashing at terminations according to approved details.
  - 3. Fastening membrane flashing through metal counterflashing is not acceptable.
- B. Any lumber or shimming required for attachment or to make material flashing flush or level with offsets and/or transitions shall be incorporated in the flashing specifications.

3.11 BASE FLASHING (APPROXIMATELY 8" IN HEIGHT MINIMUM)

- A. Base flashings shall be installed using the flashing membrane, with length of run not to exceed twenty linear feet (20').
- B. Wooden nailers or curbs shall be installed at all edges and openings in the roof, mechanically fastened to the deck.
- C. Cant strips shall be installed at the intersection of the deck and all vertical surfaces.
- D. The roofing field membrane shall extend up over and two inches (2") above the top of cant strips at all vertical intersections or out to the roof's edge.
- E. All existing substrates receiving flashing membrane shall be clean and primed with primer, prior to application as required.
- F. All flashings shall be mechanically fastened with a termination bar a maximum of six inches (6") on center, be a maximum of eight inches (8") above finished roof height, extend a minimum of four inches (4") onto the field of horizontal roof membrane, and not exceed twenty linear feet (20') of run in length.
- G. After proper termination of the base flashing at a minimum eight inch (8") height (or maximum eighteen inch (18") height), a saw cut reglet with counterflashing shall be installed according to NRCA and SMACNA guidelines.
- H. All vertical flashing lap seams of the flashing membrane shall be hot-air welded.
- I. All flashing membrane shall be adhered with flashing bonding adhesive to the vertical substrate and hot-air welded to the field of roof membrane; hot-air weld vertical laps.
- J. Flashing laps shall be minimum two inch (2") width, no maximum. Hot-air weld of flashing lap shall be minimum two inch (2") width, no maximum.

K. Hot-Air Welding of Flashing Laps:

1. When using a hand-held hot-air welder, the seams should be pressed together using a hand-held roller. The speed and temperature settings of the welding equipment can be affected by the weather conditions at the site of application, therefore, these parameters should be set by trial and error using two (2) pieces of the flashing membrane. Minimum width of hot-air weld two inches (2"), no maximum.
2. Lay the laps together and apply pressure to the welded seam to ensure full adhesion.
3. Allow the seams to set fully, and probe the entire length for voids. Reseam voids immediately with a hot-air gun and roller.

L. All hot-air welded seams/laps shall be tested daily with a probe for integrity, no variance.

3.12 PERIMETER FASTENING

- A. Wood nailers are required for perimeter gravel stops or drip edges. Field membrane and all plies shall be mechanically fastened on the vertical face of nailer, twelve inches (12") on center maximum.

3.13 EDGING FLASHINGS

- A. An NRCA-approved gravel stop/fascia system shall be installed in strict accordance with published instructions to meet ES-1.

3.14 PIPING/CONDUIT

- A. Refer to specification section 07 72 00 Roof Accessories for further information
- B. Piping/conduit shall be raised to NRCA recommended heights, and new supports furnished. Permanent supports shall be installed upon pads approved by membrane manufacturer. Coordinate work with Project Manager/Architect.
- C. All gas lines, piping, and conduits shall be coated with industrial grade yellow paint

3.15 MEMBRANE PROTECTION

- A. Walk Way Pads: Install manufacturer's walk way pads continuously on each side of each air-handling/mechanical unit on the roof in accordance with the manufacturer's recommended procedures.
- B. Where equipment pads, wood sleepers, or walkway slabs are to be installed over the roofing membrane, an additional layer of the roofing membrane shall be installed between the roofing membrane and the pad, sleeper, or slab. Due caution shall be exercised to prevent roofing membrane damage during placement. Where required, membrane shall be welded to field membrane to prevent slippage.

3.16 CLEANING

- A. Clean exposed surfaces of excess cement, adhesive, sealants, mortar and paint associated with the new work.

B. Clean work area of excess roofing materials and installation debris daily.

C. Repair or replace defaced or disfigured finishes caused by the work.

### 3.17 MEMBRANE CLEANING

A. After all membrane has been installed, it shall be cleaned with a cleaning agent compatible with the membrane to return the membrane to like new appearance.

### 3.18 PROTECTION

A. Protect all building surfaces against damage from roofing work.

B. Where traffic must continue over finished, installed roofing system, protect membrane, underlayment accessories and finishes from damage.

### 3.19 OVERNIGHT SEAL

A. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building.

B. Installation shall be performed according to accepted roofing practice as outlined in the NRCA Roofing Manual.

### 3.20 FIELD QUALITY CONTROL

A. Owner reserves the right to have finished Work inspected using infrared thermography or other appropriate, non-destructive means to establish satisfactory conditions of completed Work.

B. Correct identified defects or irregularities. Cut out and repair membrane defects before end of each day.

### 3.21 PROTECTION OF FINISHED WORK

A. Protect finished Work under provision of application Section.

B. Where traffic must continue over finished roof installation, protect surfaces with minimum one-half inch (1/2") wood fiberboard insulation, under five-eighth inch (5/8") thick plywood protective walkways ballasted in place with sandbags or the like.

C. At all parapet and metal coping cap conditions, provide additional layer of self-adhered underlayment for temporary protection over all parapet and coping caps conditions once roofing has been completed and prior to installation of wood nailers and metal coping cap. Self-adhered underlayment is to cover cavity conditions from roof side of parapet framing to outside of exterior finish to protect cavity from moisture prior to completing parapet cap framing.

3.22 ROOF PLAQUE

- A. Metal plaque shall be installed on the underside of each roof hatch or on the inside of the maintenance room door. Location of plaque to be determined by Project Manager.
- B. Plaque shall be fastened with stainless steel screws that are short enough to not penetrate outer surface of hatch or door where mounted.

**END OF SECTION 07 54 19**

**SECTION 07 62 00**  
**SHEET METAL AND MISCELLANEOUS ACCESSORIES**

**PART 1 - GENERAL**

**1.01 SUMMARY**

**A. Section Includes:**

1. All sheet metal components for moisture protection.
2. Related accessories.

**1.02 SUBMITTALS**

**A. Product Data:**

1. Submit shop drawings, product data and mockups of all sheet metal.

**1.03 QUALITY ASSURANCE**

- A.** Comply with governing codes and regulations. Provide products of acceptable manufacturers in satisfactory use in similar service for five (5) years. Use experienced installers. Deliver, handle and store materials in accordance with manufacturer's instructions.

- B.** Reference Standards: Applicable portions of ASCE, SMACNA, ASTM and NAAMM publications.

**1.04 WARRANTIES**

- A.** Manufacturer's Product Warranty: Submit manufacturer's standard limited product warranty signed by the manufacturer's authorized official, guaranteeing to correct failures in product which may occur during the warranty period, without reducing or otherwise limiting any other rights to correction which Sunrise and the Project Manager may have under the contract documents. Failure is defined to include product failure which leads to interruption of a watertight installation. Correction may include repair or replacement of failed product.

- B.** Contractor's Warranty Period: For roofing flashing and sheet metal, provide a written warranty which shall warrant work to be free of leaks and defects in materials and workmanship for five (5) years, starting from date of substantial completion.

- C.** Defects of the sheet metal occurring during the warranty period shall be promptly corrected by the Contractor, and defects of the roofing shall be promptly corrected by the manufacturer at no additional cost to Sunrise. Upon notification from Sunrise or the Project Manager that evidence of a defect exists, the responsible party shall immediately inform the Project Manager of the date on which corrective work will be scheduled, and shall notify the Project Manager when the corrective work has been completed.

**PART 2 - PRODUCTS**

**2.01 SHEET METAL MATERIAL**

- A. Stainless - Steel for use as counter flashings (where not visible from the ground) and expansion joints:
- B. Hot-dipped Galvanized Steel for use as continuous clips: Minimum 22-gauge, G-90, hot-dipped galvanized metal, commercial quality, ASTM A 525.
- C. Prefinished Galvanized Sheet Steel (where visible from the ground): Shall be 24-gauge flat stock, prefinished with Kynar finish meeting ASTM A 446, forty-five and one-half inches to forty-eight inches width by one hundred twenty inches in length (45-1/2" - 48" x 120") for use as new metal edge gravel guard, downspouts, gutters, coping and miscellaneous metal.
- D. Stainless Steel: QQ-S-766, Class 301, 302, 304, or 316; or ASTM A 167, Type 301, 302, 304, or 316; form and condition most suitable for the purpose.
- E. Aluminum and Aluminum Alloy Plate and Sheet: QQ-A-250; form, alloy, and temper shall be that most suitable for the purpose.
- F. All existing sheet metal shall be replaced with new metal of like gauge and type, or as specified on drawings.
- G. All prefinished metal color shall be as selected by Owner/Architect from manufacturer's full range of colors, including metallics.
- H. Elvaloy® Cladded Metal for Pitch Pans: Shall be G-90 galvanized steel with 25 mil Elvaloy® membrane.
- I. Elvaloy® Cladded Metal: Shall be G-90 galvanized steel with 25 mil Elvaloy® membrane lamination; width shall be four feet (4'), length shall be eight feet (8') or ten feet (10').

**2.02 FASTENERS**

- A. Fasteners shall be same metal as flashing/sheet metal, or other non-corrosive metal as recommended by sheet manufacturer for the specific application. Match finish of exposed heads with material being fastened.
- B. Fasteners and fastening plates or bars shall be listed in the FM Global Approval Guide.
- C. Fastener for Brick: Shall be one-fourth inch by two inches (1/4" x 2"), zinc with plated steel or stainless-steel nail, one-piece unit, flat head.
- D. Screws: Self-taping sheet metal type with neoprene washer, as appropriate.
- A. Pop Rivets: Full stainless-steel Series 42 or 44, as appropriate.

- F. Continuous Clip: Concealed hold-down clip type; of same materials as coping, gravel guard, sized to suit application. Use a continuous clip, minimum 22-gauge G-90 galvanized.

2.03 RELATED MATERIAL

- A. Sealant (for Sheet Metal): One-component polyurethane, conforming to requirements of FS TT-S-230C, non-staining and non-bleeding.
- B. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, non-corrosive, size, and gauge required for performance.

**PART 3 - EXECUTION**

3.01 INSPECTION

- A. Verify roof openings, curbs, pipes, sleeves, ducts or vents through roof are solidly set, cant strips and reglets in place, substrates are smooth and clean and nailing strips located.
- B. Verify membrane termination and base flashings are in place, sealed and secure.
- C. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

- A. Field measure site conditions prior to fabricating work. Provide all shop drawings and mock-ups one month prior to installation to the Project Manager for approval.
- B. Install starter and edge strips and cleats before starting installation.

3.03 FABRICATION - GENERAL

- A. Shop-fabricate work to greatest extent possible. Comply with details shown, and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates. Comply with material manufacturer's instructions and recommendations. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels as indicated, with exposed edges folded back to form hems.
- B. Fabricate gravel stops/fascia, gutters/downspouts, counterflashings, expansion joints, and copings with new stainless-steel sheet metal as specified. Fabricate gravel guard and fascia to size and dimensions as indicated on the drawings. Fabricate light metal coping, gutters and downspouts as indicated.
- C. Fabricate pitch pans with cladded metal as specified.

- D. Form sheet metal on bending brake.
- E. Shape, trim and hand seam metal on bench insofar as practicable.
- F. Form materials with straight lines, sharp angles and smooth curves.
- G. Fold back edges on concealed side of exposed edge to form hem (1/2" minimum).
- H. Weld or solder joints on parts that are to be permanently and rigidly assembled.
- I. Submit sheet metal models for approval by Sunrise and the Project Manager.
- J. Limit single-piece lengths to ten feet (10').
- K. Fabricate corner pieces with eighteen-inch (18") extensions, metered and sealed by forming as one piece.
- L. All existing metal rooftop projections shall be replaced. New rooftop projection details shall be as recommended in NRCA or SMACNA handbooks. All rooftop projections shall be cleaned, all joints sealed, and painted with a rust inhibitive paint. Standard color to be selected by the Owner.
- M. All sheet metal shall be sealed and watertight.
- N. Metal work should be secured so as to prevent damage from buckling or wind. Where clips are shown, these are to be continuous.
- O. Seams: Fabricate non-moving seams in sheet metal with flat-lock seams. For metal other than aluminum, tin edges are to be seamed, form seams, and solder.
- P. Expansion Provisions: Form expansion joints of intermeshing hooked flanges, not less than one inch (1") deep, filled with mastic sealant (concealed within joints).
- Q. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with industry standards.
- R. Separations: Provide for separation of metal from non-compatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

#### 3.04 INSTALLATION

- A. General: All Sheet metal applications shall:  
Meet or exceed all ANSI/SPRI ES-1 APPLICATIONS FOR THE REGION OF THIS PROJECT.
- B. Gravel Guard/Fascia:
  - 1. Shall be installed with expansion joints, ten feet (10') on center, one-fourth inch (1/4") expansion leeway, with a cover plate.

2. Secure metal flashings per specifications.
  3. Lock seams and end joints.
  4. Form sections identical to profiles as shown or approved similar, to match existing building.
  5. Fabricate corner pieces with minimum eighteen-inch (18"), maximum forty-eight inch (48") extensions, formed and sealed with rivets and sealant, as one piece.
  6. Hem exposed edges one-half inch (1/2") minimum.
  7. Backpaint flashing in contact with masonry or dissimilar materials with bituminous paint. Surface sand before applying primers.
  8. Integrate flashing in a manner consistent with detailing.
  9. Provide and install continuous clip around perimeter.
  10. Shall be fabricated in accordance with all SMACNA provisions.
- C. Counterflashing: Remove existing and replace with new metal counterflashing as required for a permanent watertight installation.
- D. Pitch Pans – Cladded Metal:
1. Install pitch pans of cladded metal according to NRCA standards, minimum of six inches by six inches (6" x 6").
  2. Pitch pans shall be fabricated to minimum of four inches (8") above the finished roof membrane. Seams of pitch pans shall be soldered inside and out.
  3. Install new galvanized pitch pan around roof penetration fastened to existing metal roof deck.
  4. Top of pitch pan is required to have a 1-inch reverse hem seam.
  5. All metal flanges shall be primed with asphalt primer prior to flashing installation. Inside of pitch pan shall be cleaned and primed.
  6. All projections enclosed in pitch pans shall be cleaned in any manner suitable and coated with a rust inhibitive coating as approved by the Owner/Project Consultant. Coating shall be allowed to dry prior to pitch pan fill.
  7. Base of pitch pans shall be filled around penetration with M-1 sealant.
  8. Top finish fill shall be one-part, self-leveling polyurethane sealant for use in new pitch pans, or as supplied by SPF roof system manufacturer, with minimum fill to top of pitch pan sides.
  9. Strip metal flange of pitch pan with one strip of the PVC KEE flashing membrane extending from the outer edge of the flange a minimum of three inches (3") inward to base of pitch pan.
- E. Bonnets/Hoods:
1. Fabricate and install above all pitch pans, where necessary, or reinstall as applicable, metal bonnets over all pitch pans, NO EXCEPTIONS.
  2. Bonnets/Hoods shall be stainless steel.
  3. Install new stainless steel bonnet, hood, or goose neck hood cover with high dome fasteners utilized for goose neck applications fastened through the first 1-inch lever where sealant is present.
  4. Any fastener installed below the sealant level will be required to be reinstalled.
  5. On beams and other steel, weld in place bonnets fabricated from one-fourth inch (1/4") steel plate.
  6. Draw band bonnets fabricated from 22-gauge galvanized steel may be used on circular projections.

1 3.05 FINISH  
2

3 A. Damaged or exposed surfaces to be provided with a factory applied fluorocarbon Kynar  
4 finish meeting ASTM A 446 and AAMA specification 605.2 for high performance coating.  
5  
6  
7

8 **END OF SECTION 07 62 00**

**SECTION 07 71 23  
GUTTERS AND DOWNSPOUTS**

**PART 1 – GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

A. Section Includes:

1. Precoated galvanized steel gutters, downspouts, scuppers, brackets, spacers, fasteners, stiffeners and caps.
2. Precast concrete splash blocks.

**1.03 REFERENCES**

A. American Society for Testing and Materials:

1. ASTM A 48 Grey Iron Castings.
2. ASTM A 167 Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
3. ASTM A 361 Sheet Steel, Zinc-Coated (Galvanized) by Hot-Dip Process for Roofing and Siding.
4. ASTM A 446 Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
5. ASTM B 32 Solder Metal.
6. ASTM B 209 Aluminum and Aluminum Alloy Sheet and Plate.

- B. Federal Specifications: FS TT-C-494 – Coating Compound, Bituminous, Solvent Type, Acid Resistant.

- C. SMACNA – Architectural Sheet Metal Manual.

**1.04 SUBMITTALS**

- A. Product Data: Provide technical data, installation instructions, and general recommendations for each specified sheet material and fabricated product.

- B. Shop Drawings: Showing layout, profiles, jointing methods, fastening details, locations, and installation details.

- C. Samples: Submit six inch (6") long samples of factory-fabricated products illustrating component design, finish, color and configuration.

**1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Five years documented experience installing sheet metal systems.

- B. Regulatory Requirements: Comply with applicable code for size and method of rain water discharge. Comply with SMACNA Manual for sizing components for rainfall intensity determined by storm occurrence of 1 in 5 years.

- C. Gutters/Downspouts and all accessories shall be designed and provided by metal roofing manufacturer providing the standing seam metal roof panels.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Stack preformed and prefinished material to prevent twisting, bending or abrasion, and to provide ventilation. Slope to drain.

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

1.07 SEQUENCING AND SCHEDULING

- A. Coordinate work with roofing work for correct sequencing of items which makes up entire weatherproof, rain drainage and sheet metal system.

- B. Coordinate work with downspout discharge pipe inlet.

- C. Coordinate gutter and downspout system with installation of field fabricated flashing and sheet metal and sheet metal roofing under Section Sheet Metal and Miscellaneous Accessories 07 62 00. Work of this Section shall bring gutters and downspouts to point of connection with roofing system, with necessary accommodations for connections.

**PART 2 – PRODUCTS**

2.01 MATERIALS

- A. Pre-Coated Galvanized Steel: ASTM A 446, Grade A, G 90 zinc coating, 24-gauge core steel, shop pre-coated.

- B. Fasteners: Galvanized steel screws, bolts or nuts, as applicable.

- C. Stiffener Angles and Supports: Formed steel, type to match gutters, 18-gauge and clad with prefinished metal cover.

- D. Solder: ASTM B 32, 50-50 percent tin/lead solder with rosin flux for use with steel.

- E. Neutralized: Five percent (5%) to ten percent (10%) washing soda solution.

- F. Protective Back Paint for Galvanizing: Zinc chromate or galvanized iron type.

- G. Bituminous Coating: FS TT-G-494, or MIL-C-18480, or SSPC-12, cold-applied bituminous mastic, compound, for 15 mil dry film thickness coating.

- H. Wire Screen: One-half inch (1/2") mesh, stainless steel.

- I. Splash Pads or Blocks: Precast concrete type; minimum 3000 psi at 28 days, with minimum five percent (5%) air entrainment.

2.02 FABRICATION

- A. Gutters: SMACNA style profile box type, 24 gauge minimum.
- B. Downspouts: SMACNA style profile box type, 24-gauge minimum.
- C. Fabricate gutters and downspouts true to design and dimensions, straight and without deformation. Finish work free from blemishes, abrasions, tool marks, burrs and other defects which may affect strength or performance. Form corners to smallest radius possible without causing grain separation or otherwise impairing work. Allow for expansion and contraction.
- D. Install gutter sections, maximum of 12-foot in length, with overlapping joints of 2-inches set in multiple beads of sealant.
- E. Install gutter sections in shingle fashion for the direction of flow to the adjacent downspout.
- F. Install 2 rows of watertight pop rivets spaced at 1-inch between rivet the entire profile of the gutter section. Install inside sealant joint.
- G. Form gutters in eight foot (8') or ten foot (10') long sections. No more than 40-feet of gutter sections can be installed before a gutter expansion joint must be installed.
- H. Provide loose-locked expansion joints midway between outlet tubes and where gutter ends adjoin walls. Fit joints with cover strips in manner to provide watertight connections.
- I. A minimum of 2 downspouts, or as required to meet rainfall, must be installed between gutter expansion joints.
- J. Provide outlet tubes with flanges riveted and set in a full bed of sealant. Extend tubes three inches (3") into downspouts. Set gutters to slope to downspouts minimum one-eighth inch (1/8") for each foot.
- K. Form downspouts in eight foot to ten foot (8' - 10') lengths. Telescope end joints one and one-half inch (1-1/2") and lock longitudinal joints. Fasten downspouts to walls with three inch (3") wide straps. Space straps not more than eight feet (8') apart. Fasten straps to walls with screws in lead sleeves. Form downspouts of length to discharge water three feet to zero inches (3' - 0") from building slab.
- L. Close tops of downspout heads with 18-gauge removable strainer type with wire screen.
- M. Field measure site conditions prior to fabricating work.
- N. Fabricate with required connection pieces.
- O. Hem exposed edges of metal.
- P. Support Brackets, Joint Fasteners: Profiled to suit gutters and downspouts.

Q. Anchorage Devices: SMACNA requirements. Type recommended by fabricator.

R. Downspout Supports: 18-gauge straps, Kynar. Color and finish to match gutter.

S. Gutter straps and supports to be 18-gauge and clad with prefinished metal cover as detailed.

T. Seal all metal joints watertight for full metal surface contact.

U. Downspouts: Rectangular profile. Seal all joints, six inches by six inches (6" x 6").

## 2.03 FINISHES

A. Gutter and Downspouts: 70-75 percent fluorocarbon resin equivalent to Kynar 500/Hylar 5000; custom color as selected by Owner.

B. Back paint concealed metal surfaces with protective backing paint to minimum dry thickness of 15 mils.

C. Apply bitumen protective backing paint on surfaces in contact with dissimilar materials.

## PART 3 – EXECUTION

### 3.01 INSTALLATION

A. Install gutters, downspouts and accessories in accordance with SMACNA Architectural Sheet Metal Manual.

B. Joint lengths with seams watertight. Flash and seal gutters to downspouts and accessories.

C. Slope gutters to drain.

D. Set splash blocks under downspouts.

### 3.02 FIELD QUALITY CONTROL

A. Flood test gutters and downspouts upon completion. Repair any leaks.

**END OF SECTION 07 71 23**

**SECTION 07 72 00**  
**ROOF ACCESSORIES**

**PART 1 – GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

- A. This Section includes the following:

- 1. Roof curbs
- 2. Equipment supports
- 3. Pipe supports

**1.03 SUBMITTALS**

- A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details for roof accessories. Show layouts of roof accessories including plans and elevations. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components. Include plans, elevations, sections, details, and attachments to other work.
- C. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
  - 1. Size and location of roof accessories specified in this Section.
  - 2. Method of attaching roof accessories to roof or building structure.
  - 3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
- D. Samples: For each type of exposed factory-applied finish required and for each type of roof accessory indicated, prepared on Samples of size to adequately show color.
- E. Warranty: Special warranty specified in this Section.

**1.04 QUALITY ASSURANCE**

- A. Sheet Metal Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Pack, handle, and ship roof accessories properly labeled in heavy-duty packaging to prevent damage.

1.06 PROJECT CONDITIONS

- A. Field Measurements: Verify required openings for each type of roof accessory by field measurements before fabrication and indicate measurements on Shop Drawings.

1.07 COORDINATION

- A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
1. With Architect's approval, adjust location of roof accessories that would interrupt roof drainage routes and or roof expansion joints.

1.08 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.
1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
- a) Color fading more than 5 Hunter units when tested according to ASTM D 2244.
  - b) Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
  - c) Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: twenty (20) years from date of Substantial Completion.

**PART 2 – PRODUCTS**

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers listed in other Part 2 articles.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers listed in other Part 2 articles.

2.02 METAL MATERIALS

- A. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coated.
- B. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, AZ50 (AZM150) coated.
- C. Prepainted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by hot-dip process and prepainted by coil-coating process to comply with ASTM A 755/A 755M.
1. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coated.
2. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 (Class AZM150) coated.

3. Exposed Finishes: High-Performance Organic Finish (2-Coat Fluoropolymer): Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
- a) Fluoropolymer 2-Coat System: Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements in AAMA 2605, except as modified below:
- (1) Humidity Resistance: 1000 hours.
- (2) Salt-Spray Resistance: 1000 hours.

- D. Stainless-Steel Shapes or Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304 or Type 316, No. 2D finish.

#### 2.03 MISCELLANEOUS MATERIALS

- A. Acrylic Glazing: ASTM D 4802, thermoformable, monolithic sheet, category as standard with manufacturer, Type UVA (formulated with UV absorber), Finish 1 (smooth or polished).
- B. Polycarbonate Glazing: Thermoformable, monolithic polycarbonate sheets manufactured by extrusion process, burglar-resistance rated per UL 972 with an average impact strength of 12 to 16 ft-lbf/in. of width when tested according to ASTM D 256, Method A (Izod).
- C. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by roof accessory manufacturer. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners.
- D. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.
- E. Elastomeric Sealant: ASTM C 920, polyurethane sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, and heavy bodied for hooked-type expansion joints with limited movement.
- G. Roofing Cement: ASTM D 4586, non asbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.

#### 2.04 ROOF CURBS

- A. Roof Curbs: Provide metal roof curbs, internally reinforced and capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported on roof curbs. Fabricate with welded or sealed mechanical corner joints and integral formed mounting flange at perimeter bottom. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1. Manufacturers:
  - a) ThyCurb; Div. of Thybar Corporation.
  - b) Uni-Curb, Inc.
  - c) Vent Products Company, Inc.
2. Load Requirements: As required to adequately support rooftop equipment.
3. Material: Galvanized steel sheet, 0.052 inch thick.
4. Material: Aluminum sheet, 0.090 inch thick.
5. Material: Stainless-steel sheet, 0.078 inch thick.
  - a) Finish: Prime painted.
  - b) Finish: Mill.
6. Liner: Same material as curb, of manufacturer's standard thickness and finish.
7. Factory install wood nailers at tops of curbs.
8. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
9. Factory insulate curbs with one and one-half inch (1-1/2") glass fiberboard insulation.
10. Curb height may be determined by adding thickness of roof insulation and minimum base flashing height recommended by roofing membrane manufacturer. Fabricate units to minimum height of fourteen inches (14"), unless otherwise indicated.
11. Sloping Roofs: Where slope of roof deck exceeds 1:48, fabricate curb units with water diverter or cricket and with height tapered to match slope to level tops of units.

## 2.05 EQUIPMENT SUPPORTS

- A. Equipment Supports: Provide metal equipment supports, internally reinforced and capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported. Fabricate with welded or sealed mechanical corner joints and integral formed mounting flange at perimeter bottom. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.
1. Manufacturers:
    - a) ThyCurb; Div. of Thybar Corporation.
    - b) Uni-Curb, Inc.
    - c) Vent Products Company, Inc.
  2. Material: (Galvanized) steel sheet, 0.052 inch thick.
  3. Material: Stainless-steel sheet, 0.078 inch thick.
  4. Factory-install continuous wood nailers three and one-half inches (3-1/2") wide at tops of equipment supports.
  5. Metal Counterflashing: Manufacturer's standard removable counterflashing, fabricated of same metal and finish as equipment support.
  6. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
  7. Fabricate units to minimum height of fourteen inches (14") unless otherwise indicated.
  8. Sloping Roofs: Where slope of roof deck exceeds 1:48, fabricate curb units with water diverter or cricket and with height tapered to match slope to level tops of units.

## 2.06 ROOF SUPPORTS

- A. Light-Duty Pipe Roof Supports: Extruded-aluminum base assembly and Type 304 stainless-steel roller assembly for pipe sizes indicated, including manufacturer's standard hardware for mounting to structure or structural roof deck.

1. Manufacturers:

- a) Thaler Metal Industries Ltd.
- b) Miro Industries.
- c) PHP Systems/Design.
- d) Or approved equal.

B. Duct Roof Supports: Two inch (2") diameter, extruded-aluminum, urethane-insulated supports, including manufacturer's standard hardware for mounting to structure or structural roof deck.

1. Manufacturers:

- a) Thaler Metal Industries Ltd., or approved equal.

**PART 3 – EXECUTION**

**3.01 EXAMINATION**

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.

- 1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored and is ready to receive roof accessories.
- 2. Verify dimensions of roof openings for roof accessories.
- 3. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.02 INSTALLATION**

A. General: Install roof accessories according to manufacturer's written instructions. Anchor roof accessories securely in place and capable of resisting forces specified. Use fasteners, separators, sealants, and other miscellaneous items as required for completing roof accessory installation. Install roof accessories to resist exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Install roof accessories to fit substrates and to result in watertight performance.

C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

- 1. Coat concealed side of uncoated aluminum roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
- 2. Underlayment: Where installing exposed-to-view components of roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene underlayment.
- 3. Bed flanges in thick coat of asphalt roofing cement where required by roof accessory manufacturers for waterproof performance.

D. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.

E. Roof Curb Installation:

- 1. Set roof curb so top surface of roof curb is level.

F. Equipment Support Installation:

1. Pipe/equipment supports shall be removed and replaced with new premanufactured pipe supports.
2. Set equipment support so top surface of equipment support is level.
3. Pipe supports shall be placed approximately ten feet (10') on center.
4. New pipe supports shall be set in sealant and strapped to pipe and conduit with the appropriate strap specific for the support supplied.

3.03 TOUCH UP

A. Touch up factory-primed surfaces with compatible primer ready for field painting.

B Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.04 CLEANING

A. Clean exposed surfaces according to manufacturer's written instructions.

**END OF SECTION 07 72 00**

**SECTION 07 92 00  
SEALANTS AND CAULKING**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

**A. Work includes:**

1. Throughout the Work, seal and caulk joints where shown on the Drawings and/or as required by the Consultant to provide and maintain watertight and airtight continuous seals.
2. This section includes, but is not limited to, providing joint sealants to be in the following areas:
  - a) Exterior openings
  - b) Perimeter of soffits to wall surfaces
  - c) Control and expansion joints in masonry and concrete walls
  - d) Trim moldings to wall surfaces
  - e) Parapet cap copings and counter flashings at roofing conditions
  - f) Perimeter joints of plumbing fixtures
  - g) All other joints as directed by the Architect/ Consultant

**1.02 QUALITY ASSURANCE**

- A.** Use adequate numbers of skilled workmen who have successfully completed a minimum of three projects in the last five years of similar type and scope as the project herein. The workmen shall be thoroughly trained and experienced in joint sealant applications and completely familiar with the specified requirements and methods needed for the proper performance of the work of this section.
- B.** Joint sealer products shall be obtained from a single manufacturer for each product required.
- C. Job Site Testing**
1. All joint sealants shall be field tested for proper adhesion to the joint substrates prior to installation. Do not proceed with the work until job site tests have been approved by the Consultant.
  2. Locate and provide test joints for each type of joint sealant, and substrate as directed by the Consultant.
  3. Acceptable test joints will be used as the standard for all joint sealant work on the project.
  4. Sealants which fail to adhere to the substrates shall be removed and replaced at no extra cost to the Owner.

**1.03 SUBMITTALS**

- A. Product Data:** Within fifteen (15) calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
1. Materials list of items proposed to be provided under this Section;

2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
3. Manufacturer's recommended installation procedures which, when approved by the Consultant, will become the basis for accepting or rejecting actual installation procedures used on the Work.

- B. Samples: Accompanying the submittal described above, submit samples of each sealant, each backing material, each primer, and each bond breaker proposed to be used. Include color samples of full standard product color range.

#### 1.04 PRODUCT HANDLING

- A. Do not retain at the job site material which has exceeded the shelf life recommended by its manufacturer.
- B. Store products on site in compliance with the manufacturer's recommendations and as necessary to prevent damage or deterioration to the materials.

#### 1.05 WARRANTY

- A. All sealants and caulking shall be provided with a five (5) year manufacturer's warranty.

### PART 2 – PRODUCTS

#### 2.01 SEALANTS AND CAULK

- A. Except as specifically otherwise approved by the Consultant, use only the types of sealants described in this Section.
- B. Vertical surfaces and non-traffic bearing horizontal surfaces:
1. One-part Urethane Sealant: Sealant for use at coping joints, reglet joints, etc., shall be a one-component urethane non-sag, gun grade sealant designed for use in active exterior joints, and shall meet or exceed Federal Specification No. 1 TT-S-00230C, Type II, Class A, ASTM C 920. Where joint surfaces are contained or are contaminated with bituminous materials, provide manufacturer's modified-type sealant (modified with coal-tar or asphalt as required), as manufactured by Sonneborn, or approved equal.
  2. Dow Corning Dowsil 795 one-part silicone sealant or approved equal as required by manufacturer representative for compatibility with the roofing system and silicone based coating.
- C. Colors
1. Colors for each sealant installation will be selected by the Consultant from standard colors normally available from the specified manufacturers.
  2. Should such standard color not be available from the approved manufacturer except at additional charge, provide such colors at no additional cost to the Owner.

2.02 PRIMERS

- A. Use only those primers which are non-staining, have been tested for durability on the surfaces to be sealed, and are specifically recommended for this installation by the manufacturer of the sealant used.

2.03 BACKUP MATERIALS

- A. Use only those backup materials which are specifically recommended for this installation by the manufacturer of the sealant used, which are non-absorbent, and which are non-staining.

- B. Acceptable types include:

1. Closed-cell resilient urethane or polyvinyl-chloride foam;
2. Closed-cell polyethylene foam;
3. Closed-cell sponge of vinyl or rubber;
4. Polychloroprene tubes or beads;
5. Polyisobutylene extrusions

- C. Preformed support strips for ceramic tile control joint and expansion joint work: Use polyisobutylene or polychloroprene rubber.

2.04 BOND-BREAKER TAPE

- A. Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.05 MASKING TAPE

- A. For masking around joints, provide masking tape complying with Fed Spec UU-T-I06c.

2.06 EXPANDED POLYETHYLENE JOINT FILLER

- A. Provide flexible, compressible, closed-cell, polyethylene of not less than 10 psi compression deflection (25%); except provide higher compression deflection strength as may be necessary to withstand installation forces and provide proper support for sealants, surface water absorption of not more than 0.1 pounds per square foot, as manufactured by Sonneborn, or approved equal.

2.07 JOINT PRIMER/SEALER

- A. Provide type of joint primer/sealer recommended by sealant manufacturer for joint surfaces to be primed or sealed.

2.02 BOND BREAKER TAPE

- A. Provide polyethylene tape or other plastic tape as recommended by sealant manufacturer, to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.

2.09 SEALANT BACKER ROD

- A. Provide compressible rod stock of polyethylene foam, polyurethane foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable, non-absorptive material as recommended by sealant manufacturer for back-up of and compatibility with sealant. Where used with hot-applied sealant, provide heat-resistant type which will not be deteriorated by sealant application temperature as indicated.

2.10 FLUID APPLIED URETHANE DECK SEALANT SYSTEM

- A. Shall be a two layer, minimum sixty (60) mil dry film thickness, two-component liquid urethane waterproofing system suitable for concrete deck application (exposed), as manufactured by Gates Engineering, UDC-82, or approved equal.

2.11 MULTI-COMPONENT POLYURETHANE SEALANT

- A. Except as otherwise indicated, provide manufacturer's standard, non-modified, 2-or-more-part, polyurethane-based, elastomeric sealant; complying with either ASTM C 920, Type M, Class 25, or FS TT-S-00227E, Class A; self-leveling grade/type where used in joints of surfaces subject to traffic, otherwise non-sag grade/type, as manufactured by Sonneborn, or approved equal.
- B. Durability: Less than 0.5 square inch adhesion/cohesion loss for three (3) samples of both mortar and aluminum; ASTM C 719 test procedure.
- C. Adhesion in Peel: Fifteen pound (15#) peel strength and 10% maximum loss of bond to substrate; ASTM C 794.
- D. Bituminous Modification: Where joint surfaces contain or are contaminated with bituminous materials, provide manufacturer's modified type sealant which is compatible with joint surfaces (modified with coal-tar or asphalt as required).

**PART 3 – EXECUTION**

3.01 SURFACE CONDITIONS

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

3.02 PREPARATION

A. Concrete surfaces

1. Install only on surfaces which are dry, sound, and well brushed, wiping free from dust.
2. At open joints, remove dust by mechanically blown compressed air if so required.
3. Use solvent to remove oil and grease, wiping the surfaces with clean rags.
4. Where surfaces have been treated, remove the surface treatment by sandblasting or wire brushing.
5. Remove laitance and mortar from joint cavities.
6. Where backstop is required, insert the approved backup material into the joint cavity to the depth needed.

B. Steel surfaces

1. Steel surfaces in contact with sealant:  
Sandblast as required to achieve acceptable surface for bond.
  - a) If sandblasting is not practical, or would damage adjacent finish, scrape the metal or wire brush to remove mill scale.
  - b) Use solvent to remove oil and grease, wiping the surfaces with clean rags.
2. Remove protective coatings on steel by sandblasting or by using a solvent which leaves no residue.

C. Aluminum surfaces

1. Aluminum surfaces in contact with sealant:
  - a) Remove temporary protective coatings, dirt, oil, and grease.
  - b) When masking tape is used for protective cover, remove the tape just prior to applying the sealant.
2. Use only such solvents to remove protective coatings as are recommended for that purpose by the manufacturer of the aluminum work, and which are non-staining.

3.03 INSTALLATION OF BACKUP MATERIAL

- A. Use only the backup material recommended by the manufacturer of the sealant used, and approved by the Consultant for the particular installation, compressing the backup material 25 to 50 percent to achieve a positive and secure fit.
- B. When using backup of tube rod stock, avoid lengthwise stretching of the material. Do not twist or braid hose or rod backup stock.

3.04 PRIMING

- A. Use only the primer recommended by the manufacturer of the sealant, and approved by the Consultant for the particular installation, applying in strict accordance with the manufacturer's recommendations as approved by the Consultant.

3.05 BOND-BREAKER INSTALLATION

- A. Provide an approved bond-breaker where recommended by the manufacturer of the sealant for preventing the sealant to adhering to rigid, inflexible joint filler materials or to joint surfaces at back of joint where such adhesion would result in sealant failure. Adhere strictly to the installation recommendations as approved by the Consultant.

3.06 INSTALLATION OF SEALANTS

- A. Prior to start of installation in each joint, verify the joint type according to details on the Drawings, or as otherwise directed by the Consultant, and verify that the required proportion of width of joint to depth of joint has been secured.
- B. Comply with ASTM C1193 for application of joint sealants.
- C. Equipment:
  - 1. Apply sealant under pressure with power-actuated or handgun, or by other appropriate means.
  - 2. Use guns with nozzle of proper size and providing sufficient pressure to completely fill the joints as designed.
- D. Thoroughly and completely mask joints where the appearance of sealant on adjacent surfaces would be objectionable.
- E. Install the sealant in strict accordance with the manufacturer's recommendations as approved by the Consultant, thoroughly filling joints to the recommended depth.
- F. Tool joints to the profile shown on the Drawings, or as otherwise required if such profiles are not shown on the Drawings.
- G. Do not install sealant when air temperature is under 40 degrees F. Sealant temperature to be at least 50 degrees F; controlled warming permitted to ease installation.
- H. Cleaning up:
  - 1. Remove masking tape immediately after joints have been tooled.
  - 2. Clean adjacent surfaces free from sealant as the installation progresses, using solvent or cleaning agent recommended by the manufacturer of the sealant used.

3.07 HORIZONTAL EXTERIOR JUNCTURE OF METAL EDGE AND COPING TO EXTERIOR WALL, REGLET JOINTS, CAULK JOINTS, WALL JOINTS, AND WALL CRACKS ABOVE THE ROOF LINE

- A. All reglet and horizontal edge metal and coping metal on exterior of wall shall be raked clean of loose materials and debris, and sealed with caulk sealant. Sealant shall be properly installed and tooled in a workmanlike manner to ensure permanent seal.
- B. All open coping and masonry terminations and intersections shall be cleaned out and sealed with backer rod and caulk sealant. Backer rod shall be minimum one and one-half (1-1/2) times the width of the opening to be sealed. Caulk sealant thickness shall be minimum of one-half (1/2) of the width of the opening to be sealed.

- 1  
2 C. Clean joint surfaces immediately before installation of gaskets, sealant or caulking  
3 compound. Remove dirt, insecure coatings, existing sealant, moisture, and other  
4 substances which could interfere with seal of gasket or bond of sealant or caulking  
5 compound. Etch concrete and masonry joint surfaces as recommended by sealant  
6 manufacturer. Roughen vitreous and glazed joint surfaces as recommended by sealant  
7 manufacturer.  
8  
9 D. Prime or seal joint surfaces where indicated, and where recommended by sealant  
10 manufacturer. Confine primer/sealer to areas of sealant bond; do not allow spillage or  
11 migration onto adjoining surfaces.  
12  
13 E. Comply with manufacturer's printed instructions except where more stringent requirements  
14 are shown or specified, and except where manufacturer's technical representative directs  
15 otherwise.  
16  
17 F. Install sealant backer rod for liquid-applied sealants, except where shown to be omitted or  
18 recommended to be omitted by sealant manufacturer for application indicated.  
19  
20 G. Employ only proven installation techniques, which will ensure that sealants are deposited  
21 in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint  
22 to bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant  
23 rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal  
24 joints are between a horizontal surface and vertical surface, fill joint to form a slight cove,  
25 so that joint will not trap moisture and dirt.  
26  
27 H. For normal moving joints to be sealed with elastomeric sealants but not subject to traffic,  
28 fill joints to a depth equal to 50% of joint width, but neither more than one-half inch (1/2")  
29 deep nor less than one-fourth inch (1/4") deep.  
30  
31  
32  
33  
34

**END OF SECTION 07 92 00**

**SECTION 07 99 99**  
**ROOF PLANS / DETAIL DRAWINGS**

**1.01 ROOF PLANS**

- A. Any drawings supplied are for reference purposes only. Dimensions, penetrations, curbs, etc. must be field verified. Those shown are typical but may not be all inclusive, and contractor shall be responsible for the correctness of same. Any existing insulation thickness, deck type or other details shown on the drawings shall be subject to contractor confirmation.

**1.02 DETAIL DRAWINGS**

- A. The enclosed details for this project are intended primarily to present the proper installation of the membranes used for waterproofing at flashings, perimeter closures, roof projections, etc. Specific underlying construction configurations, such as walls, nailers, wood backing, structural steel, etc., which may currently be in place may or may not be accurately depicted on the attached details. Unless specifically called out in the accompanying written specifications, or where a detail is noted "AS DRAWN", and/or proper roofing and construction practices are not being followed, underlying construction configurations are to remain unchanged from those in place on the building prior to this reroofing.

**END OF SECTION 07 99 99**



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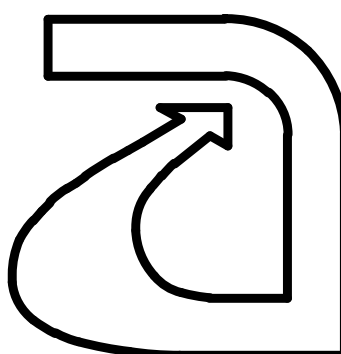
TRUE  
VICINITY MAP



TRUE  
LOCATION MAP

| SHEET INDEX  |                               |
|--------------|-------------------------------|
| Sheet Number | Sheet Name                    |
| GS1.00       | COVER SHEET                   |
| GS1.01       | GENERAL ROOFING INFORMATION   |
| R1.01        | OVERALL ROOF PLAN - WAREHOUSE |
| R1.02        | OVERALL ROOF PLAN - ANNEX     |
| R2.01        | ROOF DETAILS                  |





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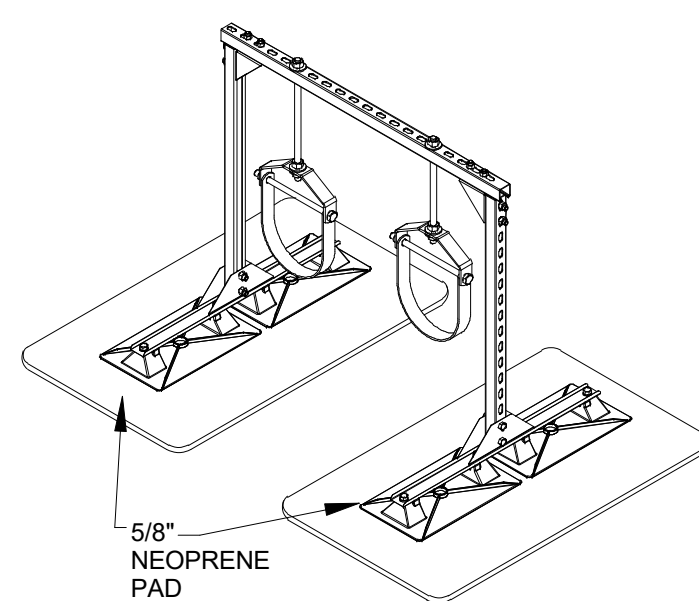
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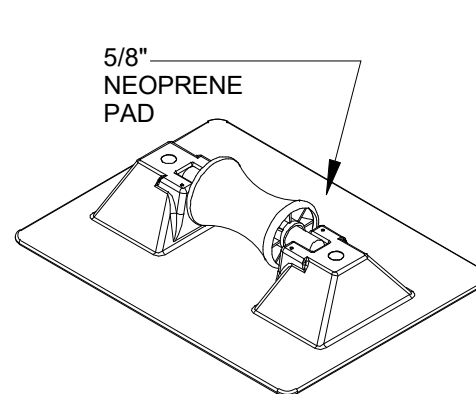
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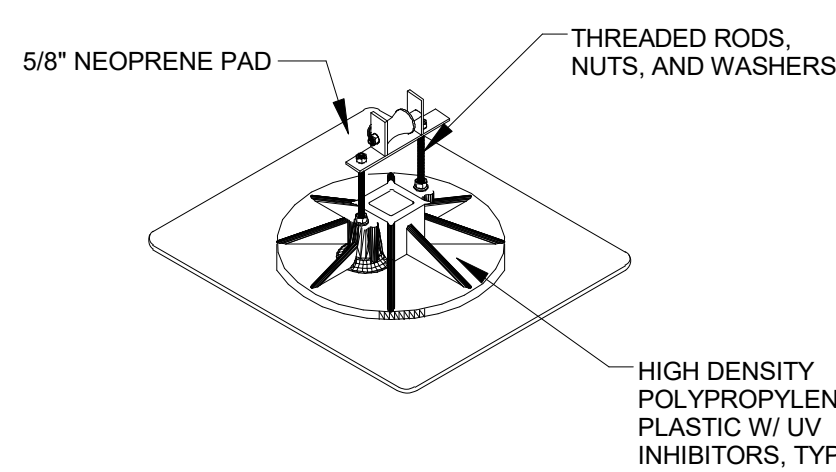
GS1.00



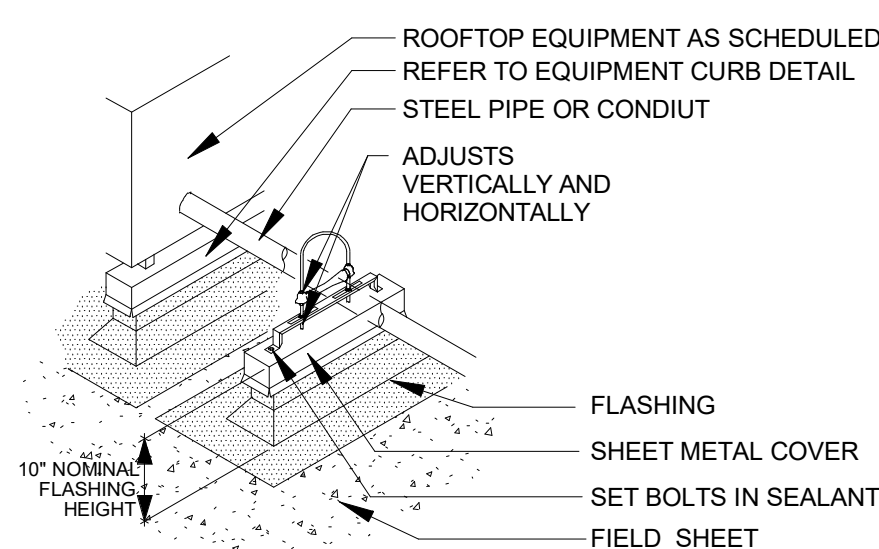
5 PIPE HANGER  
NOT TO SCALE



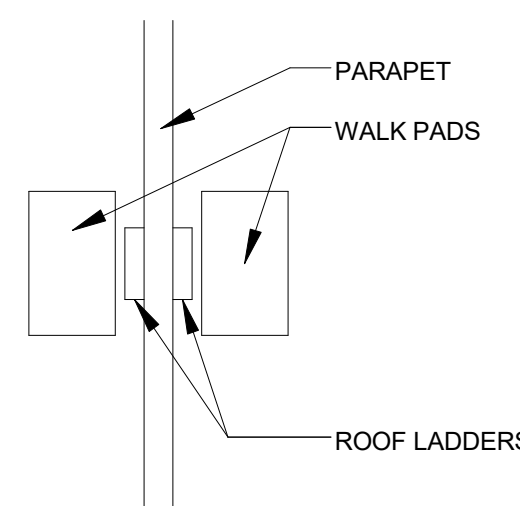
## 4 ROLLER PIPE SUPPORT



### 3 ROLLER PIPE SUPPORT

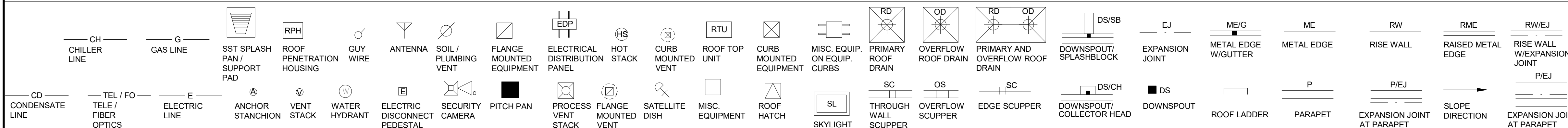


## 2 PIPE STAND

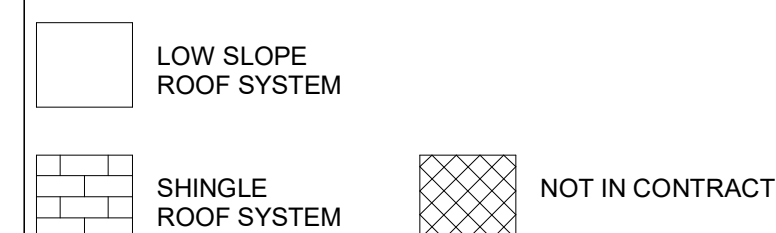


## 1 ROOF TO ROOF LADDER WITH WALK PADS

|                                                       |                     |
|-------------------------------------------------------|---------------------|
| Building Code                                         | 2018 IRC            |
| Energy Code                                           | 2018 IECC           |
| Existing Building Code                                | 2018 IEBC           |
| ASCE Wind Updite                                      | ASCE 7-16           |
| Wind Exposure                                         | C                   |
| Internal Pressure Coefficient                         | +/-0.18             |
| Risk Category                                         | III                 |
| Basic Design Wind Speed, $V$ (mph)                    | 153                 |
| Allowable Stress Design (ASD) Wind Speed, $V_{ASD}$   | $V\sqrt{0.6}$ (mph) |
| Risk Category (Storm Shelters & Essential Facilities) | IV                  |
| Basic Design Wind Speed, $V$ (mph)                    | 169                 |
| Allowable Stress Design (ASD) Wind Speed, $V_{ASD}$   | $V\sqrt{0.6}$ (mph) |
|                                                       | 125                 |



## ROOF LEGEND



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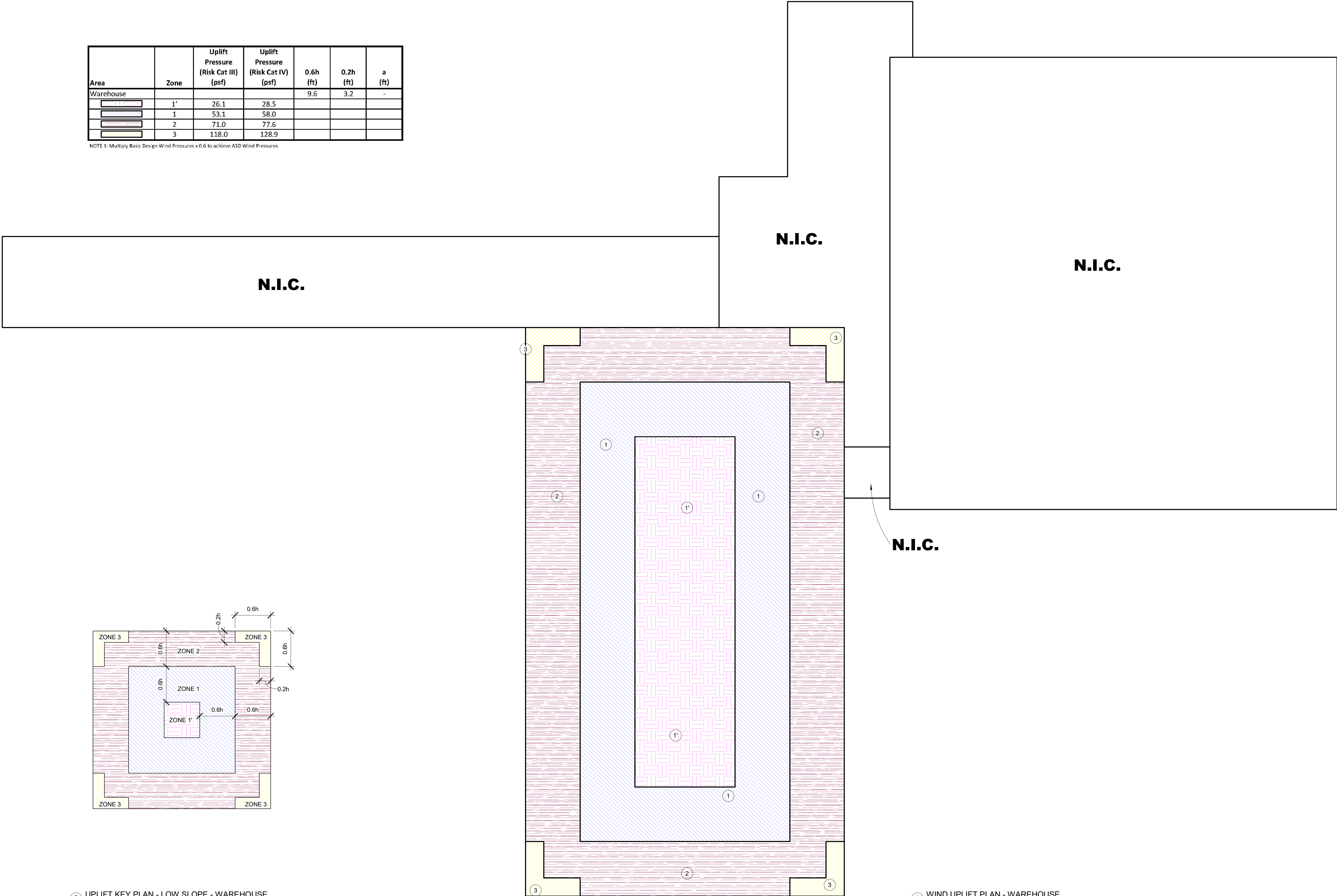
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## GENERAL ROOFING INFORMATION

# GS1.01

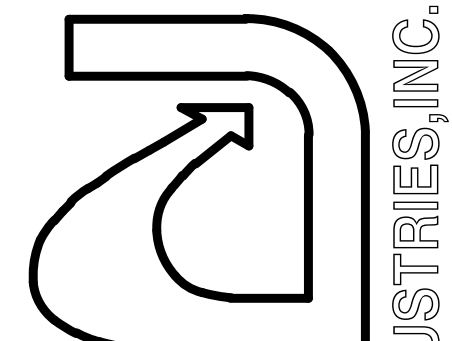
| Area      | Zone | Uplift Pressure<br>(Risk Cat III)<br>(psf) | Uplift Pressure<br>(Risk Cat IV)<br>(psf) | 0.6h<br>(ft) | 0.2h<br>(ft) | a<br>(ft) |
|-----------|------|--------------------------------------------|-------------------------------------------|--------------|--------------|-----------|
| Warehouse |      |                                            |                                           | 9.6          | 3.2          | -         |
|           | 1'   | 26.1                                       | 28.5                                      |              |              |           |
|           | 1    | 53.1                                       | 58.0                                      |              |              |           |
|           | 2    | 71.0                                       | 77.6                                      |              |              |           |
|           | 3    | 118.0                                      | 128.9                                     |              |              |           |

NOTE 1: Multiply Basic Design Wind Pressures x 0.6 to achieve ASD Wind Pressures



② UPLIFT KEY PLAN - LOW SLOPE - WAREHOUSE  
1/32" = 1'-0"

① WIND UPLIFT PLAN - WAREHOUSE  
1/8" = 1'-0"



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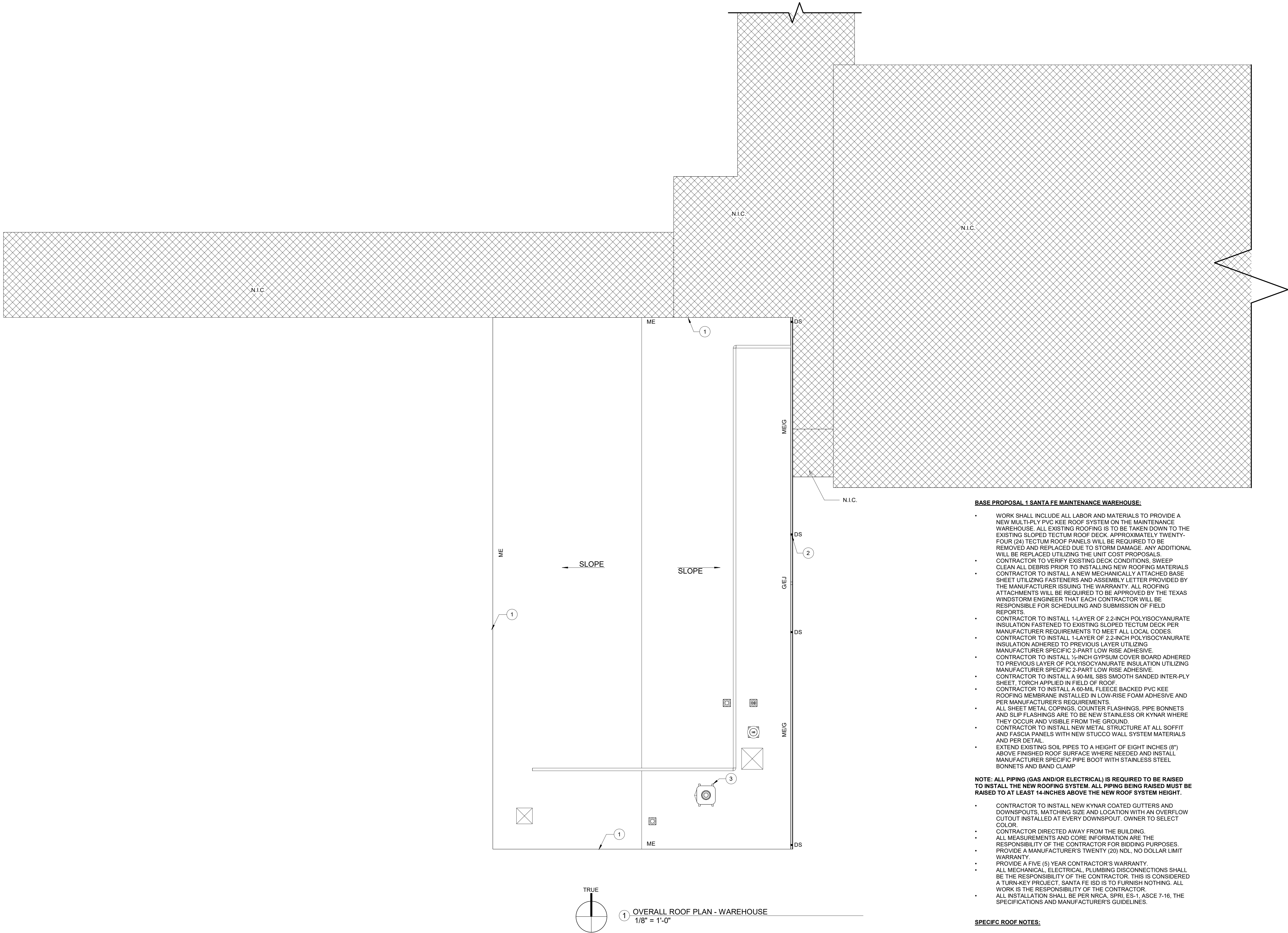
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WIND UPLIFT  
PRESSURE PLAN -  
WAREHOUSE

GS2.01





**BASE PROPOSAL 1 SANTA FE MAINTENANCE WAREHOUSE:**

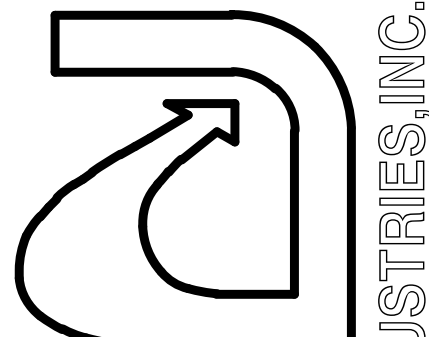
- WORK SHALL INCLUDE ALL LABOR AND MATERIALS TO PROVIDE A NEW MULTI-PLY PVC KEE ROOF SYSTEM ON THE MAINTENANCE WAREHOUSE. ALL EXISTING ROOFING IS TO BE TAKEN DOWN TO THE EXISTING SLOPED TECTUM ROOF DECK. APPROXIMATELY TWENTY-FOUR (24) TECTUM ROOF PANELS WILL BE REQUIRED TO BE REMOVED AND REPLACED DUE TO STORM DAMAGE. ANY ADDITIONAL WILL BE REPLACED UTILIZING THE UNIT COST PROPOSALS.
- CONTRACTOR TO VERIFY EXISTING DECK CONDITIONS. SWEEP CLEAN ALL DEBRIS PRIOR TO INSTALLING NEW ROOFING MATERIALS
- CONTRACTOR TO INSTALL A NEW MECHANICALLY ATTACHED BASE SHEET UTILIZING FASTENERS AND ASSEMBLY LETTER PROVIDED BY THE MANUFACTURER ISSUING THE WARRANTY. ALL ROOFING ATTACHMENTS WILL BE REQUIRED TO BE APPROVED BY THE TEXAS WINDSTORM ENGINEER THAT EACH CONTRACTOR WILL BE RESPONSIBLE FOR SCHEDULING AND SUBMISSION OF FIELD REPORTS.
- CONTRACTOR TO INSTALL 1-LAYER OF 2.2-INCH POLYISOCYANURATE INSULATION FASTENED TO EXISTING SLOPED TECTUM DECK PER MANUFACTURER REQUIREMENTS TO MEET ALL LOCAL CODES.
- CONTRACTOR TO INSTALL 1-LAYER OF 2.2-INCH POLYISOCYANURATE INSULATION ADHERED TO PREVIOUS LAYER UTILIZING MANUFACTURER SPECIFIC 2-PART LOW RISE ADHESIVE.
- CONTRACTOR TO INSTALL 1/2-INCH GYPSUM COVER BOARD ADHERED TO PREVIOUS LAYER OF POLYISOCYANURATE INSULATION UTILIZING MANUFACTURER SPECIFIC 2-PART LOW RISE ADHESIVE.
- CONTRACTOR TO INSTALL A 90-MIL SBS SMOOTH SANDED INTER-PLY SHEET. TORCH APPLIED IN FIELD OF ROOF.
- CONTRACTOR TO INSTALL A 60-MIL FLEECE BACKED PVC KEE ROOFING MEMBRANE INSTALLED IN LOW-RISE FOAM ADHESIVE AND PER MANUFACTURER'S REQUIREMENTS.
- ALL SHEET METAL COPINGS, COUNTER FLASHINGS, PIPE BONNETS AND SLIP FLASHINGS ARE TO BE NEW STAINLESS OR KYNAR WHERE THEY OCCUR AND VISIBLE FROM THE GROUND.
- CONTRACTOR TO INSTALL NEW METAL STRUCTURE AT ALL SOFFIT AND FASCIA PANELS WITH NEW STUCCO WALL SYSTEM MATERIALS AND PER DETAIL.
- EXTEND EXISTING SOIL PIPES TO A HEIGHT OF EIGHT INCHES (8") ABOVE FINISHED ROOF SURFACE WHERE NEEDED AND INSTALL MANUFACTURER SPECIFIC PIPE BOOT WITH STAINLESS STEEL BONNETS AND BAND CLAMP

**NOTE: ALL PIPING (GAS AND/OR ELECTRICAL) IS REQUIRED TO BE RAISED TO INSTALL THE NEW ROOFING SYSTEM. ALL PIPING BEING RAISED MUST BE RAISED TO AT LEAST 14-INCHES ABOVE THE NEW ROOF SYSTEM HEIGHT.**

- CONTRACTOR TO INSTALL NEW KYNAR COATED GUTTERS AND DOWNSPOUTS, MATCHING SIZE AND LOCATION WITH AN OVERFLOW CUTOUT INSTALLED AT EVERY DOWNSPOUT. OWNER TO SELECT COLOR.
- CONTRACTOR DIRECTED AWAY FROM THE BUILDING.
- ALL MEASUREMENTS AND CORE INFORMATION ARE THE RESPONSIBILITY OF THE CONTRACTOR FOR BIDDING PURPOSES.
- PROVIDE A MANUFACTURER'S TWENTY (20) NDL, NO DOLLAR LIMIT WARRANTY.
- PROVIDE A FIVE (5) YEAR CONTRACTOR'S WARRANTY.
- ALL MECHANICAL, ELECTRICAL, PLUMBING DISCONNECTIONS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THIS IS CONSIDERED A TURN-KEY PROJECT. SANTA FE ISD IS TO FURNISH NOTHING. ALL WORK IS THE RESPONSIBILITY OF THE CONTRACTOR.
- ALL INSTALLATION SHALL BE PER NRCA, SPRI, ES-1, ASCE 7-16, THE SPECIFICATIONS AND MANUFACTURER'S GUIDELINES.

**SPECIFIC ROOF NOTES:**

1. PROVIDE PREFINISHED METAL EDGE FLASHING AS DETAILED
2. PROVIDE PREFINISHED METAL GUTTER AND DOWNSPOUTS AS DETAILED.
3. PROVIDE NEW PREMANUFACTURED EQUIPMENT SUPPORT CURBS.



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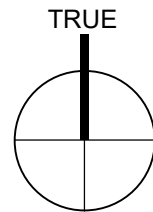
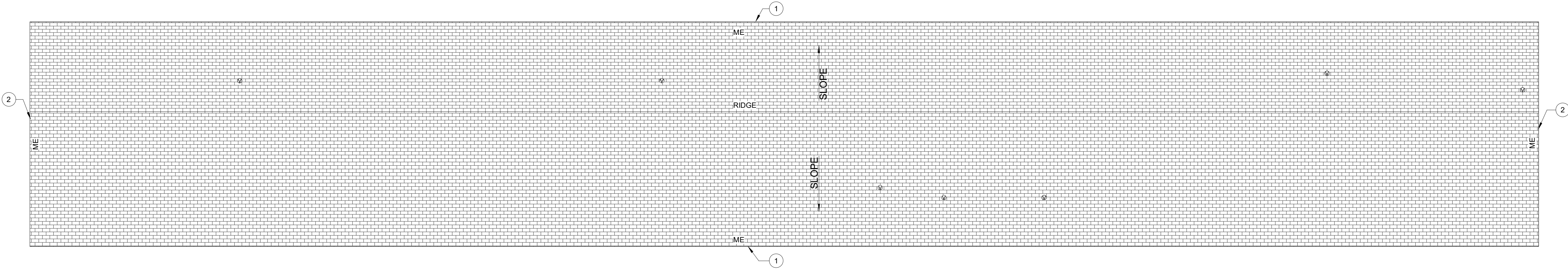
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OVERALL ROOF  
PLAN - WAREHOUSE

R1.01



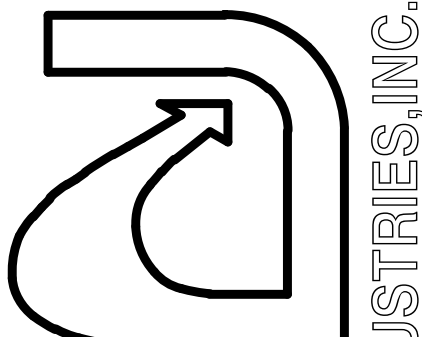
1 OVERALL ROOF PLAN - ANNEX  
1/8" = 1'-0"

**BASE PROPOSAL 2 – ANNEX BUILDING**

- WORK SHALL INCLUDE ALL LABOR AND MATERIALS TO PROVIDE A NEW ARCHITECTURAL SHINGLE ROOF SYSTEM ON ROOF AREA A OF SANTA FE ISD ANNEX. ALL ROOF AREAS ARE TO BE TAKEN DOWN TO EXISTING PLYWOOD DECKING. CONTRACTOR TO INSPECT AND REPAIR ANY DETERIORATED PLYWOOD DECKING PRIOR TO INSTALLING A MECHANICALLY ATTACHED SYNTHETIC BASE SHEET.
- CONTRACTOR TO INSTALL A NEW SELF-ADHERED WATERPROOFING UNDERLAYMENT AT THE RIDGE AND OVER TOP OF A NEW DRIP EDGE PRIOR TO NEW MECHANICALLY ATTACHED SYNTHETIC BASE SHEET MECHANICALLY ATTACHED TO MEET LOCAL WIND REQUIREMENTS TO MEET ASCE 7-16.
- INSTALL NEW SYNTHETIC BASE SHEET MECHANICALLY ATTACHED TO EXISTING PLYWOOD ROOF DECK AND NAIL BASE INSULATION.
- CONTRACTOR TO INSTALL NEW KYNAR COATED DRIP EDGE AT ALL LOCATIONS. MECHANICALLY ATTACHED TO EXISTING PLYWOOD NAIL BASE AND IMMEDIATELY STRIPPED IN WITH NEW SELF-ADHERED BASE FLASHING.
- CONTRACTOR TO INSTALL A NEW ARCHITECTURAL SHINGLE TO MATCH EXISTING COLOR. FASTENED AT 6 NAILS PER SHINGLE FOR 'ENHANCED' APPLICATIONS OR AS REQUIRED TO MEET LOCAL WIND ZONE. TAMKO TITAN XT OR SIMILAR TO MEET WIND WARRANTY REQUIREMENTS.
- ANY LEAD FLASHING BOOTS ARE TO BE REPLACED WITH NEW ROOF JACK LEAD BOOTS PRIMED AND SET IN SEALANT.
- ALL MEASUREMENTS ARE THE RESPONSIBILITY OF THE CONTRACTOR FOR BIDDING PURPOSES.
- PROVIDE A MANUFACTURER'S 40-YEAR LIMITED WARRANTY MANUFACTURER'S DEFECT WARRANTY.
- PROVIDE A MANUFACTURER'S 15-YEAR WIND WARRANTY UP TO 160MPH WITH SPECIAL INSTALLATION.
- PROVIDE MANUFACTURER'S 120-MONTH ALGAE WARRANTY.
- PROVIDE A FIVE (5) YEAR CONTRACTOR'S WARRANTY. THIS IS CONSIDERED A TURN-KEY PROJECT, SANTA FE ISD IS TO FURNISH NOTHING. ALL WORK IS THE RESPONSIBILITY OF THE CONTRACTOR.
- ALL INSTALLATIONS SHALL BE PER NRCA, SPRI, ES-1, ASCE 7-16, THE SPECIFICATIONS AND MANUFACTURER'S GUIDELINES.

**SPECIFIC ROOF NOTES:**

1. PROVIDE PREFINISHED METAL EDGE FLASHING AS DETAILED
2. PROVIDE PREFINISHED RAKE FLASHING AS DETAILED



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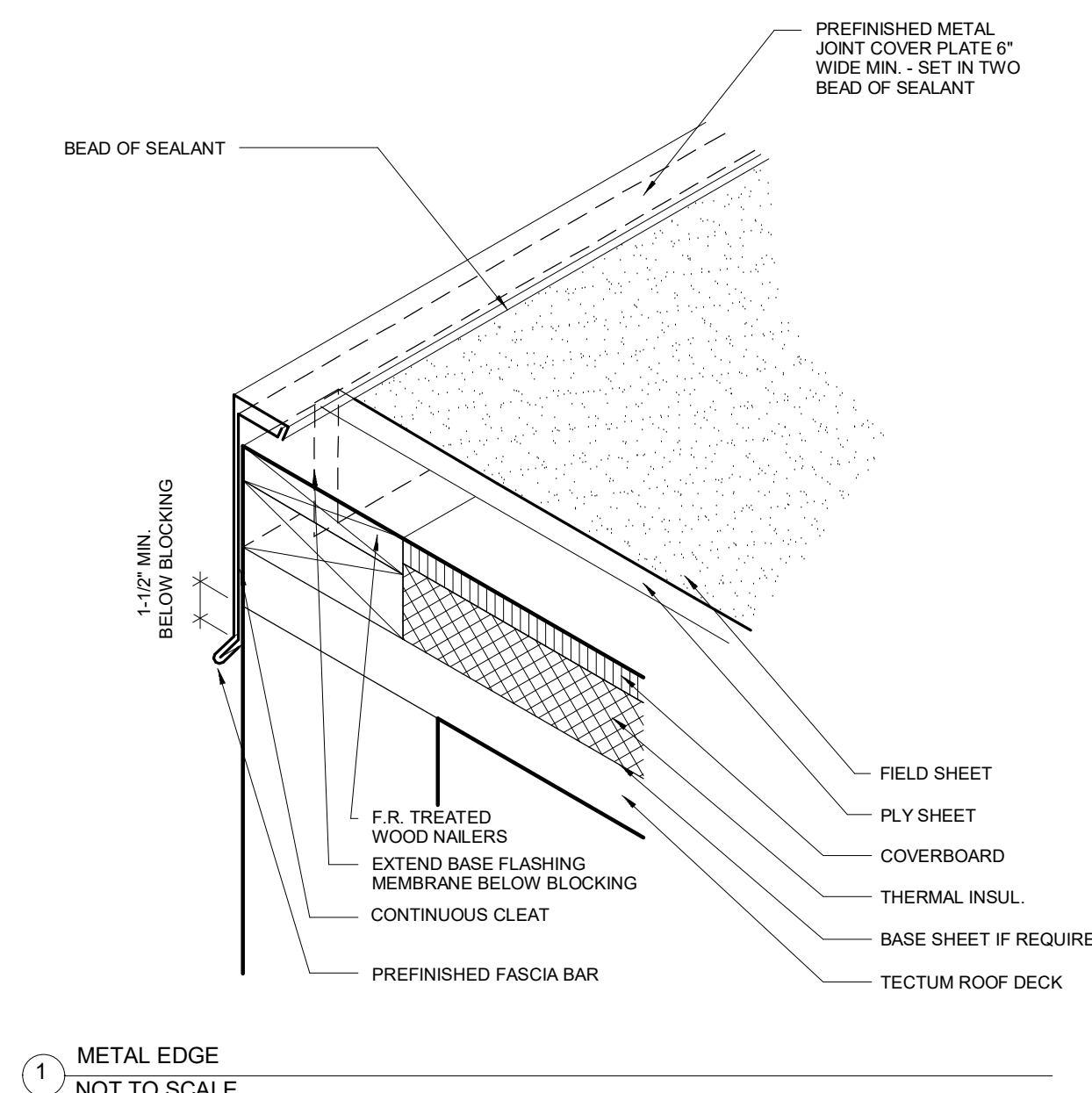
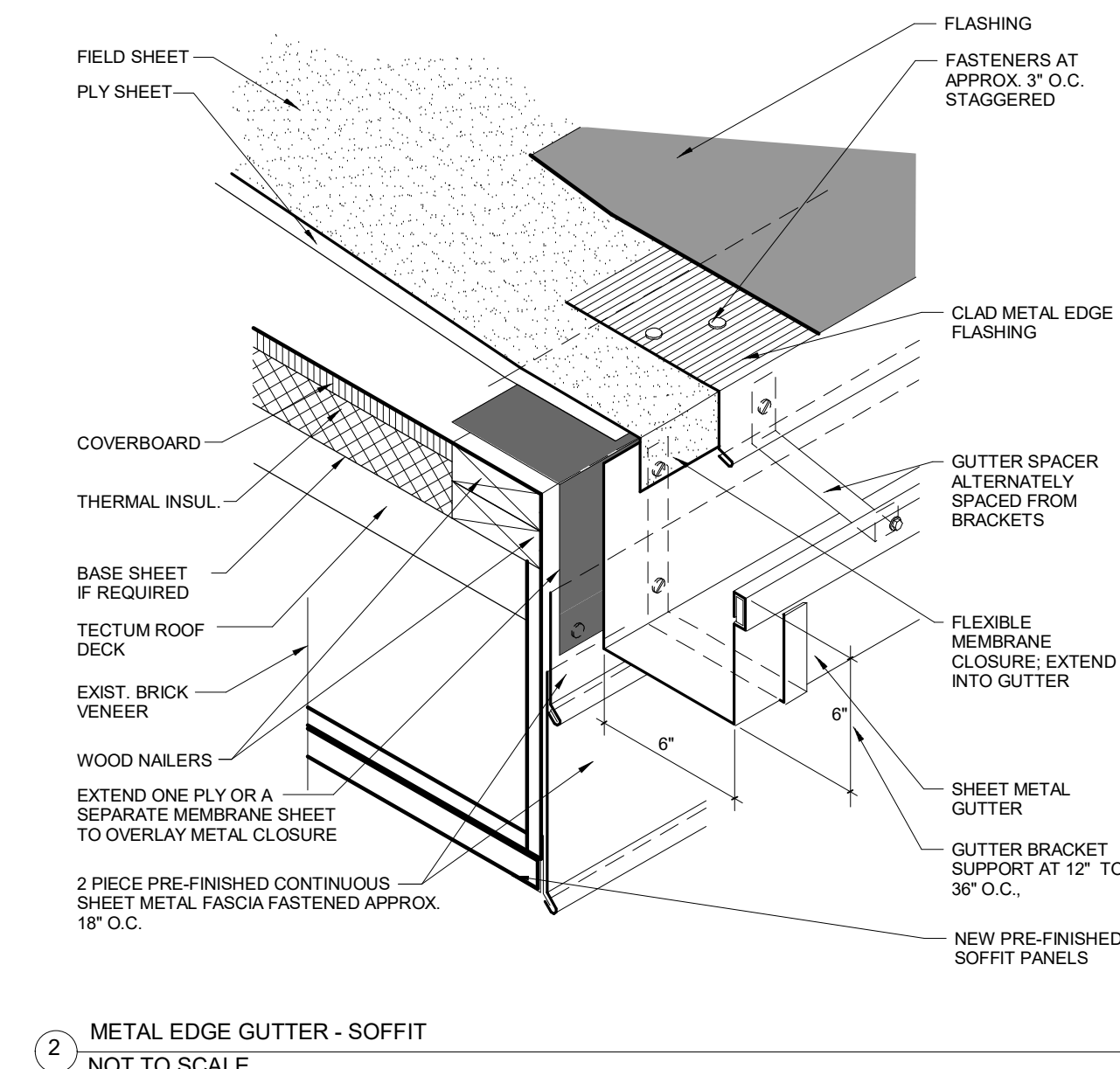
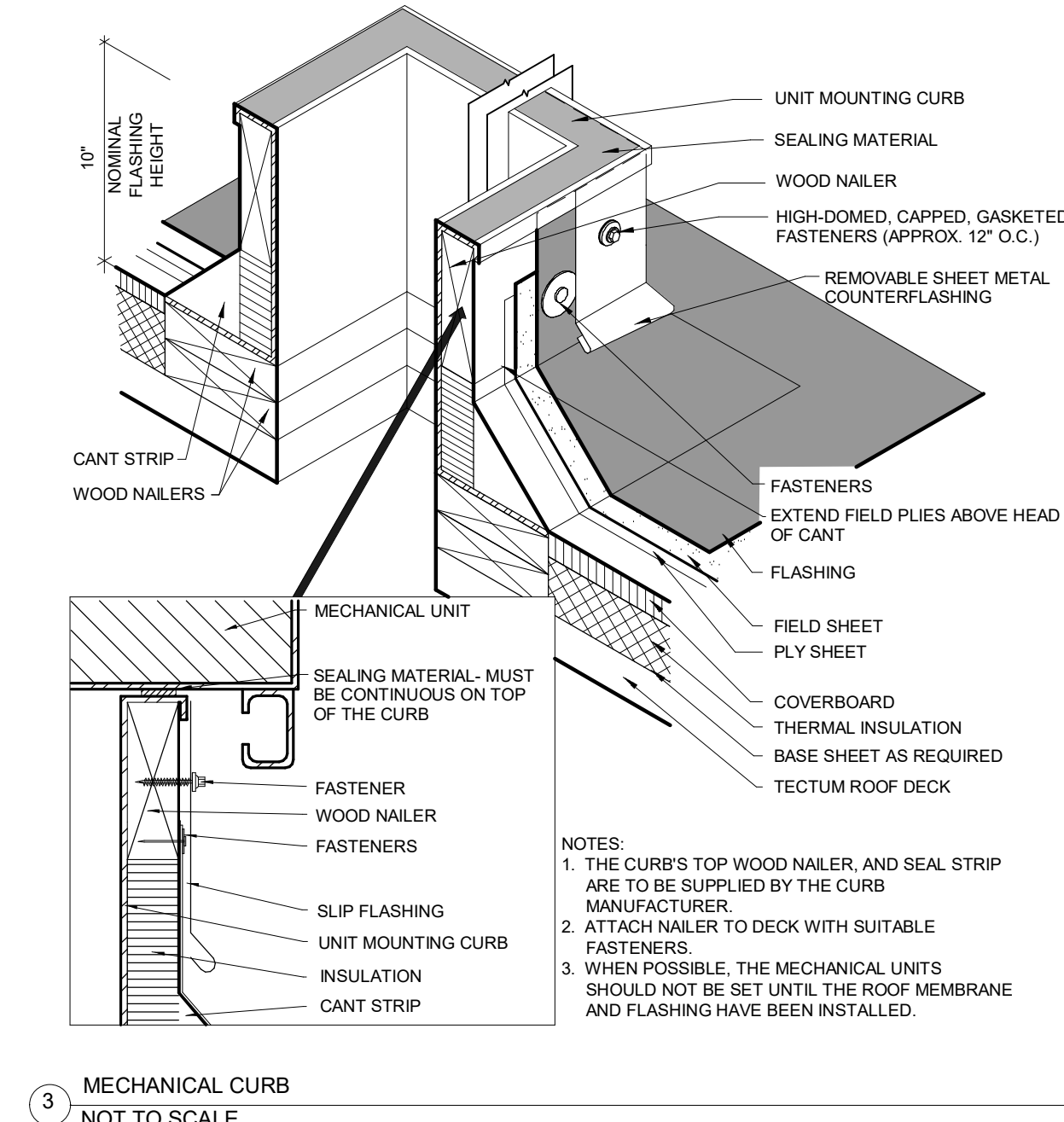
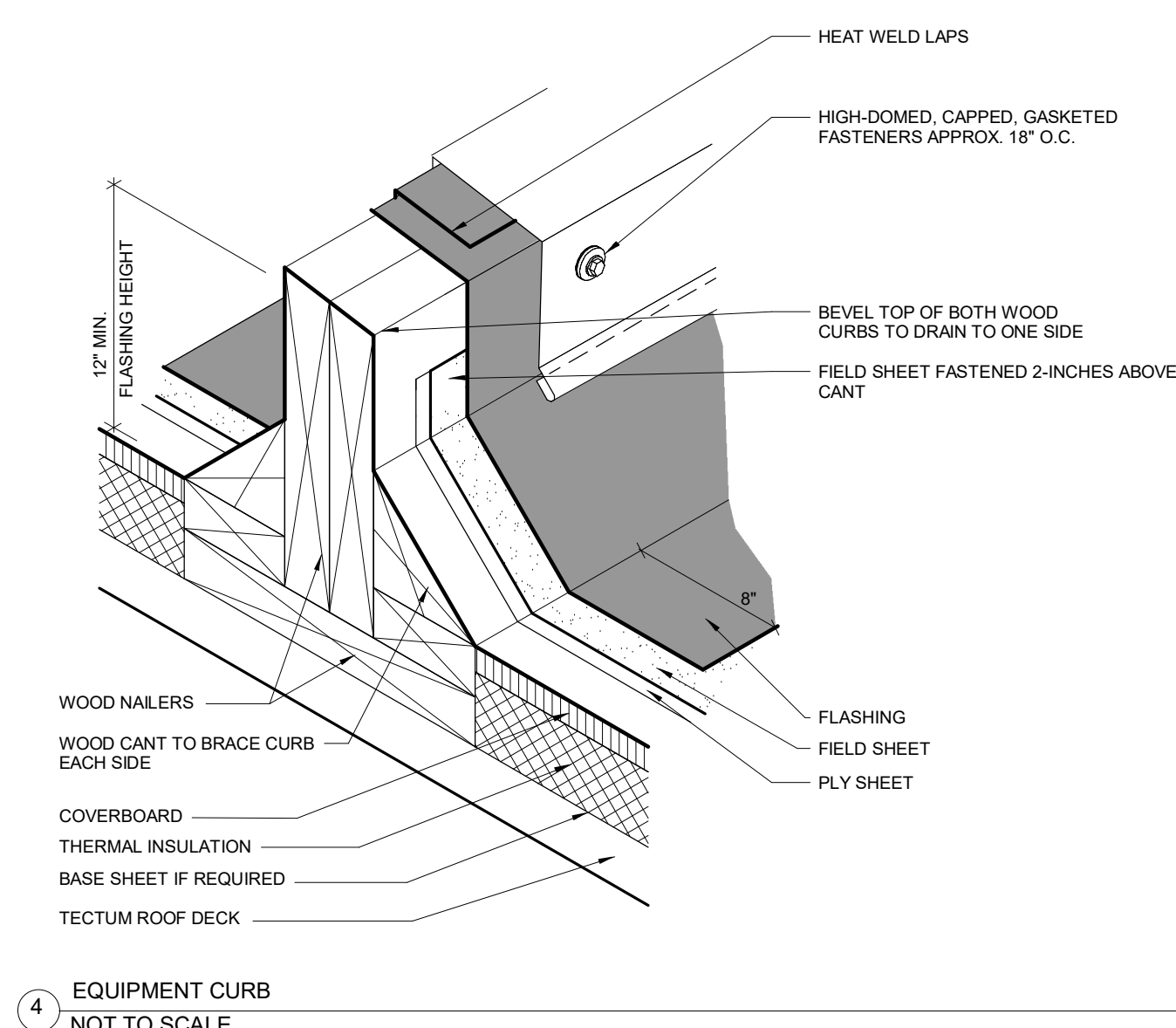
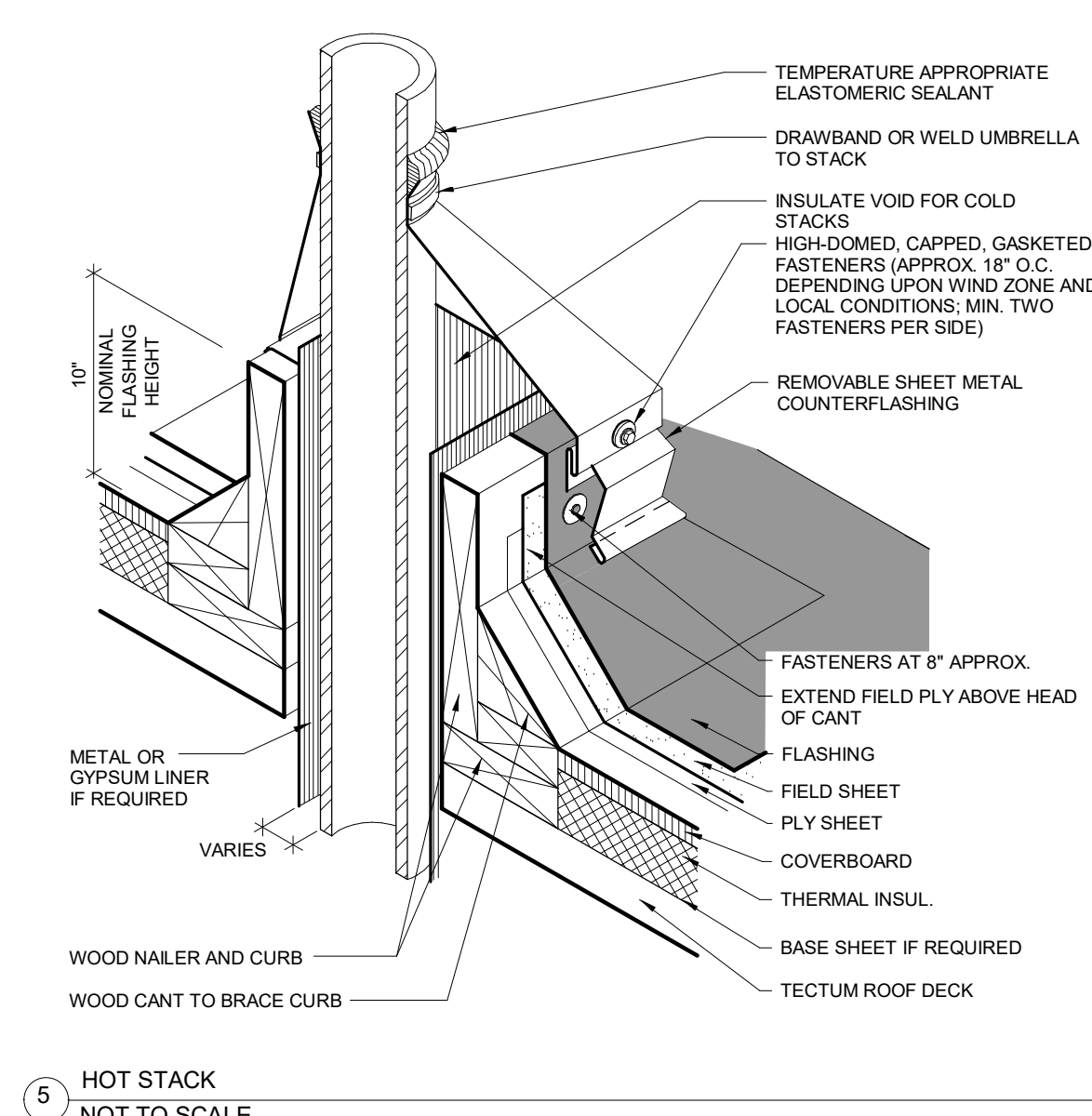
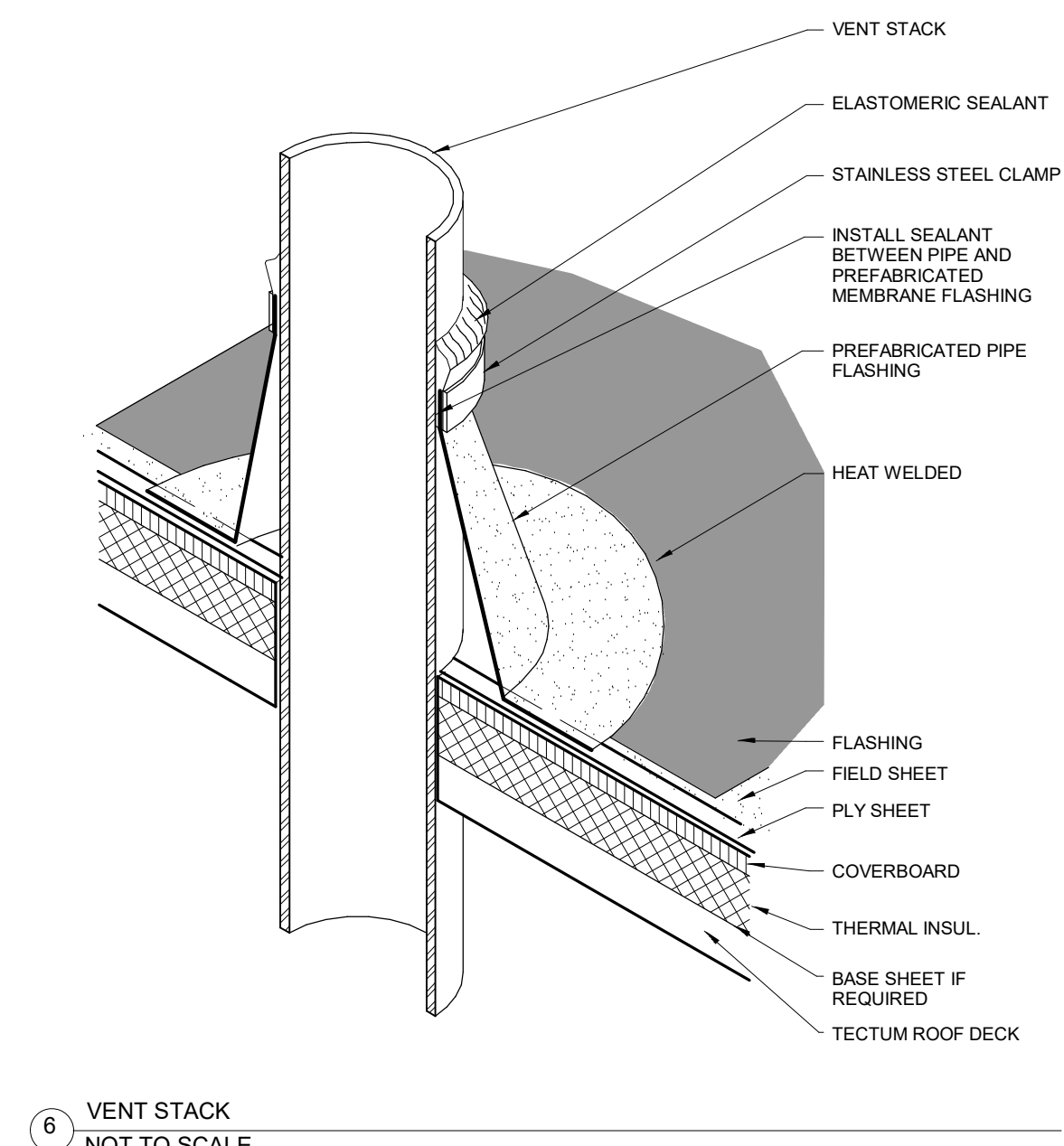
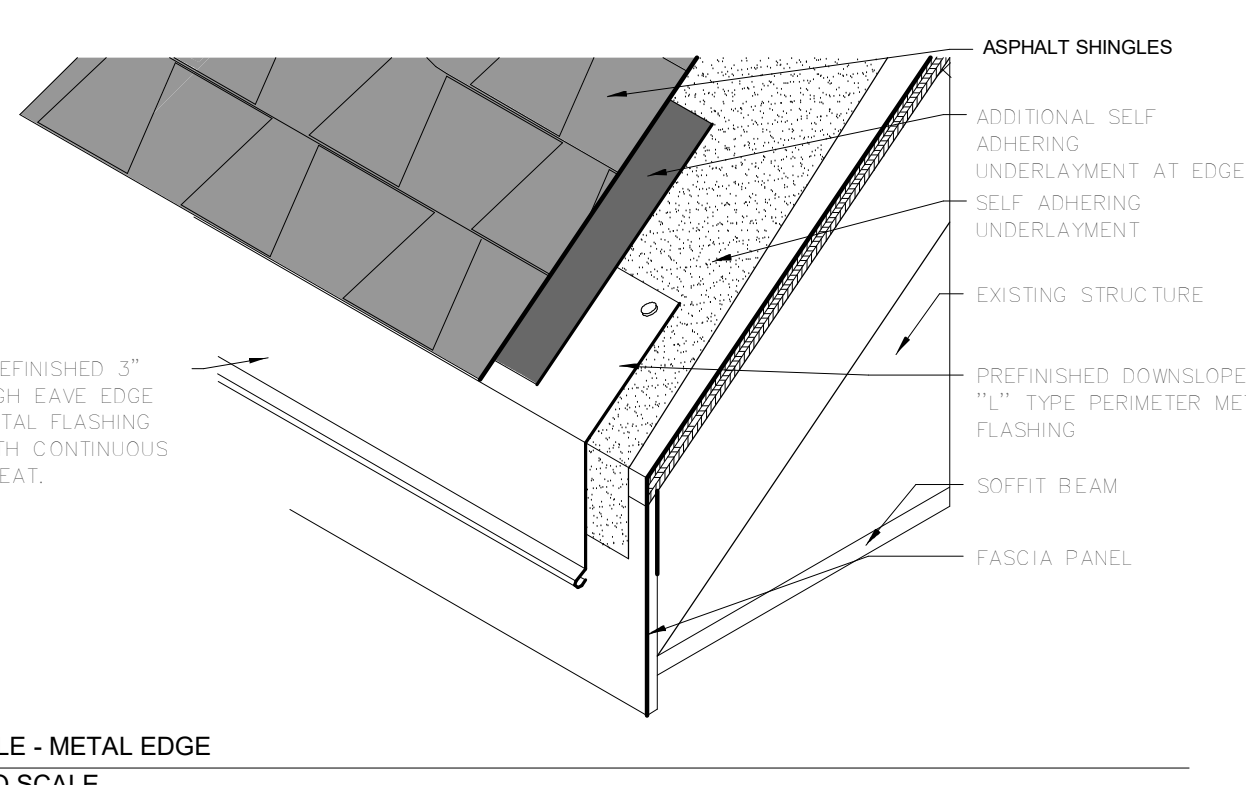
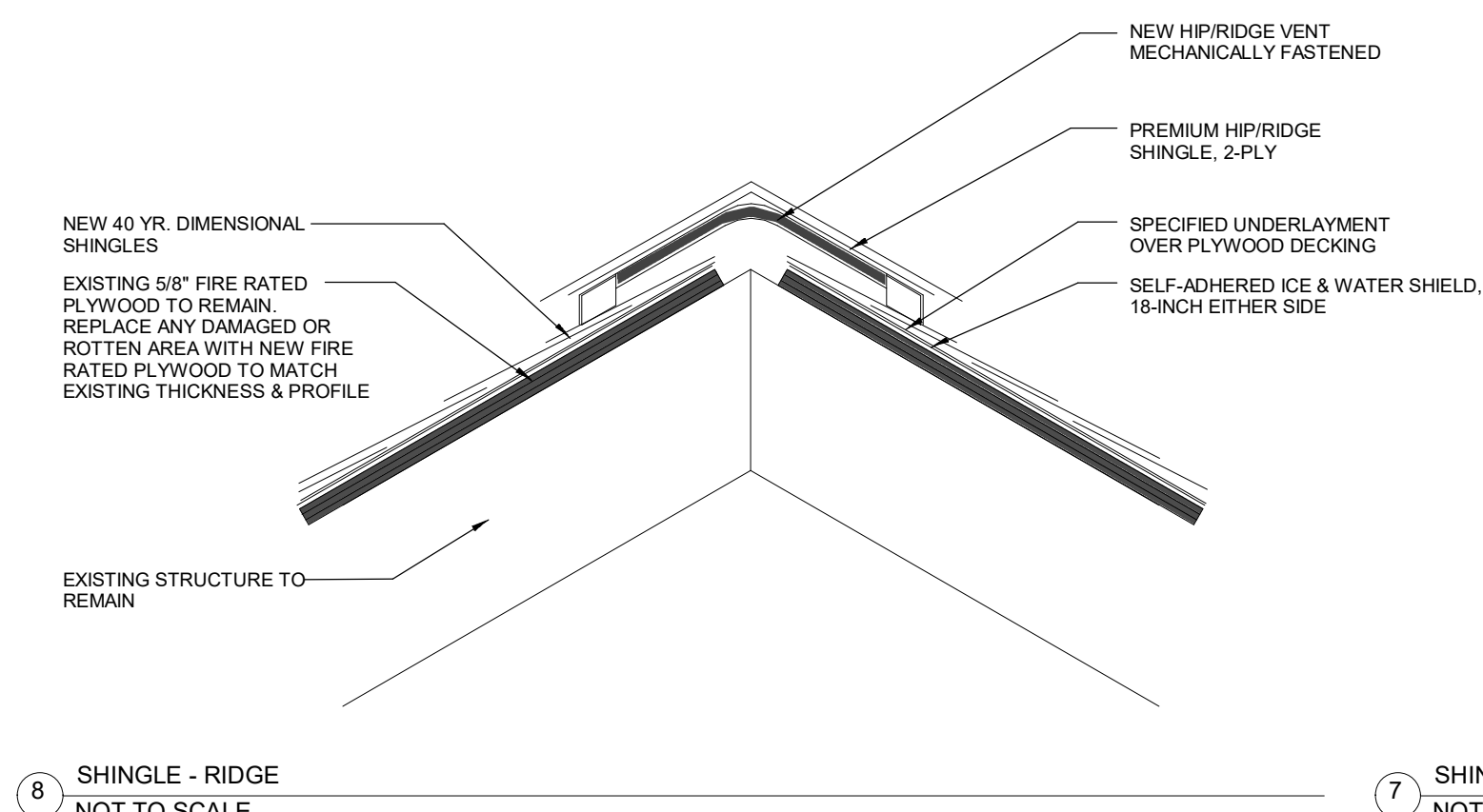
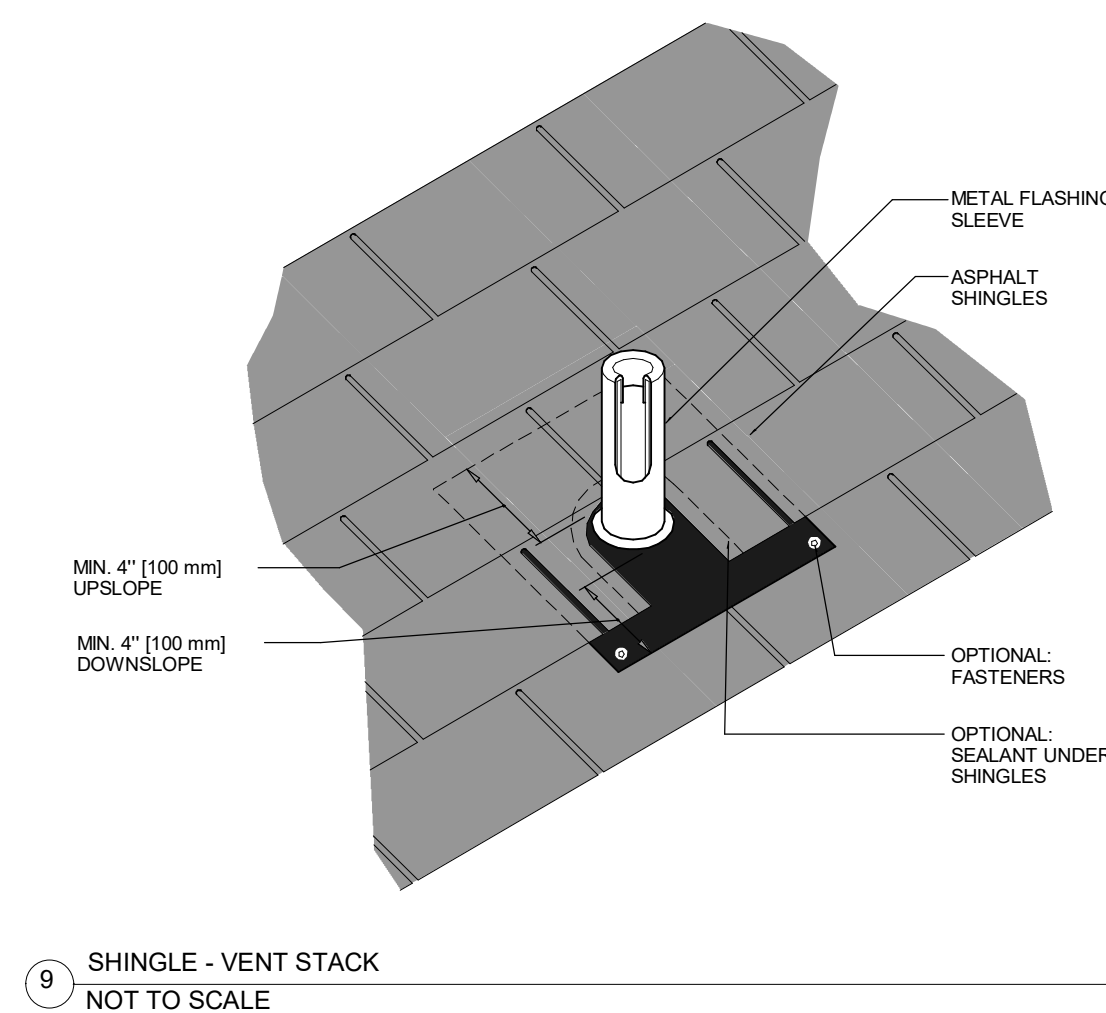
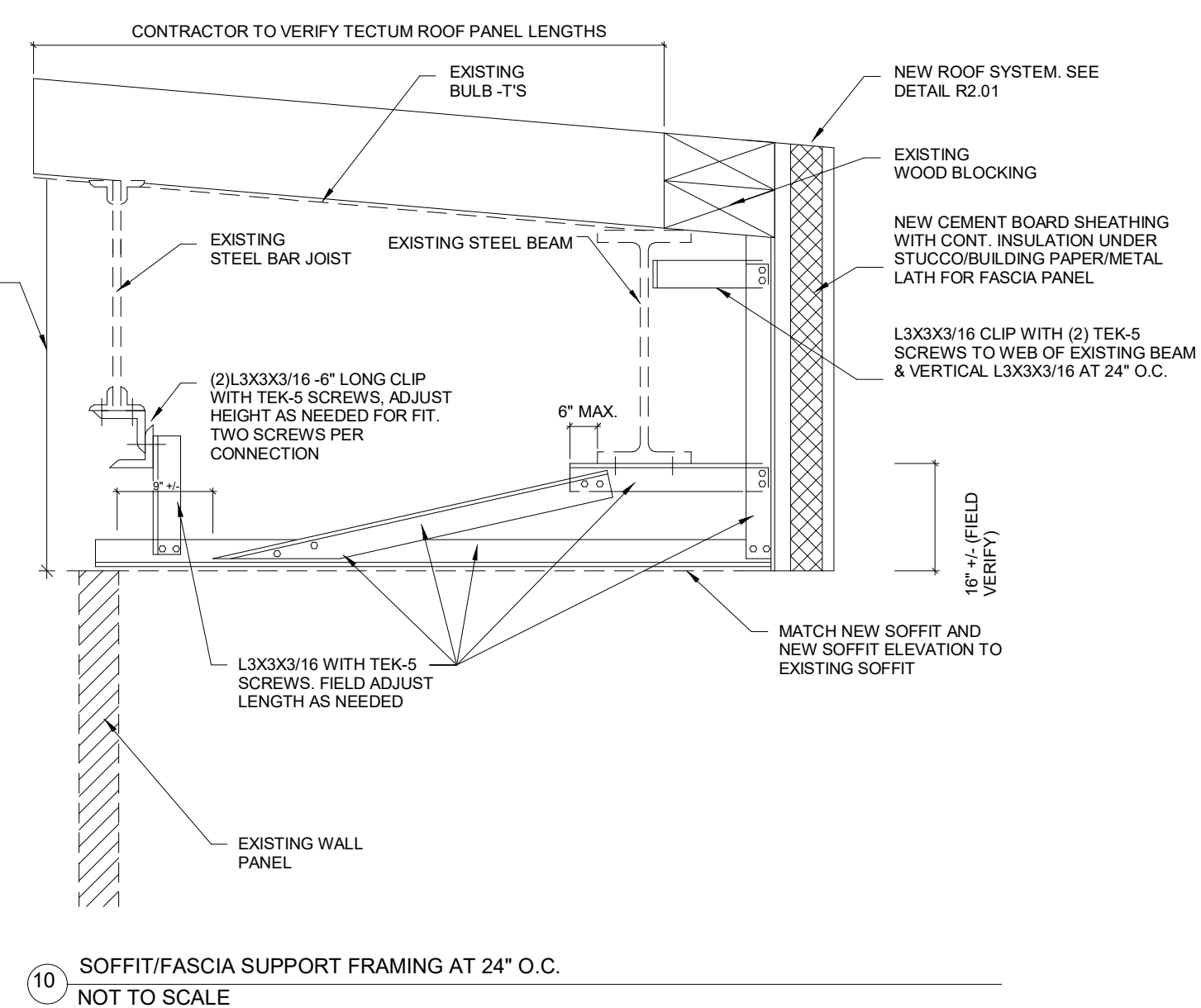
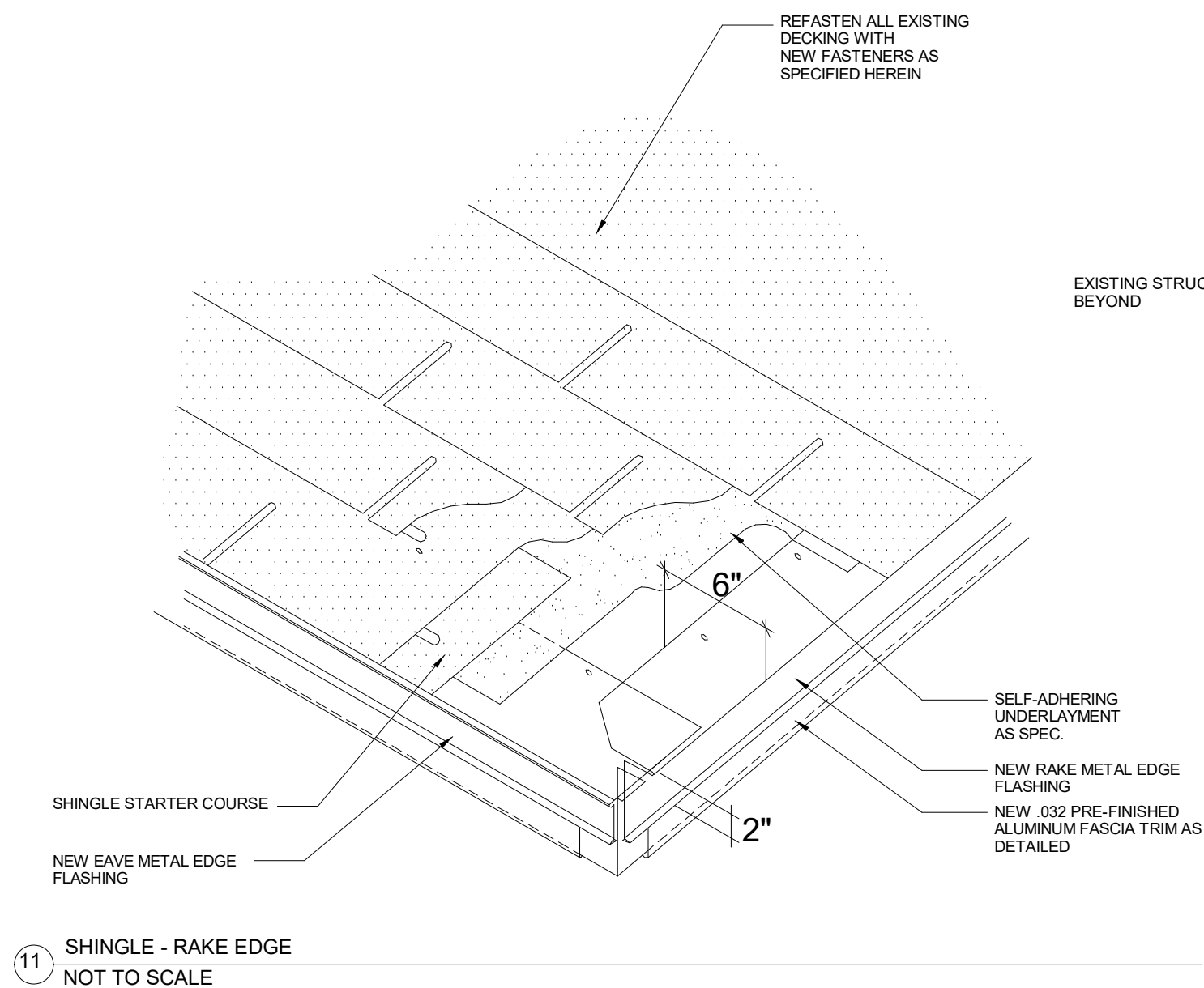
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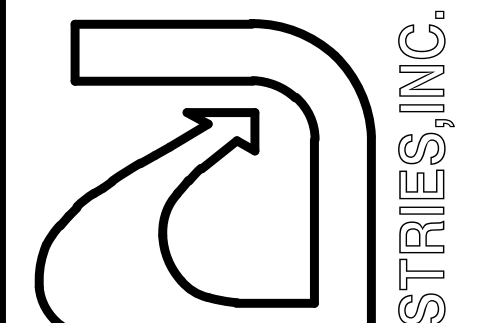
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OVERALL ROOF  
PLAN - ANNEX

R1.02





**ARMKO INDUSTRIES, INC.**  
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ENGINEERING FIRM F-6498  
1320 SPINKS ROAD  
FLOWER MOUND  
TEXAS 75028  
(972) 874-1388

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ROOF DETAILS  
  
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