SPECIFICATIONS

FOR ROOFING

AT

FIRE STATION NO. 4 & FD/PD TRAINING & FIRE STATION NO.5

FOR THE

CITY OF NORTH RICHLAND HILLS

PROJECT NUMBER: 23-1169--34

08-15-2024

Armko Industries, Inc.
Texas Registered Engineering Firm
F-006498

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CONTRACTOR PROPOSAL FORM
CITY OF NORTH RICHLAND HILLS
FIRE STATION NO. 4 & FD/PD TRAINING & FIRE STATION NO.5
PROJECT NO. 23-1169-34

The purpose of this proposal is for The City of North Richland Hills to complete the replacement of the roof system at Fire Station 4 & FD/PD Training & Fire Station #5utilizing the

√ TIPS/TAPS, The Interlocal Purchasing System (TIPS) and
The Texas-Arkansas Purchasing System (TAPS)

which operates and serves as a procurement option for Governmental Agencies in accordance with any or all of the following statutes: Texas Local Government Code Chapters 252, 262, or 271; Texas Education Code Section 44.031; and/or Texas Government Code Chapter 791, which is also known as the Inter-local Cooperative Purchasing Act.

Pre-Bid is Thursday, August 22, 2024 at 9:00 a.m. at FD/PD Training. The proposal by the contractor shall be submitted via email to Chris Amarante, Camarante@nrhtx.com, on September 3, 2024 @ 2PM: Questions regarding the specifications should be directed to Mr. Javier Flores 972-689-0314, Jflores@armko.com

The contract for the project will be between The City of North Richland Hills and the Roofing Contracting Company.

CONTRACT DOCUMENTS: Having examined the Proposal, Contract, General Instructions, Materials, Execution, and Drawings for Project No. 23-1169-34 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, incidentals, and other facilities, and to perform all work for the said roofing replacement for the following:

BASE PROPOSAL 1 – FD/PD TRAINING & FIRE STATION NO.5 (roofs A, B, C1, C2)

Work shall include:

- Spud back all loose gravel on existing built-up roof.
- Mechanically fasten ½" coverboard down to the existing metal deck.
- Provide 60 mil fleece back TPO mopped in hot asphalt
- Provide all new metal coping
- Provide new base flashings at all curbs and rise walls
- Replace metal edge with new metal edge
- Replace surface mounted flashing with new through wall flashing in the existing face brick
- Cover exposed wood Nailers at fascia at the entry canopies
- Provide gutters at standing seam roof with downspouts at entries D3.
- Provide 20-year NDL warranty.
- BASE PROPOSAL TO INCLUDE CONTINGENCY WITHIN PRICING

_____$_____

ADD ALTERNATE PROPOSAL 1– FD/PD TRAINING & FIRE STATION NO.5 (METAL ROOF D1, D2, D3, D4, D5, D6)

Work shall include:

- Removal of existing metal roof down to substrate.
- Provide new standing seam 26-gauge prefinished metal roof system.
- Work shall include all HVAC and electrical piping disconnect and reconnect.

_____$_____

Installation shall be per NRCA, SMACNA, ANSI/SPRI, specifications, details, and manufacturer's guidelines. All gas lines to be tested and certified by a master plumber and certified by Texas railroad commission

- Provide 20-year NDL.

_____$_____

ADD ALTERNATE PROPOSAL 2– FD/PD TRAINING – (NON-OPENING) WINDOW REPLACEMENT (

Work shall include:

- Remove and replace all new windows as specified

_____$_____

ADD ALTERNATE PROPOSAL 3– FIRE STATION #5 – (OPERABLE) WINDOW REPLACEMENT

Work shall include:

- Remove and replace all new windows as specified

_____$_____

ADD ALTERNATE PROPOSAL 4– (OPERABLE) FIRES STATION #5

Work shall include:

- Remove existing caulking at all wall joints
- Replace new backer rod and sealants on all wall joints

_____$_____

ADD ALTERNATE PROPOSAL 5– FD/PD TRAINING & FIRE STATION NO.5 – EXTERIOR WALL JOINTS

Work shall include:

- Remove existing caulking at all wall joints
- Replace new backer rod and sealants on all wall joints

_____$_____

BASE PROPOSAL 1 – FIRE STATION NO.4- (Roofs A, C, D, F, H)

Work shall include:

- Cut all current blisters, air pockets, and bubbles in current modified bitumen membrane.
- Mechanically fasten ½ inch cover board to current metal deck.
- Provide 60 mil fleece back mopped in hot asphalt.
- Seal the gutter seam at northeast corner of Area G
- Add gutter with downspout at east side of Roof Area B
- Rework the existing flashing along the northside of Roof Area E to a watertight condition
- Provide additional taper to roof area A to eliminate ponding water
- Repair the closure flashing at the northwest corner of Roof Areas E and G
- Verify gutter straps are attached properly supporting the gutter
- Add counterflashing to all low slope roof curbs
  CAST STONE SCOPE
- Provide 20-year NDL warranty.
- _____$__

- Clean and prepare surface to paint gutters & rivet straps with rust inhibitor paint.
- All open ends on metal roofs to be sealed
- All gas lines to be painted yellow
- BASE PROPOSAL TO INCLUDE CONTINGENCY WITHIN PRICING

_____$_____

ADD ALTERNATE PROPOSAL 1– FIRE STATION NO.4 – EXTERIOR WALL JOINTS

Work shall include:

- Remove existing caulking at all wall joints
- Replace new backer rod and caulking on all wall joints

_____$_____

PERFORMANCE AND PAYMENT BONDS

_____$_____

Unit Price Proposal:

1. Additional cost over and above the contract amount for replacing wet insulation: $_____ per square foot (nominal thickness of 1").

2. Remove and replace deteriorated nailers: $_____ per board foot.

The above proposal quoted by Contractor:

Signature: _____

Name Printed: _____

Title: _____

Company: _____

Date: _____

Contractor acknowledges receipt of the following addenda:

ADDENDUM #1: _____ (Initial)

ADDENDUM #2: _____ (Initial)

The above proposal accepted by Owner:

Signature: _____

Name Printed: _____

Title: _____

City: _____

Date: _____

SECTION 01 10 00
GENERAL REQUIREMENTS

1.01 QUALIFICATIONS FOR SUBMITTING COMPETITIVE SEALED PROPOSAL

A. To qualify for submitting a proposal, each contractor is required to obtain a copy of the Proposal Documents.

1.02 Contractors performing work on City property or public right-of-way for the City of North Richland Hills shall provide the City a certificate of insurance evidencing the coverages and coverage provisions identified herein. Contractors shall provide the City evidence that all subcontractors performing work on the project have the same types and amounts of coverages as required herein or that the subcontractors are included under the contractor's policy. The City, at its own discretion, may require a certified copy of the policy.

All insurance companies and coverages must be authorized by the Texas Department of Insurance to transact business in the State of Texas and must be acceptable to the City of North Richland Hills.

The following guidelines are designed to show the most common minimum insurance requirements for standard contracts and agreements with the City. Non-standard agreements may require additional coverage and/or higher limits. Coverage Amounts required for non-standard agreements to be determined by the department and the City Manager.

General Contracts for Services:
Service work, and general maintenance agreements, etc.

- Commercial General Liability
- Automobile Liability
- Workers' Compensation & Employer's Liability
- Payment and Maintenance Bond (if applicable)

See Exhibit A for insurance language to include in general contracts for services

Professional Services:
Consultants or other professionals including: accountants, attorneys, architects, engineers, medical professionals, medical services, etc.

- Commercial General Liability
- Automobile Liability
- Workers' Compensation & Employer's Liability
- Professional Liability or equivalent Errors & Omissions (appropriate to Contractor's profession)

See Exhibit B for insurance language to include in professional services contracts

Construction:
Building contractors for construction projects.

- ☐ Commercial General Liability
- ☐ Automobile Liability
- ☐ Workers' Compensation & Employer's Liability
- ☐ Professional Liability (if applicable for design function)
- ☐ Builder's Risk (required for new or existing property under construction)
- ☐ Payment and Maintenance Bond (if applicable)

See Exhibit C for insurance language to include in construction contracts

Information Technology/Network Access Services:
For the purchasing and installation of technology-related software and equipment or contracting services that support, maintain or interact with the CITY'S technology systems.

- ☐ Commercial General Liability
- ☐ Automobile Liability
- ☐ Workers' Compensation & Employer's Liability
- ☐ Professional Liability (if applicable)
- ☐ Cyber Liability

See Exhibit D for insurance language to include in IT/network access services agreements

Standard Minimum Required Insurance Coverage

Insurance Type	Limit	Provision
Commercial General Liability	$1,000,000 Each Occurrence $2,000,000 Aggregate	City to be listed as additional insured and provided 30-day notice of cancellation or material change in coverage
	For Construction Projects: $2,000,000 Each Occurrence $4,000,000 Aggregate	
Automobile Liability	$1,000,000 Combined Single Limit	
Workers' Compensation	Texas Statutory Requirements	Waiver of subrogation in favor of City
Employer's Liability	$500,000 injury - each accident $500,000 disease - each employee $500,000 disease - policy limit	
Professional Liability (or equivalent Errors & Omissions coverage appropriate to the Contractor's profession)	$1,000,000 Each Occurrence	
Builder's Risk (required for new or existing property under construction)	100% Value	

Cyber Liability	$1,000,000 Each Occurrence	
Payment/Maintenance Bonds	In accordance with Chapter 2253 of the Texas Government Code	

EXHIBIT A

GENERAL CONTRACTS FOR SERVICES

For the duration of this Agreement, CONTRACTOR shall maintain the following minimum insurance which shall protect CONTRACTOR, its subcontractors, its sub-consultants and CITY from claims for injuries, including accidental death, as well as from claims for property damage which may arise from the performance of work under this Agreement.

A. Workers' Compensation and Employer's Liability Insurance:

Workers' Compensation	Texas Statutory
Employer's Liability	$500,000 injury - each accident
	$500,000 disease - each employee
	$500,000 disease - policy limit

B. Commercial General Liability:

On an "occurrence" basis, including, property damage, bodily injury, products and completed operations and personal & advertising injury with limits no less than $1,000,000 per occurrence and $2,000,000 aggregate.

C. Automobile Liability:

Covering any auto, or if CONTRACTOR has no owned autos, covering hired and non-owned autos with a Combined Single Limit no less than $1,000,000 per accident for bodily injury and property damage.

Insurance limits can be met with a combination of primary and excess/umbrella coverage.

The CITY, its officers, officials and employees are to be covered as "Additional Insured" on the commercial general liability and automobile liability policies as respects liability arising out of activities performed by or on behalf of the CONTRACTOR.

A waiver of subrogation in favor of the CITY, its officers, officials and employees shall be contained in the Workers' Compensation insurance policy.

Policies of insurance shall not be cancelled non-renewed, terminated, or materially changed unless and until thirty (30) days' notice has been given to CITY.

All insurance shall be issued by responsible insurance companies eligible to do business in the State of Texas and having an A.M. Best Financial rating of A- VI or better.

CONTRACTOR shall furnish the CITY certificates of insurance affecting coverage required. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. Certificates of Insurance must be submitted on a form approved by the Texas Department of Insurance.

Payment and Maintenance Bonds (if applicable): CONTRACTOR shall procure Payment and Maintenance Bonds as applicable and in accordance with Chapter 2253 of the Texas Government Code.

EXHIBIT B

PROFESSIONAL SERVICES

For the duration of this Agreement, CONTRACTOR shall maintain the following minimum insurance which shall protect CONTRACTOR, its subcontractors, its sub-consultants and CITY from claims for injuries, including accidental death, as well as from claims for property damage which may arise from the performance of work under this Agreement.

A. Workers' Compensation and Employer's Liability Insurance:

Workers' Compensation	Texas Statutory
Employer's Liability	$500,000 injury - each accident
	$500,000 disease - each employee
	$500,000 disease - policy limit

B. Commercial General Liability:

On an "occurrence" basis, including, property damage, bodily injury, products and completed operations and personal & advertising injury with limits no less than $1,000,000 per occurrence and $2,000,000 aggregate.

C. Automobile Liability:

Covering any auto, or if CONTRACTOR has no owned autos, covering hired and non-owned autos with a Combined Single Limit no less than $1,000,000 per accident for bodily injury and property damage.

D. Professional Liability (Errors and Omissions)

CONTRACTOR shall maintain Professional Liability (or equivalent) errors and omissions insurance appropriate to the CONTRACTOR'S profession, describe type of services, with a limit no less than $1,000,000 per occurrence or claim.

Insurance limits can be met with a combination of primary and excess/umbrella coverage.

The CITY, its officers, officials and employees are to be covered as "Additional Insured" on the commercial general liability and automobile liability policies as respects liability arising out of activities performed by or on behalf of the CONTRACTOR.

A waiver of subrogation in favor of the CITY, its officers, officials and employees shall be contained in the Workers' Compensation insurance policy.

Policies of insurance shall not be cancelled non-renewed, terminated, or materially changed unless and until thirty (30) days' notice has been given to CITY.

All insurance shall be issued by responsible insurance companies eligible to do business in the State of Texas and having an A.M. Best Financial rating of A- VI or better.

CONTRACTOR shall furnish the CITY certificates of insurance affecting coverage required. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. Certificates of Insurance must be submitted on a form approved by the Texas Department of Insurance.

EXHIBIT C

CONSTRUCTION

For the duration of this Agreement, CONTRACTOR shall maintain the following minimum insurance which shall protect CONTRACTOR, its subcontractors, its sub-consultants and CITY from claims for injuries, including accidental death, as well as from claims for property damage which may arise from the performance of work under this Agreement.

A. Workers' Compensation and Employer's Liability Insurance:

Workers' Compensation	Texas Statutory
Employer's Liability	$500,000 injury - each accident
	$500,000 disease - each employee
	$500,000 disease - policy limit

B. Commercial General Liability:

On an "occurrence" basis, including, property damage, bodily injury, products and completed operations and personal & advertising injury with limits no less than $2,000,000 per occurrence and $4,000,000 aggregate.

C. Automobile Liability:

Covering any auto, or if CONTRACTOR has no owned autos, covering hired and non-owned autos with a Combined Single Limit no less than $1,000,000 per accident for bodily injury and property damage.

D. Professional Liability (if contract involves design work)

CONTRACTOR shall maintain Professional Liability (or equivalent) errors and omissions insurance appropriate to the CONTRACTOR'S profession, with a limit no less than $1,000,000 per occurrence or claim

E. Builder's Risk

CONTRACTOR shall maintain Builder's Risk Insurance providing All-Risk (Special Perils) coverage in an amount equal to one hundred percent (100%) of the completed value of the project in question and no coinsurance penalty provisions. The policy shall list the CITY as loss payee as their interests may appear.

Insurance limits can be met with a combination of primary and excess/umbrella coverage.

The CITY, its officers, officials and employees are to be covered as "Additional Insured" on the commercial general liability and automobile liability policies as respects liability arising out of activities performed by or on behalf of the CONTRACTOR.

A waiver of subrogation in favor of the CITY, its officers, officials and employees shall be contained in the Workers' Compensation insurance policy.

Policies of insurance shall not be cancelled non-renewed, terminated, or materially changed unless and until thirty (30) days' notice has been given to CITY.

All insurance shall be issued by responsible insurance companies eligible to do business in the State of Texas and having an A.M. Best Financial rating of A- VI or better.

CONTRACTOR shall furnish the CITY certificates of insurance affecting coverage required. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. Certificates of Insurance must be submitted on a form approved by the Texas Department of Insurance.

Payment and Maintenance Bonds (if applicable): CONTRACTOR shall procure Payment and Maintenance Bonds as applicable and in accordance with Chapter 2253 of the Texas Government Code

EXHIBIT D

INFORMATION TECHNOLOGY/NETWORK ACCESS SERVICES

For the duration of this Agreement, CONTRACTOR shall maintain the following minimum insurance which shall protect CONTRACTOR, its subcontractors, its sub-consultants and CITY from claims for injuries, including accidental death, as well as from claims for property damage which may arise from the performance of work under this Agreement.

A. Workers' Compensation and Employer's Liability Insurance:

Workers' Compensation	Texas Statutory
Employer's Liability	$500,000 injury - each accident
	$500,000 disease - each employee
	$500,000 disease - policy limit

B. Commercial General Liability:

On an "occurrence" basis, including, property damage, bodily injury, products and completed operations and personal & advertising injury with limits no less than $1,000,000 per occurrence and $2,000,000 aggregate.

C. Automobile Liability:

Covering any auto, or if CONTRACTOR has no owned autos, covering hired and non-owned autos with a Combined Single Limit no less than $1,000,000 per accident for bodily injury and property damage.

D. Professional Liability (Errors and Omissions)

If appropriate for CONTRACTOR'S work, CONTRACTOR shall maintain Professional Liability (or equivalent) errors and omissions insurance appropriate to the CONTRACTOR'S profession, with a limit no less than $1,000,000 per occurrence or claim.

E. Cyber Liability

CONTRACTOR shall maintain cyber liability (or equivalent) insurance. Such insurance shall provide limits of no less than $1,000,000 per occurrence. Coverage shall be sufficiently broad to respond to the duties and obligations as undertaken by the CONTRACTOR.

Insurance limits can be met with a combination of primary and excess/umbrella coverage.

The CITY, its officers, officials and employees are to be covered as "Additional Insured" on the commercial general liability and automobile liability policies as respects liability arising out of activities performed by or on behalf of the CONTRACTOR.

A waiver of subrogation in favor of the CITY, its officers, officials and employees shall be contained in the Workers' Compensation insurance policy.

Policies of insurance shall not be cancelled non-renewed, terminated, or materially changed unless and until thirty (30) days' notice has been given to CITY.

All insurance shall be issued by responsible insurance companies eligible to do business in the State of Texas and having an A.M. Best Financial rating of A- VI or better.

CONTRACTOR shall furnish the CITY certificates of insurance affecting coverage required. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. Certificates of Insurance must be submitted on a form approved by the Texas Department of Insurance

Other Insurance Requirements - To Be Included As Applicable

CONTRACTOR'S who serve or distribute liquor:

Liquor Legal Liability - CONTRACTOR shall maintain Liquor Legal Liability coverage covering the selling, serving, or furnishing of any alcoholic beverage performed by CONTRACTOR, or on its behalf. Such insurance shall provide limits of no less than $1,000,000.00 per occurrence.

CONTRACTOR'S who hold long-term leases:

Property Insurance – LESSEE shall maintain Property Insurance against all risks of loss to any improvements or betterments, at full replacement cost with no coinsurance penalty provision. The CITY shall be added as a Loss Payee to the policy as interests may appear.

CONTRACTOR'S whose work involves chemicals or otherwise has a pollution exposure:

Contractors' Pollution Liability (or equivalent) – CONTRACTOR shall maintain Contractors' Pollution Liability with limits no less than $1,000,000.00 per occurrence or claim and $2,000,000 policy aggregate.

CONTRACTOR'S who take possession of City or public vehicles (e.g., parking lots operators, auto repair shops):

Garage Keepers Liability (or equivalent) – CONTRACTOR shall maintain Garage Keepers Liability or equivalent coverage for applicable property while in the CONTRACTOR'S care, custody or control. Coverage must include Comprehensive and Collision coverage. Such insurance shall provide limits equal

to no less than the total value of CITY or public property in the CONTRACTOR'S care, custody and control at any one time.

CONTRACTOR'S who own and operate unmanned aircraft (drones):

UAS Liability (or equivalent) - CONTRACTOR shall procure and maintain for the duration of the contract insurance against claims for injuries to persons or damage to property which may arise from or in connection with the ownership, maintenance or use of Unmanned Aerial Systems (Drones). Coverage must include limits no less than $1,000,000 per occurrence and $2,000,000 aggregate.

A PURCHASE ORDER WILL NOT BE ISSUED WITHOUT EVIDENCE OF INSURANCE

1.03 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.

1.04 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.

1.05 LIENS

A. Neither the final payment nor the remaining retained percentage shall become due until the contractor submits to the Owner:

1. an Affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the work for which the Owner or his property might in any way be responsible, have been paid or otherwise satisfied;
2. consent of surety, if any, to final payment;
3. if required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of liens arising out of the Contract, to the extent and in such form as may be designated by the Owner.

B. If any Subcontractor refuses to furnish a release or waiver required by the Owner, the contractor may furnish a bond satisfactory to the Owner to indemnify him against any such lien.

C. If any such lien remains unsatisfied after all payments are made, the contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such lien, including all costs and reasonable attorney's fees.

1.06 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.

1.07 REJECTION OF PROPOSALS

A. The Owner reserves the right to reject any one or all proposals, to waive any formalities or irregularities, and to award the contract in the best interest of the City of North Richland Hills

1.08 ASSIGNMENT

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

1.09 RELATIONSHIP

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

1.10. TERMINATION

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

1.11 CANCELLATION

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

1.12 PERMITS

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

1.13 CONTRACT DOCUMENTS

A. In the event of a conflict between the reroofing specifications and the Owner's contract documents, the Owner's contract documents shall take precedence.

1.14 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 five (5) years successful experience on projects similar in size and scope and acceptable as applicators by the Owner's representative.

D. These roof repairs shall only be performed by a roofing contractor previously certified by the roof system manufacturer. Contractor must be able to furnish evidence of this certification.

E. Installer must be an experienced single firm specializing in the type of roofing repair required, having at least five (5) years successful experience on projects similar in size and scope and acceptable as applicators by the Owner's representative.

F. Waterproofing system shall only be applied by a waterproofing contractor previously certified or approved by the waterproofing system manufacturer. Contractor shall furnish evidence of this certification with bid.

G. Installer must be an experienced single firm specializing in the type of waterproofing required, having at least five (5) years successful experience on projects similar in size and scope and acceptable as applicators by the Owner's representative.

1.15 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.

1.16 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.

1.17 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.

1.18 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 FM Global wind uplift requirements and shall meet Underwriter's Laboratory fire rating.

H. Roof system shall be installed in accordance with FM Global requirements.

1.19 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.

1.20 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 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. 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.

E. 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.

F. Safety of Persons and Property: The contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:
   1. Employees on the work and other persons who may be affected thereby.
   2. The work, materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the contractor or the contractor's Subcontractors or Sub-subcontractors.
   3. Other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

G. The contractor shall give notices and comply in all respects with provisions and regulations of any laws, acts, codes, ordinances, rules, regulations, and lawful orders of public authorities that may be applicable to the performance of the work called for herein, and that have bearing on the safety of persons or property, or their protection from damage, injury, or loss.

H. Fire Safety: The contractor and all Subcontractors shall take all necessary precautions to keep the premises free of fire and safety hazards. The contractor shall prevent all agents, employees, licensees and invitees of the contractor from smoking on the Owner's premises and from operating or using any flame, spark or explosion hazard producing devices anywhere on or about the premises without the written approval of the Owner's representative.

I. The contractor shall designate a responsible member of the contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the contractor's superintendent unless otherwise designated by the contractor in writing to the Owner's representative.

J. The contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.

1.21 EMERGENCY CALL

A. Twenty-four Hour Call: The contractor shall have personnel on call twenty-four (24) hours per day, seven (7) days per week for emergencies during the course of a job. The Owner's project manager is to have the twenty-four (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's project manager are to be mobile, home and office numbers for:
   1. Job Foreman
   2. Job Superintendent
   3. Owner or Company Officer

1.22 USE OF PREMISES

A. 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.

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.

1.23 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.

1.24 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.

D. 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 Owner. Load placed on the roof at any point shall not exceed the safe load for which the roof is designed.

E. The contractor shall take all necessary precautions to protect the roof mat and deck from damage. The contractor shall be responsible for repairing all new areas of damage caused by the negligence of the contractor, at the contractor's expense. The Owner's on-site representative shall determine damage caused by contractor negligence.

F. 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, use the stricter document.

G. Follow insurance underwriter's requirements acceptable for use with specified products or systems.

H. 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.

I. All kettles shall have an automatic thermostat control, and temperature gauge, all in working order.

J. A temperature recording device, twenty-four (24) hour type, shall also be used. Daily records will be delivered to the Owner's representative or designated person, at the end of each twenty-four (24) hour recording. Calibrate all temperature controls.

K. For further information regarding roofing material manufacturer's recommendations for project conditions, refer to the manufacturer's published application manual.

L. 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.

M. 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.

N. 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 Owner's representative of any problems in this regard prior to commencing cleaning operations.

O. Temporary Sanitary Facilities: The contractor shall furnish and maintain temporary sanitary facilities for employees use during this project. These will be removed after the completion of the project. All portable facilities shall comply with local laws, codes, and regulations.

1.25 CREWS AND EQUIPMENT

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

1.26 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.

1.27 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.

1.28 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.

1.29 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 observation 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.

C. The Owner/Owner's representative, if deemed necessary, will notify in writing who in the Contractor's organization they want to inspect the work on the roof in addition to the Contractor's normal inspection. If the designated person or persons requested by the Owner/Owner's representative fails to respond within forty-eight (48) hours to the request, the work may be suspended, payment withheld and/or liquidated damages outlined in the specifications assessed until such time the individual(s) inspect(s) the work with the Owner/Owner's representative.

D. Neither the presence nor absence of the Owner's representative nor the manufacturer's representative, nor an inspection by the manufacturer of the work or operation of the Contractor, nor any failure by the manufacturer to detect, pinpoint, or object to any defect in the work completed, nor any deviation from these specifications, nor the acceptance by the manufacturer of any such defect or the approval of the manufacturer of any such deviation shall relieve the Contractor, or reduce, or in any way limit or divide, his full responsibility for the full performance of the work required of him under these specifications.

E. It shall be understood that such field observation as the Owner's representative may cause to be performed by the material manufacturer will be performed by the material manufacturer solely for the benefit of the Owner and in an attempt to assist with the requirements of this specification. These requirements bind the Contractor even without such inspection.

F. No observation or any act or omission of either the Owner's representative or the manufacturer's representative in connection with such observation shall prejudice the Owner's right to strict conformance, or under any circumstances be construed to excuse or mitigate any mistake or non-conformance by the Contractor.

1.30 MANUFACTURER'S INSPECTION

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

1.31 FINAL INSPECTION

A. Upon job completion, a final observation will be made by Owner's representative. Final payment will not be authorized for the work done until such inspection has been made and all work is found to have been performed in accordance with the specifications and to the satisfaction of the building Owner, and the specified warranties are issued.

B. The Contractor shall promptly remove any work that does not meet the requirements of the plans and specifications or is incorrectly installed or otherwise disapproved by the Owner as failing to meet with the plans and specifications. The Contractor shall promptly replace any such work without expense to the Owner and shall bear the cost of making good all work of other contractors or the Owner, destroyed or damaged by such removal or replacement.

1.32 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.

1.33 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.

1.34 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.

1.32 FUTURE REPAIRS

A. Contractor certifies by acceptance of this project that any future repairs or alterations he 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 $30,000 for General Contingency for Fire Training Building and $20,000 for Fire Station #4, as dictated by the Consultant and Owner.

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 time and adjust the contract sum as shown on the Change Order.

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

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 in digital format.
   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 uncompressed JPEG format, produced by a digital camera with minimum sensor size of 4.0 megapixels, and at an image resolution of not less than 1024 by 768 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.

C. Preconstruction Photographs: Before commencement of demolition, take digital photographs of project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect / Project Manager.

1. Take ten (10) photographs per facility to show existing conditions of property before starting the work.

2. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

D. Periodic Construction Photographs: Take minimum twenty (20) digital photographs per facility weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

E. Architect / Project Manager-Directed Construction Photographs: From time to time, Architect / Project Manager will instruct photographer about number and frequency of additional digital photographs with general directions on vantage points to show the status of construction and progress since last photographs were taken.

F. Final Completion Construction Photographs: Take ten (10) digital photographs per facility after date of Substantial Completion for submission as Project Record Documents. Architect / Project Manager will direct photographer for desired vantage points.

1. **Do not include date stamp.**

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 fifteen (15) 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 Architect/Project Manager.

C. "Or equal"
1. Where the phrase "or equal", or "or equal as approved by the Architect/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 Architect/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 Architect 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 five (5) 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 or digital plans 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 or a digital marked up copy of the submittals 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. Types of prints required: Submit Shop Drawings in the form of six (6) bond prints of each sheet or via digital media as selected by Architect/Project Manager

F. Review comments of the Architect/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.

G. 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 Architect/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 Architect/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 Architect/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 Architect/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 Architect/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.

B. Revisions:
   1. Make revisions required by the Architect/Project Manager.
   2. If the Contractor considers any required revision to be a change, They shall so notify the Architect/Project Manager.
   3. Make only those revisions directed or approved by the Architect/Project Manager.

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.

C. Paint:
   1. For job-built temporary offices, shops, sheds, fences and other exposed lumber and plywood, provide exterior grade acrylic-latex emulsion over exterior primer.
   2. For sign panels and applying graphics, provide exterior grade alkyd gloss enamel over exterior primer.

D. Tarpaulins: Provide waterproof, fire-resistant, UL labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures provide translucent nylon reinforced laminated polyethylene or polyvinyl chloride fire retardant tarpaulins.

E. Water: Provide portable water approved by local health authorities.

F. Open-Mesh Fencing: Provide 11-gauge, galvanized two inch (2"), chain link fabric fencing six feet (6') high with galvanized barbed wire top strand and galvanized steel pipe posts, one and one-half inches (1-1/2") in diameter for line posts and two and one-half inches (2-1/2") in diameter for corner posts.

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.

B. Water Hoses: Provide three-fourths inch (3/4") heavy-duty, abrasion-resistant, flexible rubber hoses one hundred feet (100') long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shut-off nozzles at hose discharge.

C. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.

D. Electrical Power Cords: Provide grounded extension cords. Use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach area where construction activities are in progress.

E. Temporary Storage Sheds: Provide fabricated or mobile units with lockable entrances. Provide heated units on foundations adequate for normal loading.

F. Temporary Toilet Units: Provide self-contained single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material.

G. First Aid Supplies: Comply with governing regulations.

H. Fire Extinguishers: Provide hand-carried, portable UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL-rated, Class ABC dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.
   1. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the work. Relocate and modify facilities as required.

B. Provided each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed, or are replaced by authorized use of completed permanent facilities.

3.02 TEMPORARY UTILITY INSTALLATION

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

B. Water Service: Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.
   1. Sterilization: Sterilize temporary water piping prior to use.

C. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include transformers, overload protected disconnects, automatic ground-fault interrupters and main distribution switch gear.
   1. Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, AC 20 ampere rating, and lightning circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.

3.03 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION

A. Locate field offices, storage sheds, sanitary facilities and other temporary construction and support facilities for easy access.
   1. Maintain temporary construction and support facilities until Final Completion. Remove prior to final application for payment. Where temporary construction or facilities interfere with the Owner's use or occupation of the work after Substantial Completion, remove, relocate or modify temporary construction and facilities as required to permit Owner's use and occupancy.
   2. Provide insulated, weathertight offices of sufficient size to accommodate required office personnel at the Project Site.

B. Storage and Fabrication Sheds: Install storage and fabrication sheds, sized, furnished and equipped to accommodate materials and equipment involved, including temporary utility service.

C. Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures. Comply with regulations and health codes for the type, number, location, operation and maintenance of fixtures and facilities. Install where facilities will best service the Project's needs.

1. Provide toilet tissue, paper towels, paper cups and similar disposable materials for each facility. Provide covered waste containers for used material.
2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.
3. Wash Facilities: Install wash facilities supplied with portable water at convenient locations for personnel involved in handling materials that require wash-up for a healthy and sanitary condition. Dispose of drainage properly. Supply cleaning compounds appropriate for each condition.

D. Drinking Water Fixtures: Provide drinking water fountains where required for compliance with regulations and health codes, including paper supply.

E. Temporary Enclosures: Provide temporary enclosure for protection of construction in progress and completed, from exposure, foul weather, other construction operations and 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.

D. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security.

E. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of materials to minimize the opportunity for theft and vandalism.

F. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

3.05 OPERATION, TERMINATION AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.

B. Termination and Removal: Unless the Architect requires that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired.
   1. Materials and facilities that constituted temporary facilities are property of the Contractor. The Owner reserves the right to take possession of Project identification signs.

2. At substantial Completion, clean and renovate permanent facilities that have been used during the construction period, including but not limited to:
   a) Replace air filters and clean inside of ductwork and housings.
   b) Replace significantly worn parts and parts that have been subject to unusual operating conditions.
   c) Replace lamps that are burned out or noticeably dimmed by substantial hours of use.

END OF SECTION 01 50 00

SECTION 01 73 29
CUTTING AND PATCHING

PART 1 - GENERAL

1.01 SUMMARY

A. This section specifies administrative and procedural requirements for cutting and patching.

B. Refer to other sections for specific requirements and limitations applicable to cutting and patching individual parts of the work.
   1. Requirements of this section also apply to mechanical and electrical installations, as well as work specified in other Divisions.

1.02 SUBMITTALS

A. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required before proceeding, submit a proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the proposal:
   1. Describe the extent of cutting and patching required and how is to be performed and indicate why it cannot be avoided.
   2. Describe anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
   3. List products to be used and firms or entities that will perform work.
   4. Indicate dates when cutting and patching is to be performed.
   5. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
   6. Where cutting and patching involves addition of reinforcement to structural elements, submit details and engineering calculations to show how reinforcement is integrated with the original structure.
   7. Approval by the Architect to proceed with cutting and patching dos not waive the Architect's right to later require complete removal and replacement of a part of the work found to be unsatisfactory.

1.03 QUALITY ASSURANCE

A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.
   1. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
      a) Bearing and retaining walls
      b) Structural concrete
      c) Structural steel
      d) Lintels
      e) Structural decking

f) Miscellaneous structural metals
g) Equipment supports
h) Piping, ductwork, vessels and equipment

B. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.
1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
a) Shoring, bracing and sheeting
b) Primary operational systems and equipment
c) Air or smoke barriers
d) Water, moisture or vapor barriers
e) Membranes and flashings
f) Fire protection systems
g) Noise and vibration control elements and systems
h) Control systems
i) Communication systems
j) Conveying systems
k) Electrical wiring systems

C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace work cut and patched in a visually unsatisfactory manner.
1. If possible, retain the original installer or fabricator to cut and patch the following categories of exposed work, or if it is not possible to engage the original installer or fabricator, engage another recognized experienced and specialized firm:
a) Matched-veneer woodwork
b) Performed metal panels
c) Window wall system
d) Acoustical ceilings
e) Finished wood flooring
f) Carpeting
g) Aggregate wall coating
h) Wall covering
i) HVAC enclosures, cabinets or covers

PART 2 - PRODUCTS

2.01 MATERIALS

A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 - EXECUTION

3.01 INSPECTION

A. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting, and patching is to be performed. Take corrective action before proceeding if unsafe or unsatisfactory conditions are encountered.
   1. Before proceeding, meet at the site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.02 PREPARATION

A. Temporary Support: Provide temporary support of work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
   1. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
   2. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.03 PERFORMANCE

A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
   1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.

B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible, review proposed procedures with the original installer, and comply with the original installer's recommendations.
   1. In general, where cutting is required, use one hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
   2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
   3. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.
   4. Bypass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after bypassing and cutting.

C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
   1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
   2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
   3. Where removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
   4. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken area containing the patch after the patched area has received primer and second coat.
   5. Patch, repair or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.

3.04 CLEANING

A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 01 73 29

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 form 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 80º 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 77 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 Architect/Project Manager will either proceed with observation or advise the Contractor of unfilled requirements. The Architect/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 Architect/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 Architect/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 Architect/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 Architect/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 Architect/Project Manager.
   1. Upon completion of re-observation, the Architect/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 Architect/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 Architect/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 Architect/Project Manager's reference during normal working hours.

B. Record Drawings: Maintain a clean, undamaged set of black-line white-prints of Contract Drawings and Shop Drawings in hard copy of in digital format. Mark the set to show the actual installation where the installation varies substantially from the work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

1. Mark record sets with colored erasable pencil, and use other colors to distinguish between variations in separate categories of the work. Use the following color code:
   a) Red for Architectural work
   b) Blue for Structural work
   c) Green for Plumbing work
   d) Orange for HVAC work
   e) Brown for Electrical work
   f) Black for other written notations
2. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings.
3. Note related Change Order numbers where applicable.
4. At completion of project, transfer all Project Record Data to one complete set of black-line prints using colored pencils or ink. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set. Deliver one complete set of mylar sepias of all drawings to the Architect/Project Manager for the Owner's records. The cost of printing the mylar sepias shall be paid by the Contractor.

C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual work performed in comparison with the text of the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and Product Data.

1. Upon completion of the work, submit record Specifications to the Architect/Project Manager for the Owner's records.

D. Record Product Data: Maintain one copy of each Product Data submittal. Mark these documents to show significant variations in the actual work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations. Give particular attention to concealed products and portions of the work which cannot otherwise be readily discerned later by direct observation. Note related Change Orders and mark-up of record drawings and Specifications.

1. Upon completion of mark-up, submit complete set of record Product Data to the Architect/Project Manager for the Owner's records.

E. Record Sample Submitted: Immediately prior to the date or dates of Substantial Completion, the Contractor will meet at the site with the Architect/Project Manager and the Owner's personnel to determine which of the submitted Samples that have been maintained during progress of the work are to be transmitted to the Owner for record purposes. Comply with delivery to the Owner's Sample storage area.

F. Miscellaneous Record Submittals: Refer to other Specification sections for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Architect/Project Manager for the Owner's records.

G. Maintenance Manuals: Organize operating and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual heavy-duty two inch (2"), three-ring vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:
   1. Emergency instructions
   2. Spare parts list
   3. Copies of warranties
   4. Wiring diagrams
   5. Recommended "turn around" cycles
   6. Observation procedures
   7. Shop Drawings and Product Data
   8. Fixture lamping schedule

PART 2 - PRODUCTS

2.01 CLEANING AGENTS

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

PART 3 - EXECUTION

3.01 CLOSEOUT PROCEDURES

A. Operating and Maintenance Instructions: Arrange for each installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items:
   1. Maintenance manuals
   2. Record documents
   3. Spare parts and materials
   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 77 00

SECTION 01 78 39
PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
   1. Record Drawings.
   2. Record Specifications.
   3. Record Product Data.

B. Related Sections include the following:
   1. Division 1 Section "Closeout Procedures" for general closeout procedures.
   2. Divisions 2 through 16 Sections for Specific requirements for Project Record Documents of the Work in those Sections.

1.03 SUBMITTALS

A. Record Drawings: Comply with the following:
   1. Number of copies: Submit one set of marked-up Record Prints.

B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one copy of each Product Data submittal.
   1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.01 RECORD DRAWINGS

A. Record Prints: Maintain one set of blue or black-line white prints of the Contract Drawings and Shop Drawings.
   1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

a) Give attention to information on concealed elements that would be difficult to identify or measure and record later.
b) Accurately record information in an understandable drawing technique.
c) Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

2. Content: Types of items requiring marking include, but are not limited to, the following:
a) Dimensional changes to Drawings.
b) Revisions to details shown on Drawings.
c) Revisions to routing of piping and conduits.
d) Revisions to electrical circuitry.
e) Actual equipment locations.
f) Locations of concealed internal utilities.
g) Changes made by Change Order or Construction Change Directive.
h) Changes made following Architect's written orders.
i) Details not on the original Contract Drawings.
j) Field records for variable and concealed conditions.
k) Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

2.02 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

2.03 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data Submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.

3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

2.04 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.01 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

END OF SECTION 01 78 39

SECTION 06 10 53
MISCELLANEOUS CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
1. Framing with dimension lumber.
2. Rooftop equipment bases and support curbs.
3. Wood blocking, cants, and nailers.
4. Wood furring.
5. Sheathing.
6. Subflooring and underlayment.
7. Interior wood trim.
8. Plywood backing panels.
9. Removal and replacement of damaged, deteriorated or non-compliant plywood sheathing for roof substrate, as required.
10. Expansion Joints

1.02 GENERAL INFORMATION

A. Nailers shall be installed according to NRCA, Underwriters Laboratory, and IBC guidelines.

B. Wooden nailers shall be installed at gravel stops, drip edges, expansion joints, and on outside perimeter of building.

C. Gravel stop and drip edge nailers shall be the same height as the new insulation being installed where required.

D. Nailers shall be raised if necessary by anchoring an additional nailer of appropriate height to the existing nailer if the existing nailer is not to be replaced.

E. Expansion joint nailers shall extend upward a minimum of eight inches (8") above finish roof height.

F. Where parapet wall exists, specified vertical wall shimming material shall be installed beginning at roof height up to a minimum of twelve inches (12”) above finished roof surface, or as detailed, to provide substrate for horizontal termination of roof to wall flashing system.

G. Any lumber or shimming required for attachment, or to make material flashing flush or level with offsets and/or transitions, shall be incorporated in these specifications.

1.03 DEFINITIONS

A. Lumber grading agencies, and the abbreviations used to reference them, include the following:
1. NELMA - Northeastern Lumber Manufacturers Association.
2. NLGA - National Lumber Grades Authority.

3. SPIB - Southern Pine Inspection Bureau.
4. WCLIB - West Coast Lumber Inspection Bureau.
5. WWPA - Western Wood Products Association.

1.04 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.

C. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials, both before and after exposure to elevated temperatures when tested according to ASTM D 5516 and ASTM D 5664.
3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
4. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

D. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
1. Preservative-treated wood.
2. Fire-retardant-treated wood.
3. Power-driven fasteners.
4. Powder-actuated fasteners.
5. Expansion anchors.
6. Metal framing anchors.

1.05 QUALITY ASSURANCE

A. 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. Plywood.
5. Hardboard underlayment.

B. Testing Agency Qualifications: To qualify for approval, an independent testing agency must demonstrate to Structural Engineer 's and/or Project Manager'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.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.01 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. 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.
4. Provide dressed lumber, S4S, unless otherwise indicated.
5. Provide dry lumber with nineteen percent (19%) maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.
6. Provide dry lumber with fifteen percent (15%) maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.

B. Wood Structural Panels:
1. Plywood
2. Thickness: As needed to comply with requirements specified but not less than thickness indicated.
3. Comply with "Code Plus" provisions in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial."
4. Factory mark panels according to indicated standard.

2.02 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C9 (plywood), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).
1. Preservative Chemicals: Acceptable to authorities having jurisdiction and [**one of**] the following:
a) Chromated copper arsenate (CCA).
b) Ammoniacal copper zinc arsenate (ACZA).

c) Ammoniacal, or amine, copper quat (ACQ).
d) Copper bis (dimethyldithiocarbamate) (CDDC).
e) Ammoniacal copper citrate (CC).
f) Copper azole, Type A (CBA-A).
g) Oxine copper (copper-8-quinolinolate) in a light petroleum solvent.

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

B. Kiln-dry material after treatment to a maximum moisture content of nineteen percent (19%) for lumber or fifteen percent (15%) for plywood. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.
1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.

D. Application: Treat items indicated on Drawings, 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.
3. Wood framing members less than eighteen inches (18") above grade.
4. Wood floor plates that are installed over concrete slabs directly in contact with earth.

2.03 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, provide materials that comply with performance requirements in AWPA C20 (lumber) or AWPA C27 (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 or 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.

2.04 DIMENSION LUMBER

A. General: Provide dimension lumber of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated.

B. Non-Load-Bearing Interior Partitions: Construction, Stud, or No. 2 grade and any of the following species:
   1. Mixed southern pine; SPIB.
   2. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWPA.
   3. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.
   4. Eastern softwoods; NELMA.
   5. Northern species; NLGA.
   6. Western woods; WCLIB or WWPA.

C. Other Framing: Construction, Stud, or No. 2 grade and any of the following species:
   1. Douglas fir-larch; WCLIB or WWPA.
   2. Douglas fir-south; WWPA.
   3. Douglas fir-larch (north); NLGA.
   4. Hem-fir; WCLIB or WWPA.
   5. Hem-fir (north); NLGA.
   6. Southern pine; SPIB.
   7. Mixed southern pine; SPIB.
   8. Spruce-pine-fir (south); NELMA, WCLIB, or WWPA.
   9. Spruce-pine-fir; NLGA.

2.05 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including the following:
   1. Rooftop equipment bases and support curbs.
   2. Blocking.
   3. Cants.
   4. Nailers.
   5. Furring.
   6. Grounds.

B. For items of dimension lumber size, provide Construction, Stud, or No. 2 grade lumber with fifteen percent (15%) maximum moisture content and any of the following species:
   1. Mixed southern pine; SPIB.
   2. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWPA.
   3. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.
   4. Eastern softwoods; NELMA.
   5. Northern species; NLGA.
   6. Western woods; WCLIB or WWPA.

C. For exposed boards, provide lumber with fifteen percent (15%) maximum moisture content and any of the following species and grades:
   1. Eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine Premium or 2 Common (Sterling) grade; NELMA, NLGA, WCLIB, or WWPA.
   2. Mixed southern pine, B & B Finish No. 1 grade; SPIB.
   3. Hem-fir or Hem-fir (north), Superior or C & Btr Finish grade; NLGA, WCLIB, or WWPA.
   4. Spruce-pine-fir (south) or Spruce-pine-fir, grade; NELMA, NLGA, WCLIB, or WWPA.
   5. Western red cedar, A grade; NLGA or WWPA.

D. For concealed boards, provide lumber with fifteen percent (15%) maximum moisture content and any of the following species and grades:
   1. Mixed southern pine, No. 2 grade; SPIB.
   2. Hem-fir or Hem-fir (north), Construction or 2 Common grade; NLGA, WCLIB, or WWPA.
   3. Spruce-pine-fir (south) or Spruce-pine-fir, Construction or 2 Common grade; NELMA, NLGA, WCLIB, or WWPA.
   4. Eastern softwoods, No. 2 Common grade; NELMA.
   5. Northern species, No. 2 Common grade; NLGA.
   6. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

2.06 INTERIOR WOOD TRIM

A. Softwood Lumber Trim for Transparent Finish (Stain or Clear Finish): Kiln-dried finished lumber (S4S) of one of the following species and grades:
   1. Grade Finish or 1 Common eastern white pine; NELMA or NLGA.
   2. Grade 1 Common (Colonial) Idaho white, lodgepole, ponderosa, or sugar pine; NLGA or WWPA.
   3. Grade Superior or C & Btr Finish Douglas fir-larch or Douglas fir-south; NLGA, WCLIB, or WWPA.
   4. Clear Heart western red cedar; NLGA, WCLIB, or WWPA.

B. Hardwood Lumber Trim for Transparent Finish (Stain or Clear Finish): Clear, kiln-dried, red oak finished lumber (S4S).

C. Lumber Trim for Opaque Finish (Painted): Finished lumber (S4S), either finger-jointed or solid lumber, of one of the following species and grades:
   1. Grade Finish or 2 Common eastern white pine; NELMA or NLGA.
   2. Grade 1 Common (Colonial) Idaho white, lodgepole, ponderosa, or sugar pine; NLGA or WWPA.
   3. Grade A Finish alder, aspen, basswood, cottonwood, gum, magnolia, soft maple, sycamore, tupelo, or yellow poplar; NHLA.

2.07 PANEL PRODUCTS

A. Miscellaneous Concealed Plywood: Exterior sheathing, span rating to suit framing in each location, and thickness as indicated but not less than one-half inch (1/2")

B. Plywood Underlayment: DOC PS 1, Exterior A-C with fully sanded face, thickness as indicated but not less than one-half inch (1/2")

C. Hardboard Underlayment: AHA A135.4, Class 4 (Service), Surface S1S; with back side sanded.

D. Miscellaneous Exposed Plywood: DOC PS 1, A-D Interior, thickness as indicated but not less than one-half inch (1/2")

2.08 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
   1. Where carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Wire, Brads, and Staples: FS FF-N-105.

C. Power-Driven Fasteners: CABO NER-272.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

F. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M).

G. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
   1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
   2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

2.09 METAL FRAMING ANCHORS

A. General: Provide galvanized steel framing anchors of structural capacity, type, and size indicated and acceptable to authorities having jurisdiction.

B. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.

2.10 EXPANSION JOINTS

A. General: Provide field fabricated wood expansion joints where shown on the drawings in size as indicated and acceptable to authorities having jurisdiction.

B. Expansion joint nailers shall extend upward a minimum of eight inches (8") above finish roof height.

C. Existing expansion joints shall be replaced with curbed expansion joints which extend a minimum of eight inches (8") above the finished roof surface. New expansion joint cover shall be fabricated of sheet metal in accordance with NRCA and/or SMACNA details and flashed in accordance with roofing material manufacturer's recommended procedures.

D. Provide structural expansion joint in the field of the roof where the roof span exceeds 200’-0” in any direction.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, / nailers, blocking, / grounds, and similar supports to comply with requirements for attaching other construction.

C. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

D. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.

E. Countersink fastener heads on exposed carpentry work and fill holes with wood filler.

F. Use fasteners of appropriate type and length. Predrill members when necessary to avoid splitting wood.

3.02 WOOD GROUND / SLEEPER, BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

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

3.03 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
   1. Fire block furred spaces of walls, at each floor level and at ceiling, with wood blocking or noncombustible materials accurately fitted to close furred spaces.

B. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal furring vertically at sixteen inches (16") o.c.

C. Furring to Receive Plaster Lath: Install 1-by-2-inch nominal size furring vertically at sixteen inches (16") o.c.

3.04 PANEL PRODUCT INSTALLATION

A. Wood Structural Panels: Comply with applicable recommendations contained in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.
Comply with "Code Plus" provisions in above-referenced guide.

B. Particleboard Underlayment: Comply with the National Particleboard Association's recommendations for type of subfloor indicated. Fill and sand gouges, gaps, and chipped edges. Sand uneven joints flush.

C. Hardboard Underlayment: Comply with AHA's "Application Instructions for Basic Hardboard Products" and hardboard manufacturer's written instructions for preparing and applying hardboard underlayment.

3.02 ROUGH CARPENTRY

A. Nailers shall be installed according to NRCA, Underwriters Laboratory, and IBC guidelines.

B. Wooden nailers shall be installed at gravel stops, drip edges, expansion joints, and on outside perimeter of building.

C. Gravel stop and drip edge nailers shall be the same height as the new insulation being installed where required.

D. Nailers shall be raised if necessary by anchoring an additional nailer of appropriate height to the existing nailer if the existing nailer is not to be replaced.

E. Expansion joint nailers shall extend upward a minimum of eight inches (8") above finish roof height.

F. Where parapet wall exists, specified vertical wall shimming material shall be installed beginning at roof height up to a minimum of twelve inches (12”) above finished roof surface, or as detailed, to provide substrate for horizontal termination of roof to wall flashing system.

G. Any lumber or shimming required for attachment, or to make material flashing flush or level with offsets and/or terminations, shall be incorporated in these specifications.

3.03 NAILERS

A. Wooden nailers shall be installed at gravel stops, drip edges, and expansion joints on outside perimeter of building according to NRCA, Underwriters Laboratory and IBC guidelines.

B. All Construction: Nailers shall be the same height as the new cover board being installed where required. Nailers shall be raised if necessary by anchoring an additional nailer of appropriate height to the existing nailer if the existing nailer is not to be replaced. Nailers shall be anchored to resist a pull-out force of one hundred seventy-five pounds (175#) per foot. Fasteners shall be no less than two (2) per nailer, and be spaced at three feet (3') on center maximum.

C. Expansion joint nailers shall extend upward a minimum of eight inches (8") above finish roof height.

D. Where parapet wall exists, fire treated plywood lumber must be installed a minimum of twelve inches (12”) above finished roof surface to provide substrate for horizontal termination of roof to wall flashing system.

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 EXPANSION JOINTS

A. Expansion material shall be formed and centered over the roof to roof structural EJ locations as shown on the drawings.

B. Coordinate the location of the expansion joint framing with Structural, Architectural and Roof drawings.

C. Framing of the expansion shall be in accordance with the details and as field conditions dictate.

D. Expansion material shall be formed and located adjacent to roof to rise wall structural EJ locations as shown on the drawings.

E. Wood Cants shall provide a four inch (4") rise above the roof's surface and extend a minimum of four inches (4") horizontally.

F. Vertical wood framing shall be attached over horizontal wood blocking as shown and detailed.

G. Taper the top of the expansion join as required at tapered roof areas to maintain a minimum height of 8" above finished roof surface.

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 01 55
TPO ROOFING 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.
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 Owner's representative.
4. Contractor must have successfully completed previous projects warranted by 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. Testing Laboratory Services: Test results shall meet or exceed established standards.

B. Underwriters Laboratory (Roofing Covering): Class A fire hazard classification.

C. Comply with governing local, state, and federal regulations, safety standards, and codes.

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

H. Single-Ply Roofing Industry (SPRI) – A Professional’s Guide to Specifications Manual

1.04 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.

1.05 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 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 and kettles. Fence is to be secured on a daily basis.

1.06 SITE CONDITIONS

A. Job Condition Requirements:
1. Apply roofing in dry weather.
2. Do not apply roofing when ambient temperature is below 40° F.
3. 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.
4. 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.
5. 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 Owner. Load placed on the roof at any point shall not exceed the safe load for which the roof is designed.
6. The contractor shall take all necessary precautions to protect the roof mat and deck from damage. The contractor shall be responsible for repairing all new areas of damage caused by the negligence of the contractor, at the contractor's expense. The Owner's on-site representative shall determine damage caused by contractor negligence.
7. 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, use the stricter document.
8. Follow insurance underwriter's requirements acceptable for use with specified products or systems.
9. 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.

10. All kettles shall have an automatic thermostat control, and temperature gauge, all in working order.
11. 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.
12. 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 Owner's representative of any problems in this regard prior to commencing cleaning operations.
13. Temporary Sanitary Facilities: The contractor shall furnish and maintain temporary sanitary facilities for employees use during this project. These will be removed after the completion of the project. All portable facilities shall comply with local laws, codes, and regulations.

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. 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 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. 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's 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's Project Manager are to be mobile, home and office numbers for:
   a) Job Foreman
   b) Job Superintendent
   c) Owner or Company Officer

B. 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.

C. 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.

D. 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. This is an active fire station. Do not encumber movement of the fire trucks or personnel.
   3. 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.

E. 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.
   5. The contractor must use Republic Services for dumpsters or own their own.

1.07 WARRANTY

A. Twenty (20) Year NDL Warranty: The complete roofing system 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:
   1. Roofing contractor shall guarantee the entire roofing system for a period of two (2) years from the date of Substantial Completion.
   2. The materials manufacturer shall guarantee the entire roofing system for a total period of twenty (20) years from the date of substantial completion.
   3. Membrane manufacturer shall provide the written warranty as specified.
   4. The entire roofing system shall be guaranteed to be watertight and against any failures of workmanship and materials. Repair of the system, including materials and labor, shall be done at no cost to the Owner.
   5. 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.

B. During the proposal period each Contractor shall make arrangements with the materials manufacturer to provide the required warranty. Refer to SUBMITTALS paragraph in this section for requirements concerning submittals of warranty.

PART 2 - PRODUCTS

2.01 GENERAL

A. Compatibility: Provide materials that are recommended by manufacturers to be fully compatible with indicated substrates, or provide separation materials as required to eliminate contact between incompatible materials.

B. Acceptable manufacturers: Johns-Manville, GAF, Firestone.

C. Materials herein specified shall be supplied or approved in writing by the manufacturer issuing the warranty.

D. The white polyester reinforced fleece backed adhered roofing system shall only be applied by manufacturer approved and trained roofing contractors.

E. The manufacturer shall have 15 years UL listing for the membrane to be used on the project. Membrane manufacturer shall have a minimum of 15 years FM approval, and 15 years manufacturing experience with the roofing membrane specified for this project.

F. All roofing and roof accessories shall be installed in compliance with manufacturer's current specifications and details.

G. All materials used on the project shall be asbestos free.

H. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.

2.02 TPO ROOFING MEMBRANE

A. The white 60 mil thermoplastic polyolefin (TPO) membrane sheet shall be fabric reinforced with a backing of eight-ounce, non-woven polyester fleece, meeting ASTM D 6878.

Property	Test Procedure	Physical Properties
Overall Thickness w/o fleece	ASTM D 751	0.060 in
Coating over scrim	ASTM D 6878, Annex A	0.025 in
Breaking Strength	ASTM D 751	390 lbf
Elongation at Reinforcement Break	ASTM D 751, Grab Method	25%
Tearing Strength	ASTM D 751	120 lb_f
Brittleness Point	ASTM D 2137	Pass
Ozone Resistance, no cracks	ASTM D 1149	Pass
Properties after Heat Aging	ASTM D 573	
Retention of Breaking Strength	ASTM D 751, Grab Method	>90%
Retention of Elongation at Break	ASTM D 751, Grab Method	>90%
Retention of Tearing Strength	ASTM D 751	>60%Weight Change
		<1%
Linear Dimensional Change	ASTM D 1204, 6 h @ 158°	<1%
Water Absorption	ASTM D 471	<3%
Weather Resistance	ASTM G 155, @7x magnification	>20,160 kJ/m^2
Dynamic Puncture Resistance MD	ASTM D 5635	Pass
Dynamic Puncture Resistance CD	ASTM D 5635	Pass
Static Puncture Resistance	ASTM D 5602	Pass

2.03 FLASHING MEMBRANE

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

2.04 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 white membrane, thickness approximately 45 mils.
   2. Use: Inside/outside corners, multiangled intersections, sealant pockets and other conditions where molding of the membrane is required.

2.05 CAULKS

A. 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), or approved equal.

B. To seal the leading edge of the membrane, to bond membrane at terminations with metal, and for open seam repair, 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 70° F.
Shear Strength (ASTM D-1002)	300 psi+ (7 day ambient cure)
Elongation @ break (ASTM D-412)	300% (7 day ambient cure)
Hardness Shore A (ASTM C-661)	50 – 55 (14 day ambient cure)
Tack free time (ASTM C-679)	35 minutes
Low temperature flex	Minus 20° F: PASS
Slump (sag) (ASTM C-639)	Zero slump
Shrinkage (ASTM D-2453)	No measurable shrinkage (14 cay cure)
Service temperature	-40° F to 200° F

2.06 BITUMEN

A. Shall be ASTM D 312 Type IV steep asphalt.

Slope	Interply	Top Pour	Backnail	Strap
0 - ½" per 12"	Type IV	Type IV	No	No
½" - 2" per 12"	Type IV	Type IV	Yes	Strap if Possible
2" - 3" per 12"	Type IV	Type IV	Yes	Yes

2.07 INSULATION

A. At Recovery Board: Impact-resistant, nonstructural, specially engineered gypsum and cellulose fiber panels with 95% recycled content; uniform water-resistance throughout core and surface. Board size four feet by four feet (4' x 4'), thickness 5/8"; conforming to ASTM C 1278, meeting FM 4470 Class 1 criteria, classified by Underwriters Laboratory, and listed in the FM Global Approval Guide. Board will meet the following physical properties, Dexcell-FA Roof Board, as manufactured by National Gypsum Company, or approved equal.

Test	Typical Value	Test Method
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

2.08 FASTENERS

A. Fasteners and fastening plates or bars shall be listed in the FM Global Approval Guide, and be as recommended by the fastener manufacturer for the specific application.

B. Fastener for Steel 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 ten percent (10%) red rust which surpasses FM Global Approval Standard 4470, as manufactured by Olympic Manufacturing Group, Inc., or approved equal. Fasteners, plates, and/or bars shall be listed in the FM Global Approval Guide.

2.09 BONDING ADHESIVE FOR FLASHING

A. Description: Adhesive is a bonding cement of synthetic rubber for adhering membranes to various substrates, produced by Ashland Chemical, or approved equal.

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.

2.10 ASPHALT ROOF PRIMER

A. Quick-dry asphalt-based primer for priming of asphalt roof surfaces, or approved equal.

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

2.11 WOOD

A. All nailers, cants and wooden curbs shall be fire rated, treated lumber as required by NRCA, FM Global and Underwriters Laboratory guidelines.

2.12 SEAM SEALER

A. Special caulk compatible with thermoplastic membrane to seal exposed cut edges.

2.13 TRIM STRIP

A. The trim strip shall have the following minimum properties.
   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.

2.14 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.

2.15 PIPE BANDS

A. Stainless steel bands with self-locking heads.

B. Tighten with hand tool for tension control and flush cut off.

2.16 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.

2.17 PIPESTANDS (6" OR SMALLER - LESS THAN 9" OFF ROOF SURFACE)

A. Refer to Specifications Section 07 72 00 Roof Accessories for further information.

2.18 PIPE HANGERS (6" AND LARGER – 9" TO 12" OFF ROOF SURFACE)

A. Refer to Specifications Section 07 72 00 Roof Accessories for further information.

2.19 ROOF DRAIN

A. Shall be all cast iron, minimum four inch (4"), as manufactured by Josam, or approved equal.

2.20 LEAD JACKS

A. Shall be four pound (4#) lead, and of dimensions required to completely cover existing plumbing stack.

2.21 LEAD FLASHING DRAINS

A. Shall be four pound (4#) lead, minimum thirty-six inches by thirty-six inches (36" x 36"), used for flashing of internal drains.

2.22 WALKWAY PAD

A. Shall be as recommended by the roof membrane manufacturer issuing the warranty.

2.23 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, as manufactured by Olympic Fasteners, or approved equal.

2.24 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 hatch to be determined by Owner/Project Consultant.
   1. Architect 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.

2.25 VERTICAL WALL SHIMMING MATERIAL

A. Shall be one of the following unless otherwise accepted by Owner's representative: Exterior grade plywood. Proper selection of material is required to achieve FM Global and UL guidelines.

2.26 SELF-ADHERING UNDERLAYMENT FOR TEMPORARY WATERPROOFING

A. A premium heavyweight, minimum 60 mil, self-adhering underlayment, to use as an ice and water shield.

2.27 OVERNIGHT SEAL

A. Hot applied asphalt bitumen shall be provided for the purpose of night sealing the roof system.

2.28 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.

2.29 PRECAUTIONS

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

2.30 MISCELLANEOUS MATERIALS

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

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. Bitumen kettle shall have a visible thermometer and thermostatic control or some other means to provide positive monitoring of the bitumen temperature when it is heated in accordance with manufacturer's instructions.
9. Ambient temperature shall be 45° F and rising.
10. The maximum heating temperature of Type IV asphalt shall be 500° F.
11. The temperature of Type IV asphalt shall be approximately 430° F ± at the point of application or as recommended by the membrane manufacturer.
12. Maintain kettle and/or tanker temperature at least 25° F below the actual flash point of the bituminous materials used.
13. Never heat the bituminous materials at high temperatures for prolonged periods of time.
14. Do not allow bituminous materials to stand in luggers for long periods.
15. Circulate bituminous materials.
16. Insulate hot transport lines if required.
17. Wrinkles, buckles, kinks, and fishmouths are not acceptable when laying membrane.

18. 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.
19. Provide a water test of each roof section prior to substantial completion. The test should simulate rainfall of one inch (1") per hour minimum.
20. 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 CATEGORY II (NON-FRIABLE) ASBESTOS CONTAINING MATERIALS (ACM) REMOVAL

NOTE: Asbestos removal procedures are required (if asbestos is present) while removal of ACM roof materials takes place. The following procedures are to be followed as a minimum:

A. Roofing contractors who perform asbestos roof tear-off shall use hand tools such as axes, picks, shovels or mechanical equipment such as a "roof warrior" that uses a reciprocating wedge to tear roofing materials. Breaking and/or slicing of material is permitted. Sanding, grinding or abrading during handling is not permitted.

B. Wrap all rooftop ducts, vents or exhaust openings with 6 mil poly and tape.

C. Provide an Asbestos Hazard Control Supervisor (competent person) to oversee demolition.

D. Ensure employees have received OSHA required training in asbestos removal and health hazards associated with exposure to airborne asbestos fibers.

E. Roof will be sufficiently wetted down before removal to prevent dust, using pump-up garden sprayer or water hose with spray nozzle.

F. Perform personal and area air monitoring for at least the first three (3) days of the project in accordance with 29 CFR 1910.1001. Monitoring shall be done by either: 1) in-house certified abatement personnel; or 2) certified asbestos monitoring personnel from a certified outside source.

G. Asbestos Warning signs and tape shall be posted in tear-off area.

H. Based on air monitoring results, the contractor **MUST** execute a Written Negative Exposure Assessment Determination and keep on file at the project site along with air monitoring results.

I. Use airtight chutes or mechanical means to lower ACM from the roof. The ACM must be wrapped in poly and removed daily. If ACM is NOT wrapped, the disposal container must be enclosed.

J. Disposal: Can be disposed of as construction debris at any approved landfill.

3.03 MECHANICALLY FASTENED RECOVERY BOARD AT METAL DECKS

A. Cut all current blisters, air pockets, and bubbles in current modified bitumen membrane. Specified substrate board shall be mechanically fastened to conform to 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 publications, literature, and bulletins of IBC and the manufacturer that are in effect at the time of this project. Boards shall be staggered and butted as close as possible with voids over one-fourth inch (1/4") to be filled.

B. Fasteners must penetrate the purlin a minimum of one inch (1"). Using a screw gun with a minimum of 1800 RPM, drive the fastener through the purlin until a slight depression is seen around the plate.

C. Caution should be taken not to overdrive the fastener causing stress plate surface to deflect more than one sixteenth inch (1/16").

3.04 NAILERS

A. Wooden nailers shall be installed at gravel stops, drip edges, and expansion joints on outside perimeter of building according to NRCA, Underwriters Laboratory and IBC guidelines.

B. All Construction: Nailers shall be the same height as the new recovery board being installed where required. Nailers shall be raised if necessary by anchoring an additional nailer of appropriate height to the existing nailer if the existing nailer is not to be replaced. Nailers shall be anchored to resist a pull-out force of one hundred seventy-five pounds (175#) per foot. Fasteners shall be no less than two (2) per nailer, and be spaced at three feet (3') on center maximum. Expansion joint nailers shall extend upward a minimum of eight inches (8") above finish roof height.

3.05 APPLICATION OF FLEECE BACKED MEMBRANE

A. Adhered Application: Adhere membrane to acceptable substrate with hot asphalt 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.
   3. Fold one end of the roof membrane on top of itself until both ends meet. Apply hot asphalt to the prepared roof surface. The sheet can then be pulled and laid into the bonding material using care not to create any wrinkles.
   4. Carefully push into place from fold line to overlap, avoiding wrinkles and air pockets. Roll or broom membrane flat.
   5. Repeat procedure for other sheet half.
   6. 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.
   7. 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.
   8. Seam sealer shall be applied to all non-factory edges.

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. Caulk all exposed cut edges with seam sealer.

3.06 FLASHING

A. Flash all penetrations, metal edge systems, walls, curbs, expansion joints, drains as shown on details and approved shop drawings with white reinforced 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 <u>through</u> metal counterflashing is <u>not</u> 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.

3.07 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. All existing substrates receiving flashing membrane shall be clean and primed with primer, prior to application as required.

D. 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.

E. 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.

F. All vertical flashing lap seams of the flashing membrane shall be hot-air welded.

G. 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.

H. 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.

I. 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.

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

3.08 VERTICAL WALL FLASHING (FOR USE APPROXIMATELY 8-18" ABOVE THE FINISHED ROOF LINE AND EXTENDING UPWARD)

A. Flashing membrane shall be installed on the vertical beginning a minimum of eight inches (8") above the finished roof line (where the base flashing is terminated), with length of run not to exceed twenty feet (20'). Flashing shall be installed in strict accordance with the manufacturer's recommendations.

B. The clad metal used to terminate the minimum eight inch (8”) high base flashing shall be covered with the lower edge of the upper vertical flashing. The selvedge edge of the upper flashing shall be hot-air welded to the clad metal receiver. Care should be taken to ensure the top edge of the base flashing and bottom edge of the vertical flashing are both secured.

C. All existing substrates receiving flashing membrane shall be clean and primed with asphalt primer, prior to application.

D. All substrates receiving welded-seam flashing membrane shall be clean and primed with primer, prior to application when applicable.

E. The vertical wall flashing membrane shall be set in flashing bonding adhesive according to manufacturer's guidelines.

F. All vertical flashing lap seams of the flashing membrane shall be hot-air welded.

G. 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.

H. Immediately following the laying of the flashing membrane, it shall be pressed or rolled in the width direction of the membrane. This will prevent excessive entrapment of air beneath the membrane. The pressing or rolling shall be in the width direction and with the laps so as not to buck the laps.

I. Any flashing extending further than eighteen inches (18") up onto a vertical surface shall be installed using the strapped method and must be fastened with a termination bar or installed up and over the parapet wall and fastened to the nailer on the outside of the wall.

J. The flashing membrane shall be run up the wall in sheet widths, run under the coping cap and be terminated on the outside of the wall six inches (6") on center; then the coping cap shall be reset. All side laps are to be hot-air welded.

K. Hot-air Welding 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 the contractor by using two (2) pieces of flashing membrane. Minimum width of hot-air weld shall be two inches (2").
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.

M. 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.

3.09 PERIMETER FASTENING

A. Wood nailers are required for perimeter gravel stops or drip edges. Field membrane and all plies shall be mechanically fastened to nailer on twelve inch (12") centers maximum.

3.10 EDGING FLASHINGS

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

3.11 ROOF DRAINS

A. Inspect and test drain and drain lines prior to start of work in contact area. Open if blocked or clogged and repair/replace all broken, missing drain components and lines as required. Verify in writing that all drains and lines are free flowing and watertight prior to substantial completion. Comply with local plumbing codes.

B. Remove strainer and clamping ring. Repair (or replace if damaged) and reset.

C. Insert Drains (If Required): Install new drain inserts with permanent gaskets between insert and drain wall to prevent backflow of water and leakage.

D. Replacement Drains (If Required): Sized to match existing drain system. Install watertight to existing lines. Follow drain manufacturer's installation requirements.

3.12 WALKWAY PADS

A. Adhere and heat weld walkway pads where shown on drawings or where required to provide protected pathways from rooftop access points to mechanical or other equipment requiring rooftop maintenance.

3.13 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.

3.14 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.

3.15 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.

3.16 MEMBRANE PROTECTION

A. 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.

3.17 PIPING/CONDUIT

A. Refer to Specifications Section 07 72 00 Roof Accessories for further information.

3.18 PIPE/EQUIPMENT SUPPORTS

A. Refer to Specifications Section 07 72 00 Roof Accessories for further information.

3.20 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.

END OF SECTION 07 01 55

SECTION 07 61 13
STANDING SEAM METAL 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 SECTION INCLUDES

A. Preformed and prefinished standing seam metal roof system with continuous mechanically seamed ribs, concealed clips and fastening devices.

B. Color coordinated ridge, hip, valley, gable, eave, corner, rake, headwall, counterflashings and miscellaneous flashings and attaching devices.

C. Provide concealed clips, fasteners, closures and factory and field applied sealants as necessary to meet design criteria and ensure a weathertight installation.

D. Bituminous membrane roofing underlayment.

E. Four inch (4") polyisocyanurate nailbase clad rigid insulation with three-fourths inch (3/4") exterior grade plywood.

1.03 SYSTEM DESCRIPTION

A. Design Requirements:
   1. The standing seam metal roof system, including: panels, flashings, attachment clips and attachment screws shall be designed by the metal roof system manufacturer per to meet the following design criteria:
      a) 2017 version of the International Building Code, (IBC-2017).
      b) A basic wind speed of 100 mph.
      c) Listing of applicable loads by roof zones (interior, edges and corners).
      d) The building importance factor is one - Essential Facilities.
      e) Roof snow load is zero.
      f) The building exposure factor is "C", open terrain.
   2. The standing seam metal roof system manufacturer shall provide an engineered analysis of the roofing system, sealed by a registered Structural Engineer employed by the manufacturer and licensed in the State of Texas, verifying that the product and attachment methods will resist wind pressures imposed upon it pursuant to the design criteria and that the roofing system fully complies with all specified requirements.
   3. The panel system shall bear fully documented proof that it has been independent laboratory evaluated using the U.S. Army Corps of Engineers Guide Specification (CEGS) 07416.
      a) Testing shall include establishment of ultimate and allowable system uplift capacities for both the "field" and "areas of discontinuity".

b) "Proof" shall be defined as both the manufacturer and the product being included in the document entitled: "List of Approved Standing Seam Metal Roof Systems" as published by the U.S. Army Corps of Engineers.

4. Provide factory preformed panel system that has been pretested and certified by manufacturer to comply with specified requirements under installed conditions.
5. Provide factory engineered and tested end lap (splice) details at roof third points, per ASTM 2140 water immersion testing.
6. Provide continuous mechanically seamed ribs that inherently increase load span capability, stiffness and flexural stress handling capacity.
7. Provide continuous butyl sealant within the confines of the female flange.
8. Provide factory-preformed panel that has been tested and approved for a Class 4 Impact (Hail) resistance rating per UL 2218. Listing shall be present on the UL website (Refer to Underwriters Laboratories website at www.ul.com).
9. On-site or field manufactured panels are prohibited. Field curving of pre-manufactured panels is acceptable.

B. Structural Requirements:
1. Panel structural properties determined in accordance with latest edition of American Iron and Steel Institute's "Cold Formed Steel Design Manual," using "effective width" concepts.
2. Wind uplift design for roof assemblies shall be calculated by the standing seam metal roofing system manufacturer per ASTM E 1592. Calculations shall include establishment of ultimate and allowable roof system uplift capacities for both the "field" and "areas of discontinuity".
3. Provide confirmation of positive and negative buckling moments and uplift capacity determined by full-scale tests.

C. Substrate Criteria:
1. Standing Seam Metal Roofing System: Engineer standing seam metal roof system installed over Bituminous membrane underlayment and four inch (4") Polyisocyanurate Nailbase clad rigid insulation over metal decking that is capable of withstanding the design loads when applied at 90° to the surface and spaced as shown on the approved shop drawings.
2. Waterproof Membrane Underlayment: Apply waterproof bituminous membrane under entire roof surface per manufacturers written instructions.

D. Environmental Requirements: Actual independent laboratory certified test results must be submitted.
1. Resistance to air infiltration (Tite-Loc-Plus): .002 cfm per linear foot of joint when tested in accordance with ASTM E 1680 at static test pressure differential of 12 psf.
2. Resistance to water infiltration (Tite-Loc-Plus): No leakage through panel joints when tested in accordance with ASTM E 1646 at static test pressure differential of 12 psf.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's specifications, engineered detail drawings, and installation instructions.

B. Shop Drawings:
   1. Submit three (3) sets of full size (24"x36") approval / design drawings produced by the standing seam metal roof system manufacturer indicating thickness and dimensions of parts, fastenings and anchoring methods, details and locations of seams, transitions and other provisions necessary for thermal expansion and contraction.
   2. Indicate roof terminations, clearly showing flashings and change of direction caps.
   3. Clearly indicate locations of field and factory applied sealant.
   4. Show locations, spacing patterns and types of hold-down clips and fasteners.
   5. Provide (24"x36") blue line or Auto CAD produced drawings provided by the standing seam metal roof system manufacturer showing a complete roof plan, roof panel layout, and cross section details for every individual condition of the entire roof system.

C. Samples:
   1. Submit two (2) samples, twelve inch (12") long by full width of panel, showing proposed metal gauge and seam profile.
   2. Submit color samples on metal for Architect's selection from manufacturer's full range of color offerings including custom (metallic colors) colors.

D. Test Reports: Submit verification the panel system meets the Environmental Conditions for the indicated test pressures and performance listed for Air and Water Infiltration.

E. Engineered Design Calculations:
   1. Submit panel system manufacturer's design calculations verifying the panel system meets the specified building code as defined in Section 1.03 System Description, A. Design Requirements listed above.
   2. Design calculations shall be sealed by a registered Structural Engineer employed by the standing seam metal roof system manufacturer and licensed in the State of Texas.

F. Certification:
   1. Submit manufacturer's certification that materials and finishes meet specified requirements.
   2. Submit written verification of panel Applicator's factory installation training performed by the standing seam metal roof system manufacturer and a copy of the Panel Applicator's "Authorized Applicator" certificate.

1.05 QUALITY ASSURANCE

A. Manufacturer's Qualifications:
   1. Minimum twenty (20) years experience in the fabrication of standing seam metal roof systems on projects of similar size and scope. Upon request, submit a minimum of five (5) project references for Architect's review. List project address, date of installation, Architects and Owner's name and telephone numbers.
   2. No other manufacturer of standing seam metal roof systems will be accepted without prior written approval of the Architect and based upon the manufacturer verifying the product can meet or exceed all performance criteria listed in these specifications.

3. Requests to be listed as an approved manufacturer must be submitted in writing a minimum fifteen (15) days prior to bid date accompanied by product literature, technical information, sealed engineer's calculations verifying conformance, and a product sample. Approved manufacturers will only be set forth in a written and issued addendum.
4. No substitutions will be permitted after the bid date.

B. Applicator Qualifications:
1. Panel Applicator must have a minimum of five (5) years experience in the application of standing seam metal roof systems.
2. Panel Applicator must be factory trained by the standing seam metal roof system manufacturer prior to the bid date in order to obtain a contract for installation.
3. Use adequate members of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this Section.
4. Use equipment of adequate size, capacity and numbers to accomplish the work of this Section in a timely manner.
5. Upon request, submit a minimum of five (5) successfully completed projects of similar size and scope. List project address, date of installation, Architect and Owner's name and telephone numbers.
6. Single Source Responsibility: Provide all items of the standing seam metal roof system work specified herein by a single roofing contractor to provide undivided responsibility.

C. Regulatory Requirements: Comply with all requirements of applicable building codes and other agencies having jurisdiction for positive and negative design loads of standing seam metal roof systems.

1.06 DELIVERY, STORAGE AND HANDLING

A. Delivery:
1. Delivery of material shall be made only after suitable facilities for its storage and protection area available on the site.
2. Protect products and accessories from damage and discoloration during transit and at project site.
3. Upon receipt of prefinished preformed metal panels, flat sheets, flashings and panel accessories, Panel Applicator shall examine each container for damage and for completeness of the consignment.

B. Storage:
1. Store materials out of the weather in a clean, dry place. One end of each container should be slightly elevated and covered with a loose weatherproof covering to prevent condensation.
2. Panels and/or flashings with strippable film must not be stored in areas exposed to direct sunlight.
3. Care should be taken to prevent contact with any substance that may cause discoloration.
4. Store materials to provide ventilation and prevent bending, abrasion or twisting.

5. Do not overload roof structure with stored materials. Do not permit material storage or traffic on completed roof surfaces.

C. Handling:
1. Care should be taken to avoid gouging, scratching or denting.
2. Do not allow traffic on completed roof. If required, provide cushioned walk boards.
3. Protect installed products from damage caused by foreign objects and construction until completion of project.
4. Comply with pertinent provisions of Supplementary General Conditions.

1.07 WARRANTY

A. Furnish manufacturer's standard twenty (20) year, non-prorated, material and labor written finish warranty stating that architectural fluorocarbon finish will be:
1. Free from fading or color change in excess of five (5) NBS units as measured per ASTM 2244-68.
2. Will not chalk in excess of a numerical rating of seven (7) when measured in accordance with standard procedures specified in ASTM D 659-74.
3. Will not peel, crack, chip or delaminate.

B. Furnish a written warranty signed by the Panel Applicator for a two (2) year period from the date of substantial completion of the building guaranteeing materials and workmanship for weathertightness of the roofing system, flashings, penetrations and against all leaks.

C. Special Weathertight Warranty: Furnish manufacturer's 20 year, full system, non-prorated, no dollar limit weathertight warranty to be jointly signed by the manufacturer and the Panel Applicator.

D. Protect products and accessories from damage and discoloration during transit and at project site. Store sheets and components in dry storage area to prevent condensation.

E. Do not overload roof structure with stored materials. Do not permit material storage or traffic on completed roof surfaces.

1.08 PRE-INSTALLATION CONFERENCE

A. Convene prior to commencing work of this Section.

B. Attendants: Panel Applicator, installer of each component of associated work, installers of deck or substrate construction to receive roofing work, Architect, Owner or Owner's Representative, Roofing system manufacturer's technical representative and General Contractor.

C. Record discussion, decisions and agreements reached and furnish a copy to each attendant.

D. Review installation procedures and coordination required with related Work.

E. Tour representative areas of roofing substrates, inspect and discuss condition of substrates, roof drains, curbs, penetrations, wood nailers and other preparatory work performed by other trades.

F. Review structural loading limitations of steel deck and inspect deck for loss of flatness and as required for mechanical fastening.

G. Review roofing system requirements (approved manufacturer's shop drawings, specifications and other contract documents.

H. Review required submittals.

I. Review and finalize construction schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to avoid delays.

J. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing.

K. General Contractor to document the meeting with written minutes and copy all in attendance.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Standing Seam Metal Roof System:
1. Pac Clad
2. McElroy
3. Berridge
4. Or prior approved equal

B. Bituminous Membrane Waterproof Underlayment: A 40 mil self-adhering membrane, or prior approved equal.
1. Tamko "TW Metal and Tile"
2. Or prior approved equal

C. Substitutions:
1. Approved manufacturers will only be set forth in a written and issued addendum.
2. Alternate manufacturers must fully comply with all specified requirements.

2.02 MATERIALS

A. Panels:
1. Prefinished Galvalume® sheet, ASTM AZ50 made of 55% aluminum, 1.6% silicon and the balance zinc as described in ASTM specification A792.
2. Panels shall be 22-gauge with a Polyvinylidene (Kynar 500) Finish.
3. Factory fabricated panel with integral continuous overlapping seams suitable for continuous locking or crimping by mechanical means during installation. Onsite or field manufactured panel profiles are not acceptable.

4. Seam Size:
   a) Male leg: 2" high, on Tite-Loc Plus
   b) Female leg: 2" high, on Tite-Loc Plus
5. Provide butyl sealant within the confines of female seam flange, on the bottom edge of female seam flange, designed to seal against adjacent male panel leg.

B. Clip/Fastener Assemblies:
1. Typical clip, UL-90 requirements:
   a) Wind Rated Fasteners: As per approved manufacturer's engineered shop drawings.
   b) Wind Rated Clip: Sliding 22-gauge galvanized steel hook in combination with a double fastened 18-gauge galvanized steel base, both at Fy (MIN) = 33 ksi. Clip hook shall have a shop installed hot-melt butyl sealant for continuity of seal at clip locations.
2. Typical Low Clip Requirements:
   a) UL-90 Fasteners: As per approved manufacturer's engineered shop drawings.
   b) Sliding 26-gauge at Fy=40ksi (MIN) galvanized steel hook in combination with a double fastener 18-gauge at Fy = 50 ksi (MIN) galvanized steel base. Clip hook shall have a shop installed hot-melt butyl sealant for continuity of seal at clip locations.
3. Standard Flashing Fasteners: Same as Wind Rated Fasteners specified above.

C. Accessories:
1 Provide manufacturer's standard accessories and other items essential to completeness of the standing seam metal roof installation.
2. Roof Jacks: Manufacturer's standard EPDM with an aluminum sealing base ring; for openings twelve inches (12") or smaller, centered in panel; do not interrupt seam.
3. Roof Curbs: fabricated to the specifications of the standing seam metal roof manufacturer, thereby assuring compatibility with the roof construction framing and covering. Roof curbs shall be of sufficient size and design to coordinate with requirements for support of heat and smoke vents specified in another Division 7 Section. Roof curb flashing and framing shall provide for the expected expansion and contraction of the standing seam metal roofing system.
4. Gutters and downspouts will be fabricated to the same gauge and specification as panel.

D. Field Sealants:
1. Color coordinated primerless silicone, urethane, or high grade, non-curing butyl as recommended and engineered by panel manufacturer.
2. Do not use sealants containing asphalt.

E. Bituminous Membrane Waterproof Underlayment:
1. 40 mil flexible, self-adhering rubberized asphalt sheet membrane with a polymeric film on the surface and a removable silicone-treated release sheet on the adhesive side
2. Bituminous membrane underlayment shall be rated for high temperature resistance up to 260 F.
3. Bituminous membrane shall have a maximum permeance rating of 0.05 perms.
4. Minimum thickness shall be 40 mils.

2.03 FABRICATION

A. Panels:
1. Provide factory formed panel widths of sixteen inch (16"), with a one and one-half inch (1-1/2") high standing seam.
2. On-site or field manufactured panels are prohibited. Field curving of pre-manufactured panels is acceptable.
3. Provide panels with no end laps (splices).
4. Roof panels shall have flush horizontal and vertical surfaces to facilitate sealing at terminations.

B. Seams:
1. Panel seams shall interlock entire length of seam, by means of a mechanically driven rib seamer.
2. Design standing seam to lock up and resist joint disengaugement during design wind uplift conditions as calculated to comply with local building codes and design uplift criteria.
3. Provide factory sealant within confines on trailing edge of female seam leg to aid in resistance of leaks and provide panel-to-panel seal while allowing expansion and contraction movement, and the seams shall be continuously locked or crimped together by mechanical means during installation.

C. Clips:
1. Provide Wind Rated Clips designed to allow panels to thermally expand and contract and provide a minimum of ± one inch (1") of thermal movement. Clips shall incorporate a self-centering feature to allow a minimum of one-half inch (1/2") of movement in either direction for a total movement of one inch (1").
2. Clips shall be designed to meet positive and negative pressures as calculated and engineered by the standing seam metal roofing system manufacturer.
3. Fasteners shall penetrate the metal deck a minimum of three-fourths inch (3/4").

D. Engineer panels to use concealed anchors that permit expansion and contraction.

E. Trim/Flashings:
1. Prefinished sheet metal designed by the manufacturer in the same gauge, material and finish as the standing seam metal roofing system.
2. Locations, design, sealing and fastening methods as per the manufacturer's approved engineered shop drawings.

2.04 FINISH

A. Fluorocarbon Coating:
1. Full strength 70% Kynar 500® coating baked on for fifteen (15) minutes at 450°F to dry-film thickness of 1.0 mil.
2. 15% reflective gloss (ASTM D 523). (Low Gloss).
3. 0.3 mil baked on epoxy primer.
4. Backer side of panels to be painted with an off-white polyester coating.
5. Top Side Color: As selected by Architect from manufacturer's full range of color offerings, including metallic and custom colors

PART 3 - EXECUTION

3.01 CONNECTING WORK

A. General: Provide metal roofing panels of full length from eave to ridge when possible.
   1. Field cutting by torch is not permitted.
   2. Do not apply roofing during inclement weather.
   3. Do not apply roofing to damp or frozen deck surface.
   4. Do not expose materials vulnerable to water, wind or sun damage in quantities greater than can be weatherproofed during the same day.
   5. Rigidly fasten point of fixity (high center) of metal roof panels and allow free eave movement due to thermal expansion and contraction per the approved shop drawings.
   6. Install screws fasteners with power tools having controlled torque.
   7. Locate and space fasteners per the approved shop drawings in true vertical and horizontal alignment.
   8. Install all flashings per the approved shop drawings as work progresses. Position roof jacks only in the flat of the panel; do not alter standing seam ribs.

B. The Panel Applicator shall examine all surfaces on which their work is to be applied, and shall notify the Architect in writing if not suitable to receive their work. Work on any surface shall constitute acceptance of this surface by the Panel Applicator. After beginning installation, install approximately 500 square feet of panels for Architect's approval, before proceeding with substantial work.

C. Wood Members, Units: Comply with requirements of Section 06114 Wood Blocking of these specifications for nailers and other wood members indicated as roofing system work. Provide wood pressure treated with water-borne preservatives for above ground use. All nailers shall be anchored sufficiently to resist a force of 75 pounds ± per linear foot in any direction. Provide nailers at all locations required by the roofing manufacturer (whether shown or not) – verify conditions prior to commencement of roofing installation.

3.02 FIELD MEASUREMENTS

A. Panel Applicator must take field measurements to verify or supplement dimensions indicated prior to fabrication of any materials. Where field measurements cannot be made without delaying the work, either establish opening dimensions and proceed with fabricating panels without field measurements or allow for trimming panel units.

3.03 WATERPROOF UNDERLAYMENT INSTALLATION HIGH TEMPERATURE

A. Fully adhere one ply of 40 mil self-adhering waterproofing underlayment over entire roof surface. Stagger joints perpendicular to metal roofing panels and over parapet blocking per manufacturer's written instructions, but with not less than six inch (6") laps at vertical (side) laps and four inch (4") horizontal (top and bottom) laps.

B. Install an extra layer of minimum thirty-six inch (36") wide waterproof membrane down all valley, rake wall, eaves and gable conditions, using a minimum six inch (6") horizontal (top and bottom) lap.

3.04 METAL ROOFING INSTALLATION

A. Workmanship shall conform to standards set forth in the architectural sheet metal manual as published by SMACNA.

B. Comply with manufacturer's instructions for assembly, installation, and erection in order to achieve a weathertight installation. Install in accordance with approved shop drawings.
   1. Anchor securely in place using clips and fasteners spaced in accordance with manufacturer's recommendations for design wind load criteria.
   2. Panels should be installed in such a manner that horizontal lines are true and level and vertical lines are plumb.
   3. Field apply sealant to penetrations, transitions, and other locations as necessary for an airtight, waterproof installation.
   4. Remove all protective film, if any, before installation of materials.

C. Dissimilar Metals: Do not allow panels or flashings to come into contact with dissimilar metals.

3.05 CLEAN UP

A. Clean exposed surfaces of work promptly after completion of installation.
B. Only minor scratches and abrasions will be allowed to be touched up. Any other damaged material shall be replaced.

C. Leave work areas clean, free from grease, dirt, finger marks, stains and stains.

D. Remove scrap and debris from surrounding grounds and work areas daily.

3.06 PROTECTION

A. Metal Roofing: Protect work as required to ensure that the standing seam metal roof system will be without damage at time of final completion.

END OF SECTION 07 61 13

SECTION 07 62 00
SHEET METAL AND MISCELLANEOUS ACCESSORIES

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
CTEM	Coal-Tar Elastomeric Membrane
EPA	Environmental Protection Agency
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.

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

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 Project Manager/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 Project Manager's/Architect's interpretation

1.07 SUBMITTALS

A. Product Data: Provide technical data, installation instructions (as applicable) 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.
1. Submit shop drawings, product data and mockups of all sheet metal fabrications to be used on project.
2. Shop drawings shall be single line profile engineered drawings or CAD drawings of each fabrication component on 8-1/2” x 11” sheet and shall indicate date, project name, project number, Architect/Engineer name, name of component, sheet metal type, finish, gauge, securement, and approximate dimensions of finished product. All dimensions shall be field verified prior to fabrication.
3. Submit manufacturers and contractor’s sample warranty documents.
4. Submit ES-1 certifications of sheet metal fabrication shop and ES-1 certifications of each applicable sheet metal component. (ie: edge metals, copings, & gutters).

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

1.08 QUALITY ASSURANCE

A. Comply with governing local, state, and federal regulations, safety standards, and codes. 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.

1.09 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.

1.10 WARRANTIES

A. Manufacturer's Product Warranty: Submit manufacturer's ten (10) year labor and material 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 the Owner/Project Consultant 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 two (2) 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 the Owner. Upon notification from the Owner or the Owner's representative that evidence of a defect exists, the responsible party shall immediately inform the Owner's representative of the date on which corrective work will be scheduled, and shall notify the Owner's representative when the corrective work has been completed.

PART 2 - PRODUCTS

2.01 SHEET METAL MATERIAL

A. Hot-dipped Galvanized Steel for use as counter flashings (where not visible from the ground), pitch pans and expansion joints: Minimum 24-gauge, G-90, hot-dipped galvanized metal, commercial quality, ASTM A 653/A 653M.

B. Hot-dipped Galvanized Steel for use as continuous clips: Minimum 22-gauge, G-90, hot-dipped galvanized metal, commercial quality, ASTM A 653/A 653M.

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, cover plates, downspouts, gutters, coping and miscellaneous metal.

D. Stainless Steel: QQ-S-766, Class 304 or 316; or ASTM A 167, Type 304 or 316; form and condition most suitable for the purpose.

E. Prefinished Aluminum: 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. Thermoplastic Cladded Metal for Pitch Pans: Shall be G-90 galvanized steel with 25 mil Thermoplastic membrane.

I. Thermoplastic Cladded Metal: Shall be G-90 galvanized steel with 25 mil Thermoplastic 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.

E. 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. Plastic Cement: FS SS-C-153, cutback asphalt type.

B. Solder: For use with galvanized steel or copper, provide 50-50 tin/lead solder (ASTM B 32), with rosin flux.

C. Copper, Sheet, and Strip: QQ-C-576, ASTM B 370, light cold-rolled temper, minimum 16 ounce.

D. Sealant (for Sheet Metal): One-component polyurethane, conforming to requirements of FS TT-S-230C, non-staining and non-bleeding.

E. Miscellaneous Materials:
1. Downspout Boots: Provide and install cast iron by Neenah Foundry Company, or pre-approved equal. Provide powder coating to match adjacent downspout color.
2. Splash Blocks: Concrete, 3000 psi, 28 days. Provide and install with protection pads at all downspouts. Dimensions shall be a minimum eighteen inches wide by thirty-six inches long (18" x 36").
3. Metal Accessories: Provide and install 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, prior to metal installation.

C. Beginning of installation means acceptance of conditions.

D. Compatibility: Provide materials that are recommended by manufacturers to be fully compatible with indicated substrates or provide separation materials as required to eliminate contact between incompatible materials.

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 Owner/Project Consultant 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, pitch pans, expansion joints, and copings with new galvanized 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. Form sheet metal on bending brake.

D. Form materials with straight lines, sharp angles and smooth curves.

E. Fold back edges on concealed side of exposed edge to form hem (1/4" minimum).

F. Weld or solder joints on parts that are to be permanently and rigidly assembled.

G. Limit single-piece lengths to ten feet (10').

H. Fabricate corner pieces with eighteen inch (18") extensions, mitered and sealed by forming as one piece.

I. Where installing flashing directly to masonry or dissimilar materials, backpaint with bituminous paint.

J. Install new metal rooftop projections. 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.

K. All sheet metal shall be sealed and watertight.

L. Metal work should be secured so as to prevent damage from buckling or wind. Where clips are shown, fabricate as detailed.

M. All metal to receive bitumen or adhesive shall be first primed with asphalt primer.

N. All prefinished metal shall be sanded and/or abraded prior to receiving primer.

O. 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.

P. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.

3.04 INSTALLATION

A. General: All sheet metal termination to vertical wall shall have a through-wall with receiver installed on masonry walls or prefabricated "Z" bar flashing pre-installed to fluid applied wall finished prior to installation of sheet metal termination. This applies to edge metal, base flashing closures and all vertical surface intersections. Refer to NRCA, SMACNA, and metal manufacturer's guidelines.

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. Form sections identical to profiles as shown or approved similar, to match existing building.
3. Fabricate corner pieces with minimum eighteen inch (18"), maximum forty-eight inch (48") extensions, formed and sealed with rivets and sealant, as one piece.
4. Hem exposed edges one-half inch (1/2") minimum.
5. Backpaint flashing in contact with masonry or dissimilar materials with bituminous paint. Surface sand before applying primers.
6. Integrate flashing in a manner consistent with detailing.
7. Provide and install continuous clip, minimum 22 gauge.
8. Apply sealant at horizontal juncture of gravel guard metal to exterior vertical wall.
9. Shall be fabricated in accordance with published details.
10. Install bead of sealant at metal edge juncture at exterior wall surface.

C. Coping:
1. Install new pre-manufactured metal coping for a permanent watertight installation.
2. All coping shall be pre-manufactured to include low profile standing metal seam to meet ANSI/SPRI ES-1 requirements.
3. Shall be minimum 24-gauge prefinished Kynar installed in ten foot (10') sections maximum.
4. Vertical fascia shall extend minimum two and one-half inches (2-1/2") or be minimum one and one-half inches (1-1/2") below bottom of nailer, whichever is greater.
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-fourth inch (1/4") minimum.
7. Provide and install continuous clip, minimum 22-gauge.
8. Shall be fabricated in accordance with published details.

D. Expansion Joint Field and at Wall:
1. All Expansion joints shall be in compliance with Section 06 10 53 Miscellaneous Carpentry.
2. Expansion joints at walls and field of the roof shall be curbed as outlined in accordance with NRCA and SMACNA guidelines. The curbs will be flashed as outlined above in Curb Flashings.

E. Scupper, Collector Head and Downspout:
1. Fabrication:
a) Fabricate scupper, collector head and downspout of profile and size indicated, taking care that the roof drain leader fits properly into the back of the collector head. Seal the pipe to the collector head for water tightness.
b) Field measure site conditions prior to fabricating work.
c) Fabricate with required connection pieces.
d) Fabricate section square, true, and accurate in size, in maximum possible lengths and free of distortion or defects detrimental to appearance or performance.
e) Hem exposed edges of metal.
f) Form and seal all metal joints; provide for expansion joints per SMACNA.
2. Installation:
a) Install collector head, downspout, and accessories.
b) Join lengths with seams pop riveted and sealed watertight. Flash and seal collector head to downspouts and accessories.
c) Seal all metal joints watertight for full metal surface contact.
d) Collector Head: SMACNA style profile; submit detail for approval.
e) Downspouts: Rectangular profile. Seal all joints, six inches by six inches (6" x 6") minimum or as shown on published details.
f) Support Brackets, Joint Fasteners: Profiled to suit gutters and downspouts.
g) Anchorage Devices: SMACNA requirements. Type recommended by fabricator.
h) Collector Head Supports – Kynar.
i) Downspout Support Straps – Kynar.

F. Pitch Pans:
1. Install pitch pans of 24-gauge thermoplastic 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 (4") above the finished roof membrane. Seams of pitch pans shall be soldered inside and out.
3. Mastic shall be applied under pitch pan flange a minimum of one-half pound (1/2#) per linear foot.
4. All metal flanges shall be primed with asphalt primer prior to flashing installation. Inside of pitch pan shall be cleaned and primed.
5. 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.
6. Base of pitch pans shall be filled around penetration with M-1 sealant. Sprinkle mod bit granules over sealant 1/4" deep.
7. Top finish fill shall be one-part, self-leveling sealant for new pitch pans with minimum fill to top of pitch pan sides.
8. Strip metal flange of pitch pan with one strip of TPO flashing membrane hot air welded extending from the outer edge of the flange a minimum of three inches (3") inward to base of pitch pan.

G. 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 manufactured with metal compatible with metal to which bonnet is to be attached.
3. On beams and other steel, weld in place bonnets fabricated from one-fourth inch (1/4") steel plate.
4. Draw band bonnets fabricated from 22-gauge galvanized steel may be used on circular projections.

3.05 FINISH

A. Backpaint concealed metal surfaces with bituminous paint where expected to be in contact with cementitious materials or dissimilar metals. Exposed surfaces to be provided with a factory applied fluorocarbon Kynar finish meeting ASTM A 446 and AAMA specification 605.2 for high performance coating.

END OF SECTION 07 62 00

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. Roof hatches

1.03 SUBMITTALS

A. Shop Drawings: Provide manufacturer's approved details of all pertinent 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
Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

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.

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.

B. 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.

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 roof expansion joints.

1.08 WARRANTY

A. The product manufacturer shall provide a one-year full system material warranty necessary to cover replacement of all components of the system against defects in manufacturing. The warranty will not include Acts of God, vandalism, neglect, metal finish or improper spacing of equipment, which would be a result of improper application.

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 2604) (AAMA 2605), except as modified below:
(1) Humidity Resistance: 1000 hours.
(2) Salt-Spray Resistance: 1000 hours.

D. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy and temper recommended by manufacturer for type of use and mill finish.
1. Color: (Light bronze) (Medium bronze) (Dark bronze) (Black) (Champagne) <Insert color>.
2. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: Cleaned with inhibited chemicals; Chemical Finish: Acid-chromate-fluoride-phosphate conversion coating; Organic Coating: As specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
a) Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603 except with a minimum dry film thickness of 1.5 mil, medium gloss.
b) Color and Gloss: As selected by Project Manager from manufacturer's full range.
3. High-Performance Organic Finish (2-Coat Fluoropolymer): AA-C12C40R1x (Chemical Finish: Cleaned with inhibited chemicals; Chemical Finish: Conversion coating; Organic Coating: 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). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2604 and with coating and resin manufacturer's written instructions.
a) Color and Gloss: As selected by Project Manager from manufacturer's full range.
4. Powder-Coat Finish: Immediately after cleaning and pretreating, electrostatically apply manufacturer's standard baked-polymer thermosetting powder finish. Comply with resin manufacturer's written instructions for application, baking, and minimum dry film thickness.
a) Color and Gloss: As selected by Project Manager from manufacturer's full range.

E. Aluminum Extrusions and Tubes: ASTM B 221 (ASTM B 221M), alloy and temper recommended by manufacturer for type of use, mill finished.

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

G. Steel Shapes: ASTM A 36/A 36M, hot-dip galvanized to comply with ASTM A 123/A 123M, unless otherwise indicated.

H. Steel Tube: ASTM A 500, round tube, baked-enamel finished.

I. Galvanized Steel Tube: ASTM A 500, round tube, hot-dip galvanized to comply with ASTM A 123/A 123M.

J. Galvanized Steel Pipe: ASTM A 53/A 53M.

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. Cellulosic-FiberBoard Insulation: ASTM C 208, Type II, Grade 1, one inch (1") thick.

D. Glass-FiberBoard Insulation: ASTM C 726, one inch (1") thick.

E. Polyisocyanurate Board Insulation: ASTM C 1289, one inch (1") thick.

F. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, complying with AWPA C2; not less than one and one-half inches (1-1/2") thick.

G. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

H. Polyethylene Sheet: 6-mil thick, polyethylene sheet complying with ASTM D 4397.

I. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
1. Slip Sheet: Rosin-sized paper, minimum 3 pounds per 100 square feet.

J. 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.

K. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.

L. 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.

M. 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.

N. Roofing Cement: ASTM D 4586, nonasbestos, 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: Insert load requirements.
   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. To support HVAC Duct use Model # SS2000D Duct Support. SS2000D is two 17" circular bases with 12 ga. framing channel formed to make an “H” shaped support. Framing channel is adjustable in both height and width.
   1. Manufacturers:
      a). Advanced Support Products, Inc.
      b) Miro Industries
      c) Portable Pipe Hangers

B. To support heavier HVAC equipment use equipment platform Model # HV0505B Base Platform designed by manufacturer to support the weight of the equipment and load requirements. Equipment platform shall consist of (a) 17" circular bases supporting a structural steel frame OR (b) galvanized steel plates, with four holes for approved anchoring per engineering data, supporting a structural steel frame.
   1. Manufacturers:
      a). Advanced Support Products, Inc.
      b) Miro Industries
      c) Portable Pipe Hangers

2.06 ROOF HATCHES

A. Roof Hatches: Fabricate roof hatches with insulated double-wall lids and insulated double-wall curb frame with integral deck mounting flange and lid frame counterflashing. Fabricate with welded or mechanically fastened and sealed corner joints. Provide continuous weathertight perimeter gasketing and equip with corrosion-resistant or hot-dip galvanized hardware.
   1. Manufacturers:
      Babcock-Davis; a Cierra Products Inc. Company.
      Bilco Company (The).
      Nystrom.
   2. Loads: Fabricate roof hatches to withstand 40 pounds per square foot external and 20 pounds per square foot internal loads.
   3. Type and Size: Single-leaf lid, thermally-broken, (thirty inches by thirty-six inches 30" x 36"
   4. Curb and Lid Material: Aluminum sheet, 0.090 inch thick.
      a) Finish: Baked enamel.
   5. Insulation: Three-inch (3") Polyisocyanurate, equal to R-20.3, in curb and cover.
   6. Interior Lid Liner: Manufacturer's standard metal liner of same material and finish as outer metal lid.
   7. Exterior Curb Liner: Manufacturer's standard metal liner of same material and finish as metal curb.
   8. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
   9. Fabricate units to minimum height of fourteen inches (14"), unless otherwise indicated.
   10. Sloping Roofs: Where slope or roof deck exceeds 1:48, fabricate hatch curbs with height tapered to match slope to level tops of units.
   11. Hardware: Galvanized steel spring latch with turn handles, butt- or pintle-type hinge system, and padlock hasps inside and outside.
      a) Provide 2-point latch on covers larger than eighty-four inches (84").
   12. Ladder Safety Post: Manufacturer's standard ladder safety post. Post to lock in place on full extension. Provide release mechanism to return post to closed position.
      a) Test Load
      b) Height: Forty-two inches (42") above finished roof deck.
      c) Material and Finish: Aluminum, mill finished.
      d) Diameter: Pipe with one and five-eighths inch (1-5/8") OD tube.
   13. Hatch Lid to have and R value of R12
   14. Safety Railing System: Manufacturer's standard aluminum construction, non-penetrating safety railing system with self-closing and latching gate. Corrosion resistant construction. System shall meet or exceed OSHA fall protection regulations (29 CFR 1910.29). Color: Safety Yellow.

2.07 ROOF PIPE SUPPORTS

A. To support conduit or pipe sized up to Ø8" when height adjustment is needed use Model # SS1000A Adjustable Pipe Support. 17" circular base with 12 ga. framing channel, 18"L, attached to 17" circular base using 1/2" threaded rods, 12"L, with washers and nuts. Height of channel can be adjusted along the length of the 1/2" threaded rods. Strut clamps are suggested to hold piping or conduit in place.
   1. Manufacturers:
      a) Advanced Support Products, Inc.
      b) Miro Industries

c) Portable Pipe Hangers

B. To support water or gas piping up to Ø8" or when a roller support with height adjustment is needed use Model # SS1000RA Pipe Support with Adjustable Roller. 17" circular base with SBR heavy duty rubber roller assembly attached to 17" circular base using 1/2" threaded rods, 12"L, with washers and nuts. Height of roller assembly can be adjusted along the length of the 1/2" threaded rods.
1. Manufacturers:
   a) Advanced Support Products, Inc.
   b) Miro Industries
   c) Portable Pipe Hangers

C. To support multiple pipe runs, piping up to Ø12" when height adjustment or pipe suspension is needed use Model # SS4000P, SS6000P or SS8000P Adjustable Support Bridge. SS4000P Adjustable Support Bridge is made of four (4) 17" circular bases and 12ga. framing channel formed to make one “H” shaped support with crossbar. SS6000P Adjustable Support Bridge is made of six (6) 17" circular bases and 12ga. framing channel formed to make two “H” shaped supports with crossbar. SS8000P Adjustable Support Bridge is made of eight (8) 17" circular bases and 12ga. framing channel formed to make three “H” shaped supports with crossbar. Crossbar height is adjustable and offered in 18", 24", 36", and 48" lengths. Use Adjustable Support Bridge with strut clamps or roller accessories or use optional hanger supports to suspend water or gas piping at various heights. Optional hanger supports attached to support frame using 1/2" threaded rods. Hangers offer complete height adjustments along the length of 1/2" threaded rods.
1. Manufacturers:
   a) Advanced Support Products, Inc.

2.08 ROOF WALKWAYS

A. Roof Walkway: To provide a safe walkway for rooftop traffic while protecting the roof from foot traffic, use walkway designed by Advanced Support Products utilizing 17" circular base, frame made of channel or angle, grating and handrails, if required.
1. Manufacturers:
   a) Advanced Support Products, Inc.

2.09 PREFORMED FLASHINGS

A. Exhaust Vent Flashings: Double-wall metal flashing sleeve, urethane insulation filled, with integral deck flange, fourteen inches (14") high, with removable metal hood and (slotted) (perforated) metal collar, and as follows:
1. Manufacturers:
   a) Thaler Metal Industries Ltd., or approved equal.
2. Metal: Aluminum sheet, 0.064 inch, mill finished.
3. Diameter: Four inches (4").

B. Vent Stack Flashing: Metal flashing sleeve, with integral deck flange, uninsulated, and as follows:
1. Manufacturers:
   a) Thaler Metal Industries Ltd., or approved equal.

2. Metal: Aluminum sheet, 0.064 inch thick, mill finished.
3. Height: Eight inches (8").
4. Diameter: As indicated.

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.

3.03 ROOF CURB INSTALLATION:

1. Set roof curb so top surface of roof curb is level.
2. Curb height to maintain a minimum of 10” above finished roof surface,
3. Attach roof curb according to manufacturer's written instructions

3.04 PIPE AND EQUIPMENT SUPPORT INSTALLATION:

1. Install support systems in accordance with manufacturer’s instructions and approved shop drawings.

2. Accurately locate and align pre-fabricated pipe supports in locations specified as per approved shop drawings or as required herein and by site conditions to limit pipe and/or conduit deflection to L/240, not to exceed 10' (3m) on center. No Isolation pads are required under the 17" circular bases.
3. Should the roofing manufacturer require a separation sheet between the roof and the support system, place a separation sheet or protective pad conforming to the existing roof manufacturer's system under 17" circular bases. Do not adhere to the roof system or 17" circular bases.
4. If required, insert frame structures into 17" circular bases as indicated by manufacturer's instructions.
5. Adjust height of each strut or channel and hanger or roller to its required height and tighten with nut, but do not over-tighten. Check each support for equal weight disbursement. Correct if necessary.
6. Remove any unused materials and packaging from job site. All gas lines, piping, and conduit must be supported on specified stands or hangars.
7. Supports shall be attached to pipes with oversized strapping.
8. Designated pipe/equipment supports shall be removed and replaced with new.
9. Verify that roof surface is smooth and clean to extent needed to receive materials. Surface shall be cleaned by removing any loose gravel and any foreign matter.
10. Install support systems in accordance with manufacturer's instructions and approved shop drawings. Accurately locate and align pre-fabricated pipe supports in locations specified as per approved shop drawings. Pipe supports shall be placed not to exceed ten feet (10') on center and within two feet (2") of all elevation changes, intersections, and corners.
11. Supports shall be set on a double layer of membrane, adhered to the roof surface using specified silyl-terminated polyester sealant, unless noted otherwise by support manufacturer.
12. Provide bond breaker between dissimilar metals.

3.05 ROOF HATCH INSTALLATION:

1. Check roof hatch for proper operation. Adjust operating mechanism as required. Clean and lubricate joints and hardware.
2. Attach safety railing system to roof hatch curb.
3. Attach ladder safety post according to manufacturer's written instructions.
4. Provide the required structural members necessary to install the hatch into the roof deck. Refer to structural drawings for further information.

3.06 TOUCH UP

A. Touch up factory-primed surfaces with compatible primer ready for field painting in accordance with Division 9 painting Sections.

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

3.07 CLEANING

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

END OF SECTION 07 72 00

SECTION 08 51 13
WINDOW ASSEMBLIES UPGRADE

PART 1

1.01 DESCRIPTION OF WORK:

1. Furnish new materials and labor as needed to provide and install the window and door assemblies as indicated in these specifications.
2. All openings around new window assemblies shall be properly sealed, both on the interior and the exterior.
3. All installation work shall be performed Monday through Friday during normal business hours unless otherwise approved with the City Project Manager.
4. The Contractor shall examine all areas and surfaces, and report to the City Project Manager any conditions detrimental to the work to be performed.
5. Upon awarding of the Contract, Contractor shall coordinate with City Project Manager the schedule for the Project.

1.02 FACILITY LOCATIONS AND DESCRIPTION:

A. FD/PD Training and Fire Station #5
   1. Window Block Dimension/Glass Configuration
   2. Operable windows for egress for Fire Station #5 Bunk Rooms

***SEE ATTACHMENT "A"**

NOTE: Block opening and glass panel dimensions are provided for the sole purpose of project description. Contactor shall site verify all quantities and measurements prior to ordering any materials.

1.03 PROCEDURES AND MATERIALS:

1. Door and Window Replacement:
   a. All glass shall comply with the 2000 International Energy Conservation Code
   b. Remove existing windows and install new fixed window assemblies
   c. Remove door/frame assembly, transom, sidelites and framing and install new assemblies
   d. Appropriately dispose of all removed materials
   e. Removal and replacement must be accomplished in a manner as to provide a secure building prior to the end of work each day
   f. All old caulk shall be completely removed from the opening to prevent interference with new assembly seal to building structure
   g. Installation of new window assemblies and store front shall be in strict compliance with industry standards and manufacturers' procedures

2. Material Replacement Data:
   a. Window Assemblies
      1. Frame: 2" X 4 ½" Bronze Thermal Broke Metal
      2. Sill: 6" Bronze Break Metal
      3. Glass: 1" o.a. Solex / Solorban 60 #3
   b. Store Front
      1. Door: Bronze Narrow Stile 3' x 7'

“ATTACHMENT A”

Fire station #5

Non-Opening

- W12’ x H5’-9”
- W12’ x H5’-9”
- W6’-4” x H5’-9”

Operable Bunk Rooms (Windows must be able to be opened)

- W3’-2” x H5’-9”
- W3’-2” x H5’-9”
- W3’-2” x H5’-9”
- W3’-2” x H5’-9”
- W3’-2” x H5’-9”

FD/PD Training

Non-Opening

- W12’ x H5’-9”
- W20’ x H5’-9”
- W14’-10” x H5’-9”
- W14’-10” x H5’-9”
- W14’-10” x H5’-9”
- W13’ x H5’-9”
- W14’-9” x H5’-9”
- W14’-9” x H5’-9”
- W14’-9” x H5’-9”
- W14’-9” x H5’-9”
- W13’ x H5’-9”
- W13’ x H5’-9”
- W12’ x H5’-9”
- W13’-4” x H5’-9”

a. Hinge Type: Continuous
b. Concealed Panic Bar: First Choice – Vistawall (to accept owner provided Ruswin Lockset) / or equal
c. Surface Mount Closer: CR Lawrence / or equal

4. Transom and Sidelites Frame: 2" X 4 ½" Bronze Thermal Broke Metal
5. Glass: 1" o.a. Solex / Solorban 60 #3
   a. Door: ¼" Clear Tempered
   b. Transom and Sidelites: 1" o.a. Insulated Clear
6. Implied work, work specified will be executed as if fully described; and any work or materials which are not directly noted in the specifications but are necessary for the performance of the obvious intentions are to be understood as implied work and will be provided for by the contractor in original proposal as if fully specifically described.

1.04 CONTRACTOR'S DUTIES:

1. The contractor shall remove from City property and properly dispose of, according to city, state and federal disposal requirements; all used materials replaced in this project.
2. Except as specifically noted, provide and pay for labor, materials, tools and equipment.
3. Secure and pay for as necessary, for proper execution and condition of work:
   a. Permits - A Building Permit fee will not be charged to the Contractor, but must be obtained.
   b. Licenses - Fees will be charged for licenses required to perform work.
4. Comply with the governing industry standards, all local codes, ordinances, rules, regulations, orders and other legal requirements of public authorities which bear on performance of work. Obtain inspections as required by the City Building Inspection Department.
5. Promptly submit written notice to the City Project Manager of observed variances of contract documents from legal requirements. It is the Contractor's responsibility to make certain that the contract documents comply with local codes and regulations.
   a. Appropriate modifications to Contract Documents will adjust necessary changes.
   b. Assume responsibility for work known to be contrary to such requirements, without notice.
6. Enforce strict discipline and good order among employees. Do not employ on the work site unfit persons or persons not skilled at the task being performed.
7. The Contractor will make a thorough inspection of the job sites where the units are to be installed. A thorough examination of these specifications should be made so as to be informed of the nature of the work, labor conditions or any other matters that may affect the cost and time completion of the work.
8. Checking dimensions at the site:
   a. Verify all measurements before ordering any materials or performing any work.
   b. Report any discrepancies to the City Project Manager for instructions before proceeding.
9. Approval of working surfaces:
   a. Notify the City Project Manager of any unsatisfactory condition before performing work over work of other Contractors.
   b. Beginning of work by a Contractor will constitute his acceptance of previous work.
10. Contractors use of the premise:
    a. Confine all operations at the site to those areas approved by the City Project Manager.
    b. Do not unreasonably block or encumber the site with materials or equipment.

c. Assume full responsibility for protection and safekeeping of products stored on premises.
d. City employees will be conducting business as usual in this area. Do not hinder the city operations.
e. Contractor is not to use any city facility or equipment other than the restrooms without prior approval from the City Project Manager.
f. The Contractor shall provide a dumpster for the materials removed, or will dispose of the materials away from the City property daily, as it is removed. At no time shall a City dumpster be used in connection with the project.

1.05 SUBMITTALS:

A. Materials List: Submit a complete list of materials proposed to be furnished under this portion of the work. This shall in no way be construed as permitting substitution of materials for those specified.

106 SUBSTITUTIONS:

A. Product other than that specified herein will not be considered as responsive to the specifications and will be rejected.

1.07 PROTECTION:

A. Adequately protect all surfaces, including personal and private property from possible damage. Furnish sufficient drop cloths, shields and protective equipment to cover and protect furniture, machines and equipment from dirt/dust and foreign debris during the project.

1.08 CLEANING:

A. Contractor shall furnish and have on the site while the work is being performed; vacuum sweeper, brooms, mops, etc. so that cleaning may be performed as work progresses.

B. Upon completion of work, leave the premises neat and clean, to the satisfaction of the City Project Manager.

1.09 QUALITY ASSURANCE:

A. City Project Manager reserves the right to refuse and reject any work where materials or quality of work, in City Project Manager's opinion does not meet or exceed industry standard and/or intended product result.

1.10 CLOSE OUT DOCUMENTS:

A. Upon completion of Project, Contractor shall submit a complete list of materials used on Project. List shall include but not be limited to stock numbers, model numbers, manufacturers and suppliers.

1.11 WARRANTY:

A. Contractor shall provide Owner a written one-year warranty against defects in material and quality of work. This warranty is not inclusive of any manufacturers' warranties.

TIME OF COMPLETION: The undersigned further agrees to complete the Project within calendar days from receipt of Purchase Order or signed Contract.

DETAIL DRAWINGS/ROOF PLANS

1.01 DETAIL DRAWINGS

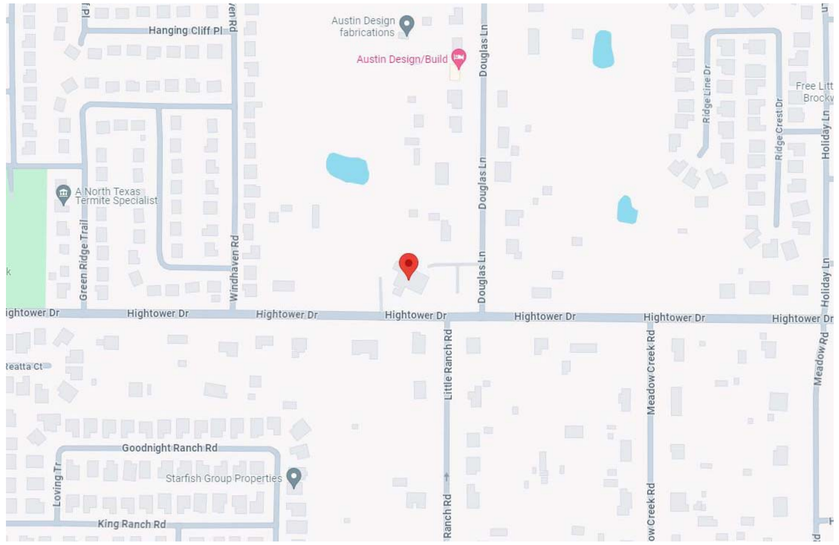
A. The enclosed details for this project are intended primarily to present the proper installation of the membranes used for waterproofing at flashings, perimeter closures, roof projections, etc. Specific underlying construction configurations, such as walls, nailers, wood backing, structural steel, 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.

1.02 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.

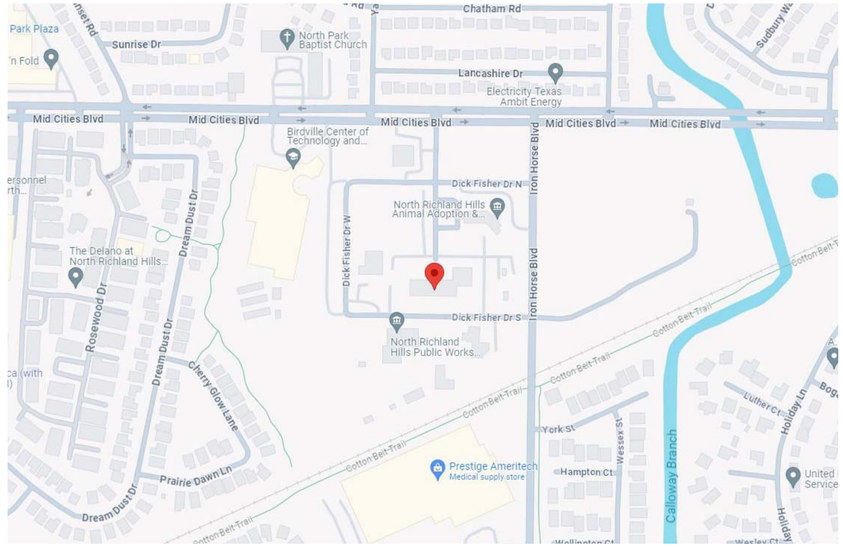
END OF SECTION

CITY OF NORTH RICHLAND HILLS
FIRE STATION NO.4, FD/PD TRAINING & FIRE STATION NO.5 ROOF REPLACEMENT
NORTH RICHLAND HILLS, TEXAS



FIRE STATION #4

7245 HIGHTOWER DR, NORTH RICHLAND HILLS, TX 76182



FD/PD TRAINING & FIRE STATION NO. 5

7202 DICK FISHER DR N, NORTH RICHLAND HILLS, TX 76180

SHEET LIST	
Sheet Number	**Sheet Name**
GS1.00	COVER SHEET
R1.00	GENERAL INFORMATION
R1.01	OVERALL ROOF PLAN - FIRE STATION NO.4
R1.02	OVERALL ROOF PLAN - FD/PD TRAINING
R2.01	ROOF DETAILS
R2.02	ROOF DETAILS - STANDING SEAM

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

THIS DOCUMENT WAS PRODUCED BY OR UNDER THE DIRECT SUPERVISION OF REGISTERED ARCHITECT

STATE OF TEXAS
DEAN D. BROWN
117508
LICENSED
PROFESSIONAL ENGINEER

ISSUE DATE: 08/15/2024

CONTRACTOR **SHALL** VERIFY ALL SUBSTRATES, DIMENSIONS, CURBS, PENETRATIONS, ECT. **THOSE SHOWN ARE TYPICAL BUT MAY NOT BE ALL INCLUSIVE**

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ISSUES

REVISIONS

PROJECT FOR:
CITY OF NORTH RICHLAND HILLS

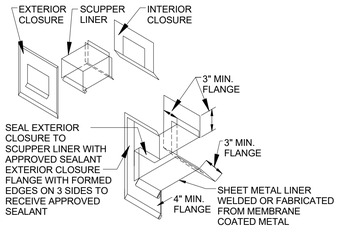
JOB: 23-1169-34
DATE: 08/15/2024
DRAWN BY: RM
CHECKED BY: BG, AL

COVER SHEET

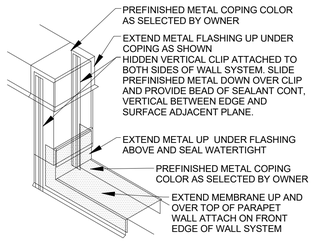
GS1.00

GENERAL ROOF NOTES:

A. PROVIDE ALL REQUIRED UTILITY / STRUCTURAL COMPONENTS AND/OR CONNECTIONS FOR THE FUNCTIONAL USE OF ALL CONTRACTOR SUPPLIED EQUIPMENT OR APPLIANCES, REGARDLESS OF ANY OMISSIONS OR INCONSISTENCIES ENCOUNTERED IN THE CONSTRUCTION DOCUMENTS.
B. THE WORD 'PROVIDE' SHALL MEAN 'FURNISH AND INSTALL' COMPLETE AND READY TO USE.
C. IF DISCREPANCIES APPEAR BETWEEN THE DRAWINGS AND THE SPECIFICATIONS, THE HIGHER QUALITY, QUANTITY, AND PRICE SHALL SUPERSEDE.
D. THE GENERAL CONTRACTOR AND SUBCONTRACTORS SHALL BECOME FAMILIAR WITH THE PROJECT AND THE ON-SITE / OFF-SITE CONDITIONS PRIOR TO BIDDING OR COMMENCING WORK.
E. PROVIDE METAL END CLOSURE ON EXPANSION JOINTS WHERE THEY OCCUR AT THE EDGE OF THE ROOF.
F. ROOF SLOPES SHOWN ON DRAWINGS ARE GENERAL AND CONCEPTUAL ONLY. TAPER INSULATION IS SHOWN CONCEPTUALLY AND FOR INTENT ONLY; NOT TO SCALE AND SHOWN AS GRAPHIC REPRESENTATION ONLY TO SHOW SLOPE. INTENT IS TO PROVIDE POSITIVE DRAINAGE TO ALL ROOF DRAINS, SCUPPERS, AND GUTTERS. VERIFY INSULATION AND TAPER IN SHOP DRAWINGS AS REQUIRED TO MAINTAIN SLOPE PRIOR TO INSTALLATION. REFER TO STRUCTURAL (IF APPLIES) FOR EXACT TOS/BOD ELEVATIONS. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
G. PROVIDE TAPERED INSULATION CRICKETS (1/2"/FT. MIN. SLOPE) AT HIGH SIDE OF ALL MECHANICAL UNITS, SMOKE VENTS, ROOF HATCHES, AND OTHER MISC. ROOF PENETRATIONS, TO SHED WATER AROUND AND TO ENSURE POSITIVE ROOF DRAINAGE.
H. PROVIDE ADDITIONAL MANUFACTURER'S WALK PADS AS PROTECTION AT "SERVICE SIDE" OF ALL MECHANICAL EQUIPMENT - FIELD VERIFY LOCATIONS. AS WELL AS PROTECTION AT "ACCESS SIDE" OF ALL ROOF HATCHES AND ROOF ACCESS LADDERS - FIELD VERIFY LOCATIONS, AND AT DOWNSPOUT LOCATIONS.
I. ALL EXPOSED FLASHING, COPING (IF APPLICABLE), AND THEIR ACCESSORIES SHALL BE AS SPECIFIED. PAINT ALL METAL FLASHING THAT IS NOT PREFINISHED (TYPICAL) AND VISIBLE FROM THE GROUND.
J. HEIGHT OF ALL NAILERS SHALL BE FLUSH WITH NEW INSULATION THICKNESS.
K. ALL THROUGH WALL FLASHING SYSTEMS TO ACCOMMODATE 8" MINIMUM FLASHING HEIGHT FROM FINISHED ROOF SURFACE. PROVIDE END DAMS AS CONDITIONS ALLOW. ALL FLASHING TO HAVE 4" LAP MINIMUM AND OR STEP.
L. ALL PITCH PANS SHALL BE DOUBLE SOLDERED THERMOPLASTIC CLADDED METAL AND RECEIVE EITHER MECHANICALLY ATTACHED GOOSENECKS OR METAL BONNETS. METAL BONNETS SHALL BE SECURED WITH CLAMPING RING AND SEALANT. SPECIAL CARE GIVEN TO WASH ALL METAL PRIOR TO INSTALLATION.
M. ALL INFIELD EXPANSION JOINTS SHALL HAVE LOW SLOPED STANDING SEAM JOINTS AND SHALL BE CHAMFERED AT TERMINATION AT ROOF EDGE TO MEET PROFILE OF PERIMETER.
N. ANY CRACKS OR VOIDS IN RISE WALLS ABOVE COUNTER FLASHING SHALL BE REPAIRED WITH COMPATIBLE SEALANT.
O. ALL VERTICAL MEMBRANE FLASHING SHALL BE MECHANICALLY FASTENED AND INSTALLED WITH NEW METAL COUNTER FLASHING UTILIZING A CONTINUOUS CLEAT. SLIDE METAL COVER PLATE DOWN OVER VERTICAL CLEAT AND SEAL.
P. ALL PIPES AND CONDUIT SHALL RECEIVE PIPE SUPPORTS AND SHALL BE PLACED ON AN ADDITIONAL ADHERED ROOF MEMBRANE UNDER SPECIFIED WALK PAD PRIOR TO SURFACE APPLICATION. SUPPORTS TO OCCUR AT 10'-0" O.C. AND WITHIN 2'-0" OF ALL SLOPES, TEES AND CORNERS. ALL PIPES TO BE PAINTED PER BUILDING CODE REQUIREMENTS.
Q. ALL METAL FLASHING SHALL EXTEND BEYOND ROOF EDGE MIN. 8" WHERE FLASHING ABUTS VERTICAL WALL SURFACE AS DETAILED. ALL FLASHING SHALL BE INSTALLED IN SHINGLE FASHION.
R. ALL EQUIPMENT CURBS TO BE RAISED AS NECESSARY TO MAINTAIN 10" MINIMUM HEIGHT ABOVE FINISHED ROOF SURFACE.
S. MECHANICAL, ELECTRICAL, AND PLUMBING ROOF EQUIPMENT SHOWN ON THIS PLAN IS FOR GENERAL ARCHITECTURAL INFORMATION ONLY.
T. FLASHING AND STRIPPING MATERIALS, BASE PLY SHEETS, MEMBRANES, INSULATION, AND ACCESSORIES SHOULD BE AS RECOMMENDED BY THE ROOFING SYSTEM MANUFACTURER FOR INTENDED USE AND COMPATIBILITY WITH THE MEMBRANE ROOFING SYSTEM.
U. PROVIDE CONCRETE SPLASH BLOCKS AT ALL ROOF LEADER NOZZLES THAT SPILL ONTO GROUND AND/OR ROOF SURFACE.
V. ALL ROOF DETAILS FOR METAL ROOF CONSTRUCTION ARE FOR BASIS OF DESIGN, FOR METAL ROOF SYSTEMS. FINAL DETAILS SHALL BE SUBMITTED BY METAL ROOF SYSTEM MANUFACTURER THROUGH THE SUBMITTAL PROCESS PRIOR TO CONSTRUCTION TO ACTIVATE AND PROVIDE A SINGLE SOURCE 20 YEAR NDL WARRANTY WITH WEATHER TIGHTNESS PROTECTION AS SPECIFIED FOR METAL ROOF SYSTEM.



15 SCUPPER SHEET METAL
NOT TO SCALE



14 COPING END CAP
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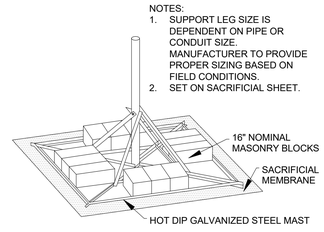
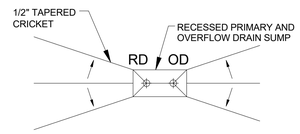
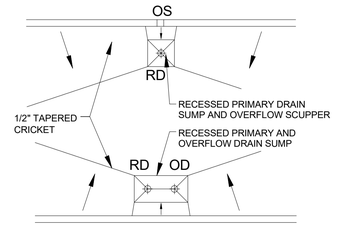


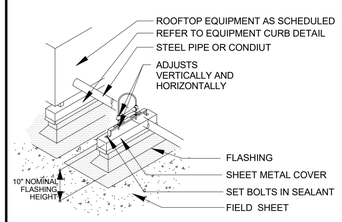
13 ANTENNA SUPPORT
NOT TO SCALE



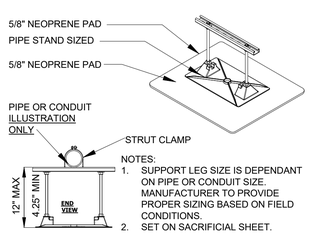
12 TAPERED SADDLES
NOT TO SCALE



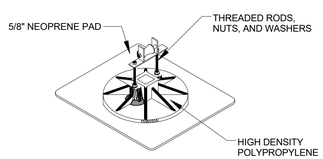
11 TAPERED CRICKET
NOT TO SCALE



10 PIPE STAND
NOT TO SCALE

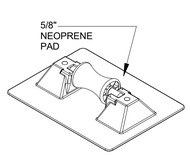


9 LARGE PIPE - PIPE STAND
NOT TO SCALE



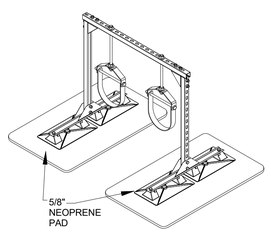
ROLLER AND SUPPORT LEG SIZE IS DEPENDENT ON PIPE OR CONDUIT SIZE. MANUFACTURER TO PROVIDE PROPER SIZING BASED ON FIELD CONDITIONS.

8 ROLLER PIPE SUPPORT
NOT TO SCALE

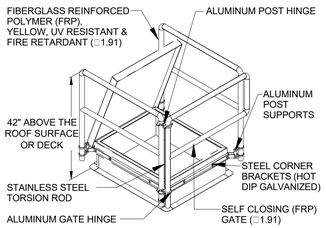


ROLLER AND SUPPORT LEG SIZE IS DEPENDENT ON PIPE OR CONDUIT SIZE. MANUFACTURER TO PROVIDE PROPER SIZING BASED ON FIELD CONDITIONS.

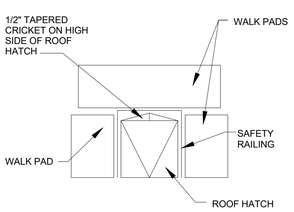
7 ROLLER PIPE SUPPORT
NOT TO SCALE



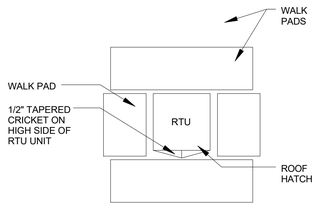
6 PIPE HANGER
NOT TO SCALE



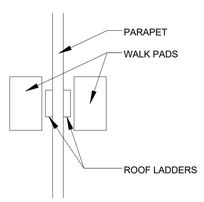
5 ROOF HATCH SAFETY RAILING
NOT TO SCALE



4 ROOF HATCH WALK PAD LAYOUT
NOT TO SCALE



3 ROOF TOP UNIT - WALK PAD LAYOUT
NOT TO SCALE



2 ROOF TO ROOF LADDER WITH WALK PADS
NOT TO SCALE

DO NOT MAKE REPAIRS OR ALTERATIONS TO THIS ROOF WITHOUT APPROVAL FROM THE DIRECTOR OF OPERATIONS AND MAINTENANCE OFFICE

PROJECT: *PROJECT NAME*
PROJECT ADDRESS
STATE

THIS ROOF IS GUARANTEED FROM *XX/XX/XX* UNTIL *XX/XX/XX*

PRIMARY ROOFING MATERIAL MANUFACTURER
MATERIAL MANUFACTURER NAME

MANUFACTURER: *MANUFACTURER NAME*
ADDRESS
STATE
NUMBER

ROOFING CONTRACTOR
CONTRACTOR NAME
ADDRESS
STATE
NUMBER

1 ROOF PLAQUE
NOT TO SCALE

Building Code	2018 IBC
Energy Code	2018 IECC
Existing Building Code	2018 IEBC
ASCE Wind Uplift	ASCE 7-16
Wind Exposure	D
Internal Pressure Coefficient	+/-0.18
Risk Category	III
Basic Design Wind Speed, V (mph)	112
Allowable Stress Design (ASD) Wind Speed, $V_{asd} = V\sqrt{0.6}$ (mph)	87
Risk Category (Storm Shelters & Essential Facilities)	IV
Basic Design Wind Speed, V (mph)	116
Allowable Stress Design (ASD) Wind Speed, $V_{asd} = V\sqrt{0.6}$ (mph)	90

CH CHILLER LINE
G GAS LINE
SST SPLASH PAN / SUPPORT PAD
RPH ROOF PENETRATION HOUSING
GUY WIRE
ANTENNA
SOIL / PLUMBING VENT
FLANGE MOUNTED EQUIPMENT
EDP ELECTRICAL DISTRIBUTION PANEL
HS HOT STACK
CURB MOUNTED VENT
RTU ROOF TOP UNIT
CURB MOUNTED EQUIPMENT
MISC. EQUIP. ON EQUIP. CURBS
RD PRIMARY ROOF DRAIN
OD OVERFLOW ROOF DRAIN
RD OD PRIMARY AND OVERFLOW ROOF DRAIN
DS/SB DOWNSPOUT/ SPLASHBLOCK
EJ EXPANSION JOINT
ME/G METAL EDGE W/GUTTER
ME METAL EDGE
RW RISE WALL
RME RAISED METAL EDGE
RW/EJ RISE WALL W/EXPANSION JOINT
CD CONDENSATE LINE
TEL / FO TELE / FIBER OPTICS
E ELECTRIC LINE
A ANCHOR STANCHION
V VENT STACK
W WATER HYDRANT
E ELECTRIC DISCONNECT PEDESTAL
SECURITY CAMERA
PITCH PAN
PROCESS VENT STACK
FLANGE MOUNTED VENT
SATELLITE DISH
MISC. EQUIPMENT
ROOF HATCH
SC THROUGH WALL SCUPPER
OS OVERFLOW SCUPPER
SC EDGE SCUPPER
DS/CH DOWNSPOUT/ COLLECTOR HEAD
DS DOWNSPOUT
P ROOF ACCESS LADDER
P PARAPET
P/EJ EXPANSION JOINT AT PARAPET
SLOPE DIRECTION
SL SKYLIGHT

ROOF LEGEND

LOW SLOPE ROOF SYSTEM
METAL ROOF SYSTEM
NOT IN CONTRACT

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

THIS DOCUMENT WAS PRODUCED BY OR UNDER THE DIRECT SUPERVISION OF REGISTERED ARCHITECT

STATE OF TEXAS
DEAN D. BROWN
117508
LICENSED
PROFESSIONAL ENGINEER

ISSUE DATE: 08/15/2024

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ISSUES

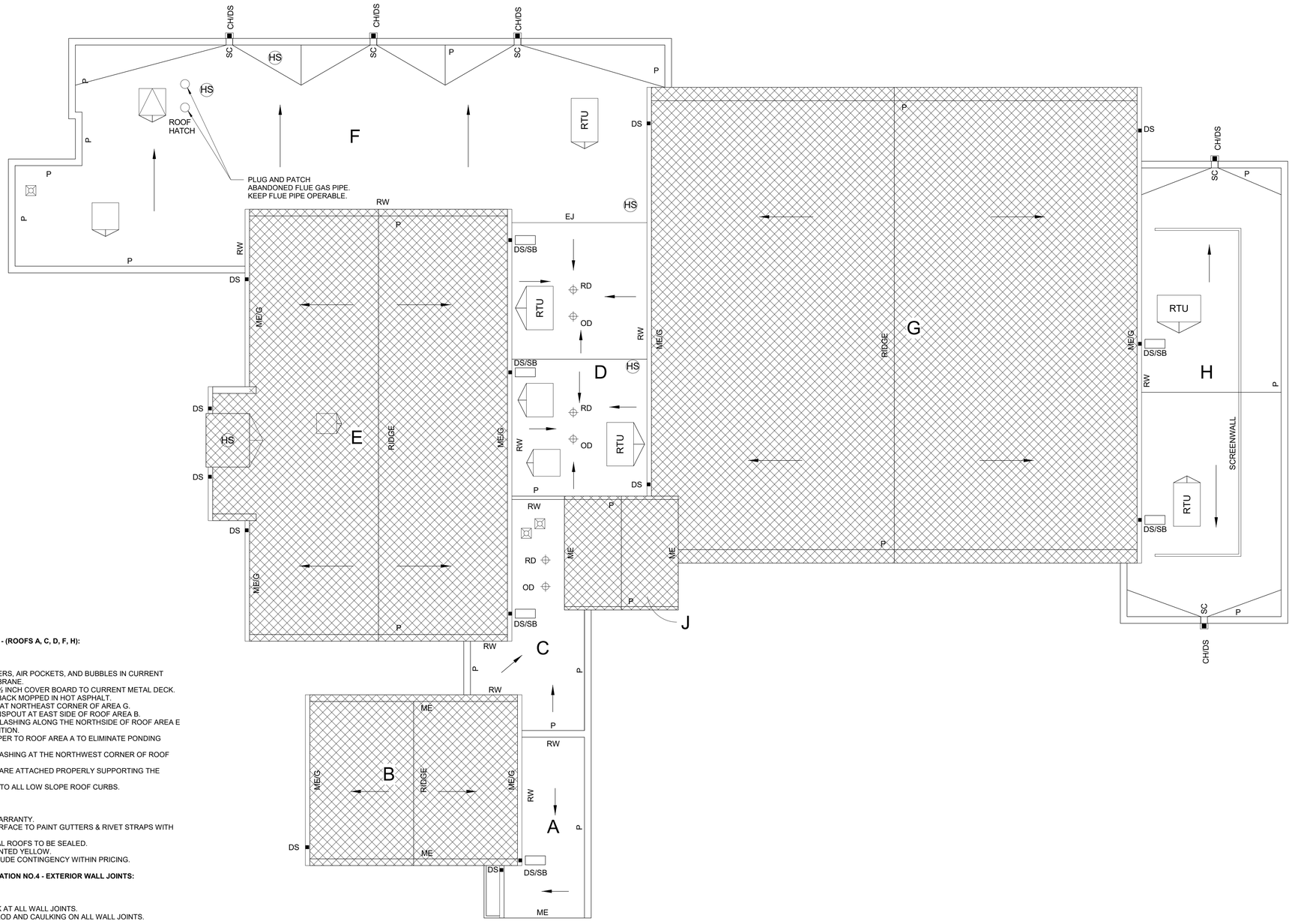
REVISIONS

PROJECT FOR:
CITY OF NORTH RICHLAND HILLS

JOB: 23-1169-34
DATE: 08/15/2024
DRAWN BY: RM
CHECKED BY: BG, AL

GENERAL INFORMATION

R1.00



1 OVERALL ROOF PLAN - FIRE STATION NO.4
1/8" = 1'-0"

SCOPE OF WORK:

BASE PROPOSAL 1 – FIRE STATION NO.4 - (ROOFS A, C, D, F, H):

WORK SHALL INCLUDE:

- CUT ALL CURRENT BLISTERS, AIR POCKETS, AND BUBBLES IN CURRENT MODIFIED BITUMEN MEMBRANE.
- MECHANICALLY FASTEN ½ INCH COVER BOARD TO CURRENT METAL DECK.
- PROVIDE 60 MIL FLEECE BACK MOPPED IN HOT ASPHALT.
- SEAL THE GUTTER SEAM AT NORTHEAST CORNER OF AREA G.
- ADD GUTTER WITH DOWNSPOUT AT EAST SIDE OF ROOF AREA B.
- REWORK THE EXISTING FLASHING ALONG THE NORTHSIDE OF ROOF AREA E TO A WATERTIGHT CONDITION.
- PROVIDE ADDITIONAL TAPER TO ROOF AREA A TO ELIMINATE PONDING WATER.
- REPAIR THE CLOSURE FLASHING AT THE NORTHWEST CORNER OF ROOF AREAS E AND G.
- VERIFY GUTTER STRAPS ARE ATTACHED PROPERLY SUPPORTING THE GUTTER.
- ADD COUNTERFLASHING TO ALL LOW SLOPE ROOF CURBS.

CAST STONE SCOPE:

- PROVIDE 20-YEAR NDL WARRANTY.
- CLEAN AND PREPARE SURFACE TO PAINT GUTTERS & RIVET STRAPS WITH RUST INHIBITOR PAINT.
- ALL OPEN ENDS ON METAL ROOFS TO BE SEALED.
- ALL GAS LINES TO BE PAINTED YELLOW.
- BASE PROPOSAL TO INCLUDE CONTINGENCY WITHIN PRICING.

ADD ALTERNATE PROPOSAL 1 – FIRE STATION NO.4 - EXTERIOR WALL JOINTS:

WORK SHALL INCLUDE:

- REMOVE EXISTING CAULK AT ALL WALL JOINTS.
- REPLACE NEW BACKER ROD AND CAULKING ON ALL WALL JOINTS.

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FLOWERMOUND
TEXAS 75028
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PROFESSIONAL ENGINEER

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ISSUES

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PROJECT FOR:
CITY OF NORTH RICHLAND HILLS
FIRE STATION NO.4
7245 HIGHTOWER DR
NORTH RICHLAND HILLS, TX 76182

JOB: 23-1169-34
DATE: 08/15/2024
DRAWN BY: RM
CHECKED BY: BG, AL

OVERALL ROOF PLAN - FIRE STATION NO.4

R1.01

SCOPE OF WORK:

BASE PROPOSAL 1 – FD/PD TRAINING & FIRE STATION NO.5 (ROOFS A, B, C1, C2):

WORK SHALL INCLUDE:

- SPUD BACK ALL LOOSE GRAVEL ON EXISTING BUILT-UP ROOF.
- MECHANICALLY FASTEN ½" COVERBOARD DOWN TO THE EXISTING METAL DECK.
- PROVIDE 60 MIL FLEECE BACK TPO MOPPED IN HOT ASPHALT.
- PROVIDE ALL NEW METAL COPING.
- PROVIDE NEW BASE FLASHINGS AT ALL CURBS AND RISE WALLS.
- REPLACE METAL EDGE WITH NEW METAL EDGE.
- REPLACE SURFACE MOUNTED FLASHING WITH NEW THROUGH WALL FLASHING IN THE THE EXISTING FACE BRICK.
- COVER EXPOSED WOOD NAILERS AT FASCIA AT THE ENTRY CANOPIES.
- PROVIDE GUTTERS AT STANDING SEAM ROOF WITH DOWNSPOUTS AT ENTRIES D3.
- PROVIDE 20-YEAR NDL WARRANTY.
- BASE PROPOSAL TO INCLUDE CONTINGENCY WITHIN PRICING.

ADD ALTERNATE PROPOSAL 1 – FD/PD TRAINING & FIRE STATION NO.5 (ROOFS D1, D2, D3, D4, D5, D6):

WORK SHALL INCLUDE:

- REMOVAL OF EXISTING METAL ROOF DOWN TO SUBSTRATE.
- PROVIDE NEW STANDING SEAM 26-GAUGE PREFINISHED METAL ROOF SYSTEM.
- WORK SHALL INCLUDE ALL HVAC AND ELECTRICAL PIPING DISCONNECT.
- INSTALLATION SHALL BE AS PER NRCA, SMACNA, ANSI/SPRI, SPECIFICATIONS, DETAILS, AND MANUFACTURER'S GUIDELINES. ALL GAS LINES TO BE TESTED AND CERTIFIED BY A MASTER PLUMBER AND CERTIFIED BY TEXAS RAILROAD COMMISSION.
- PROVIDE 20-YEAR NDL WARRANY.

ADD ALTERNATE PROPOSAL 2 – FD/PD TRAINING - (NON-OPENING) WINDOW REPLACEMENT:

WORK SHALL INCLUDE:

- REMOVE AND REPLACE ALL NEW WINDOWS AS SPECIFIED.

ADD ALTERNATE PROPOSAL 3 – FIRE STATION NO.5 - (OPERABLE) WINDOW REPLACEMENT:

WORK SHALL INCLUDE:

- REMOVE AND REPLACE ALL NEW WINDOWS AS SPECIFIED.

ADD ALTERNATE PROPOSAL 4 – (OPERABLE) FIRE STATION NO.5:

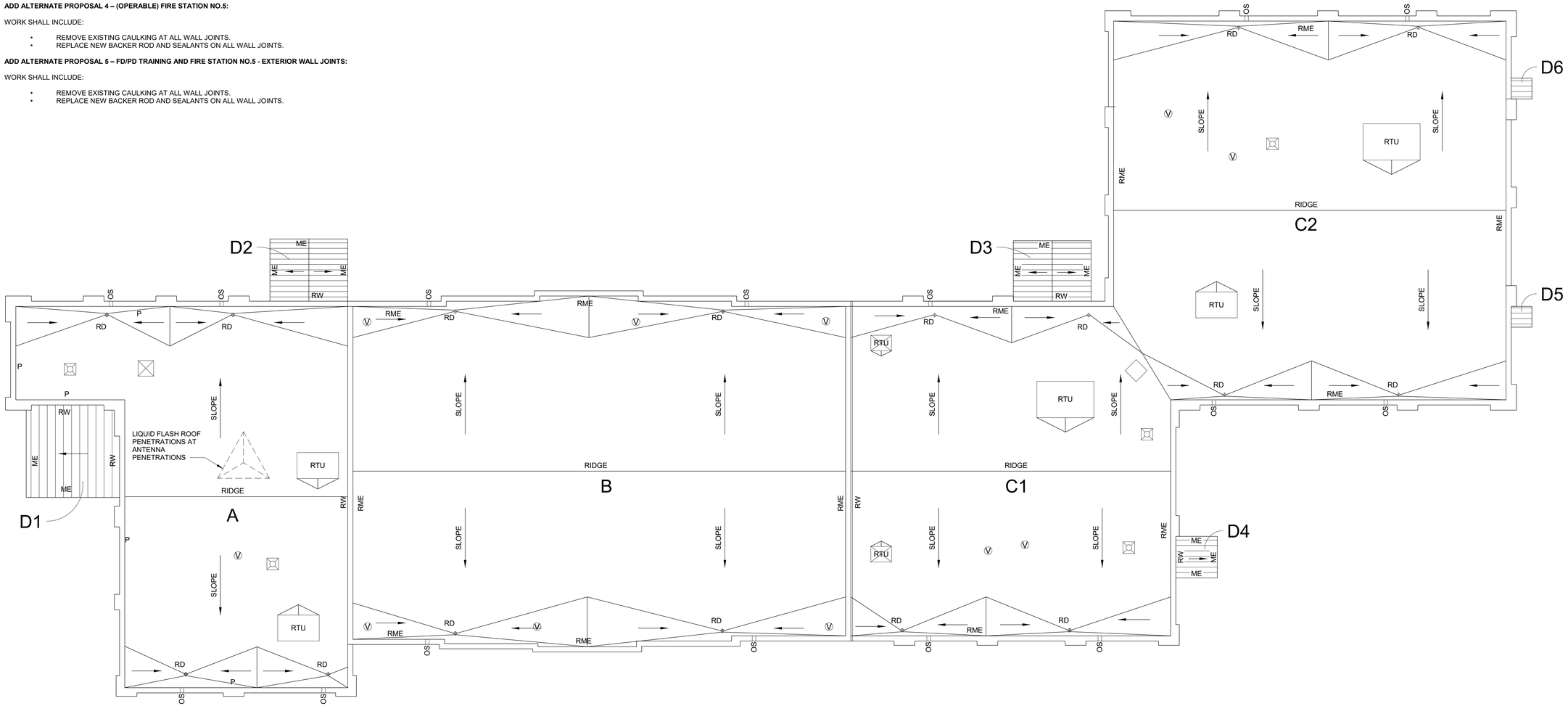
WORK SHALL INCLUDE:

- REMOVE EXISTING CAULKING AT ALL WALL JOINTS.
- REPLACE NEW BACKER ROD AND SEALANTS ON ALL WALL JOINTS.

ADD ALTERNATE PROPOSAL 5 – FD/PD TRAINING AND FIRE STATION NO.5 - EXTERIOR WALL JOINTS:

WORK SHALL INCLUDE:

- REMOVE EXISTING CAULKING AT ALL WALL JOINTS.
- REPLACE NEW BACKER ROD AND SEALANTS ON ALL WALL JOINTS.



1 OVERALL ROOF PLAN - FD/PD TRAINING & FIRE STATION NO.5
1" = 10'-0"

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PROFESSIONAL ENGINEER

ISSUE DATE: 08/15/2024

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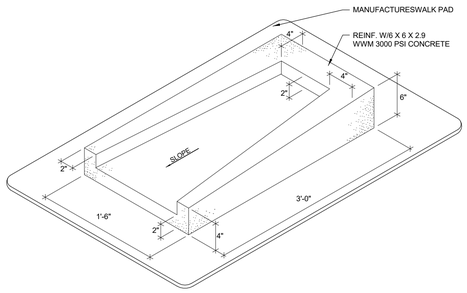
PROJECT FOR:
CITY OF NORTH RICHLAND HILLS
FD/PD TRAINING & FIRE STATION NO.5
7202 DICK FISHER DR N
NORTH RICHLAND HILLS, TX 76180

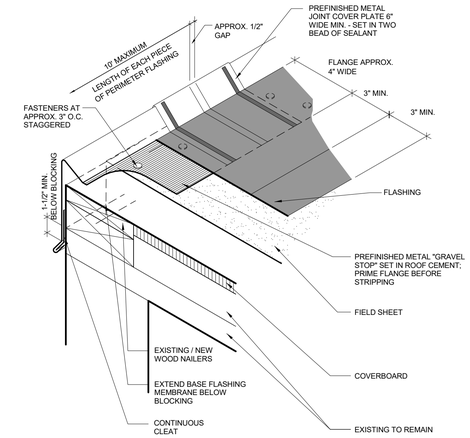
JOB: 23-1169-34
DATE: 08/15/2024
DRAWN BY: RM
CHECKED BY: BG, AL

OVERALL ROOF PLAN - FD/PD TRAINING

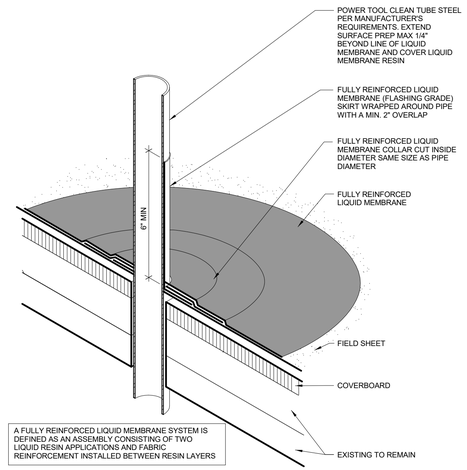
R1.02



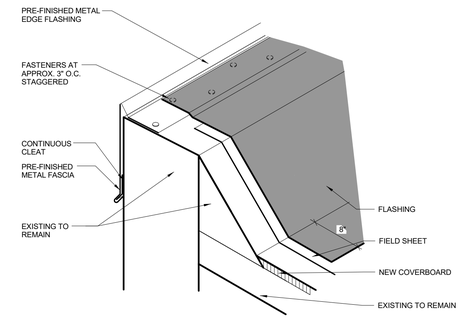
12 CONCRETE SPLASHBLOCK
NOT TO SCALE



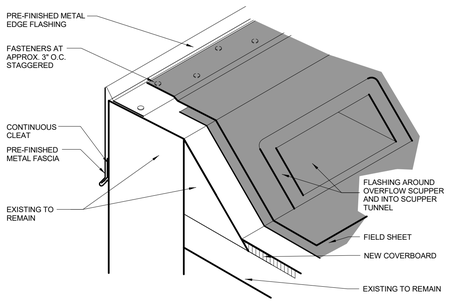
11 METAL EDGE
NOT TO SCALE



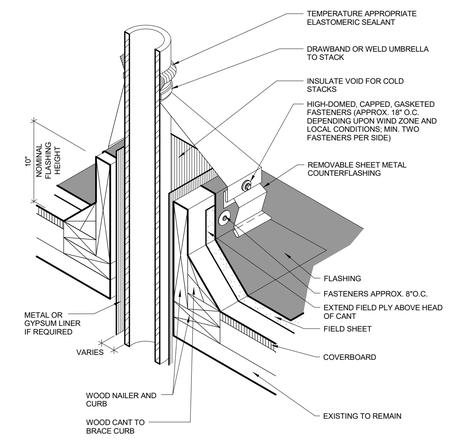
10 LIQUID APPLIED FLASHING
NOT TO SCALE



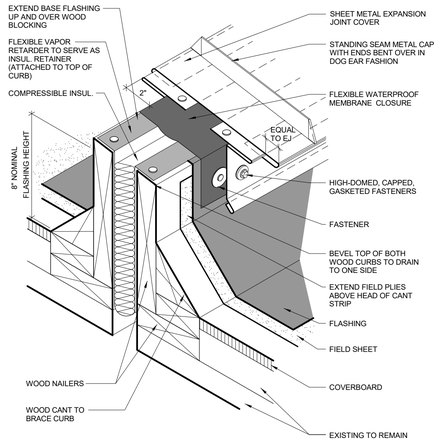
9 RAISED METAL EDGE
NOT TO SCALE



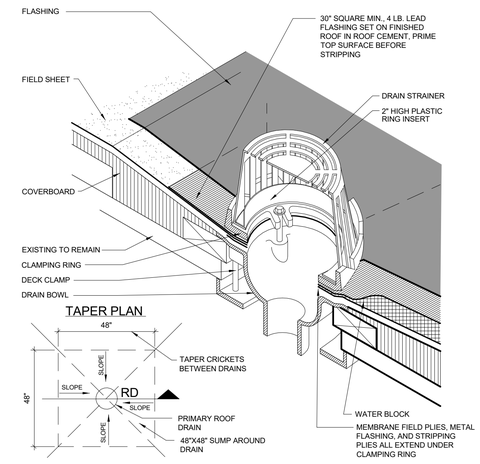
8 OVERFLOW SCUPPER
NOT TO SCALE



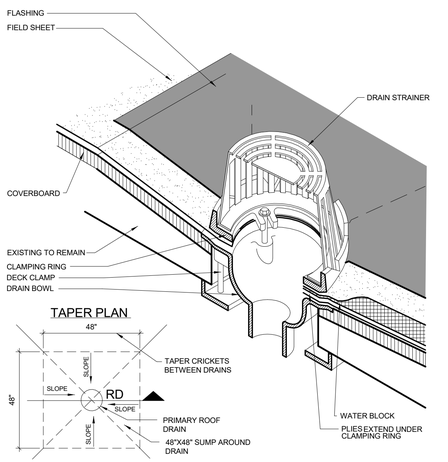
7 HOT STACK
NOT TO SCALE



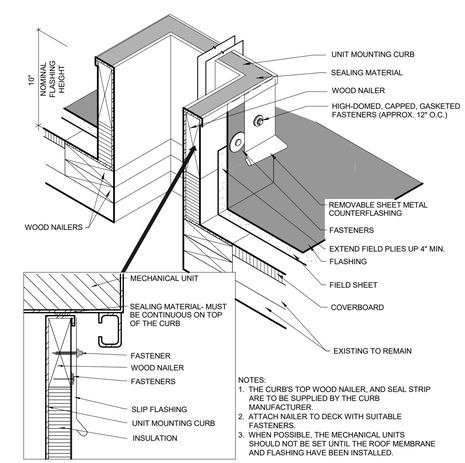
6 FIELD EXPANSION JOINT
NOT TO SCALE



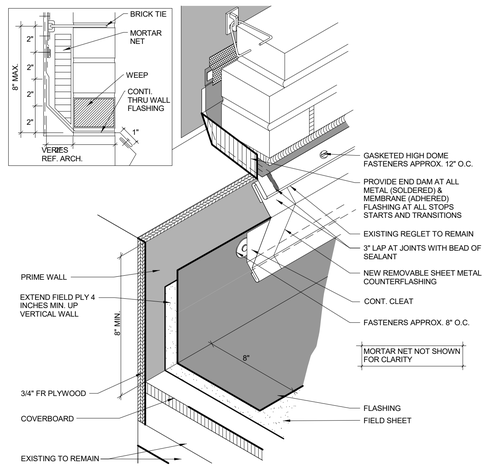
5 OVERFLOW ROOF DRAIN
NOT TO SCALE



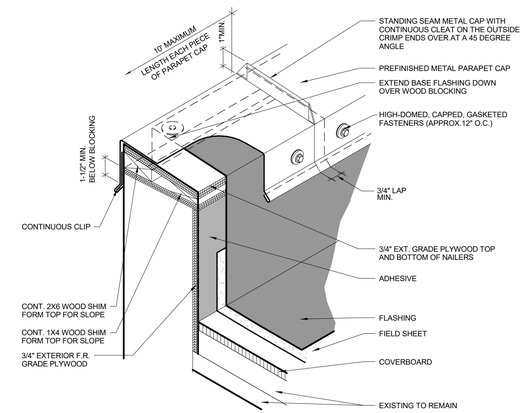
4 PRIMARY ROOF DRAIN
NOT TO SCALE



3 MECHANICAL CURB
NOT TO SCALE



2 BRICK RISEWALL
NOT TO SCALE



1 LOW PARAPET
NOT TO SCALE

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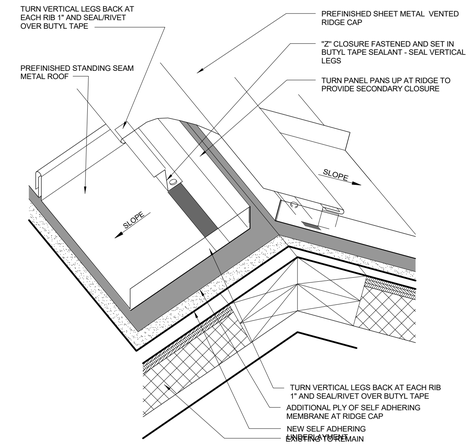
PROJECT FOR:
CITY OF NORTH RICHLAND HILLS

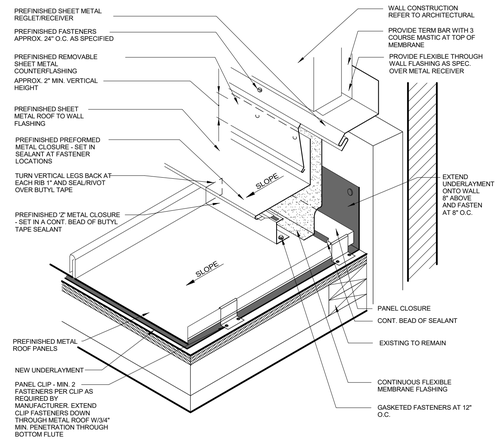
JOB: 23-1169-34
DATE: 08/15/2024
DRAWN BY: RM
CHECKED BY: BG, AL

ROOF DETAILS

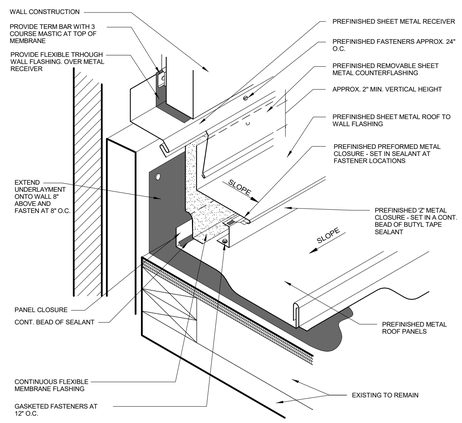
R2.01



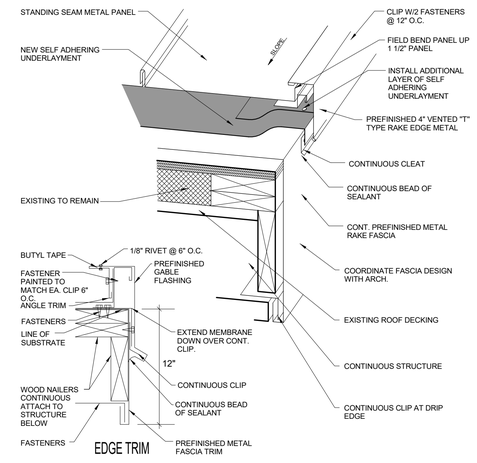
5 NON VENTED RIDGE
NOT TO SCALE



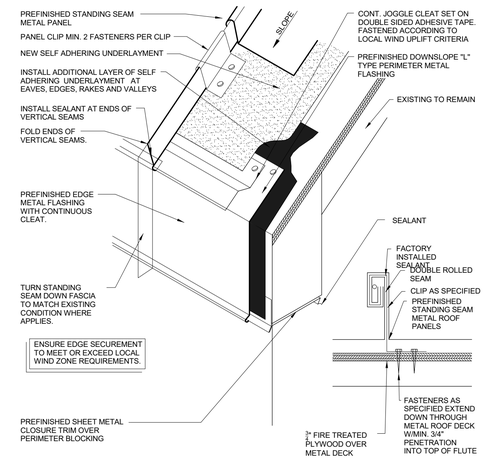
4 HEAD TO RISEWALL
NOT TO SCALE



3 RAKE TO BRICK RISEWALL
NOT TO SCALE



2 RAKE
NOT TO SCALE



1 METAL EDGE
NOT TO SCALE

ARMKO INDUSTRIES,INC.
TEXAS REGISTERED
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1320 SPINKS ROAD
FLOWERMOUND
TEXAS 75028
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ISSUES

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PROJECT FOR:
CITY OF NORTH RICHLAND HILLS

JOB: 23-1169-34
DATE: 08/15/2024
DRAWN BY: RM
CHECKED BY: BG, AL

ROOF DETAILS - STANDING SEAM

R2.02