

PROJECT MANUAL

ROOF REPLACEMENT/RETROFIT
CENTER FOR ARTS BUILDING

LONE STAR COLLEGE: CYFAIR CAMPUS
9191 BARKER CYPRESS ROAD, CYPRESS, TEXAS



PREPARED
FOR
LONE STAR COLLEGE SYSTEM
20515 STATE HIGHWAY 249
HOUSTON, TEXAS 77070-2607



PREPARED BY
PRICE CONSULTING, INC.
7122 WORCESTER DRIVE
SPRING, TEXAS 77379
TEXAS REGISTERED ENGINEERING FIRM NO. F-3814



PCI PROJECT NO. 11943.21
DECEMBER 5, 2025



TX PE Firm F-3814

12/5/2025

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

DOCUMENT 00 01 02

PROJECT DIRECTORY

OWNER: **LONE STAR COLLEGE SYSTEM**
20515 State Highway 249
Mail Code UP1102
Houston, Texas 77070-2607

PROJECT: **ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS
CENTER FOR ARTS BUILDING**
9191 Barker Cypress Road
Cypress, Texas

Contacts:

Mr. Ron Valentin
Senior Project Manager
Facilities & Construction
Cell: 210-724-9997
Direct: 281-290-5085
Email: Ron.Valentin@lonestar.edu

**CONSULTANT /
ENGINEER:**

PRICE CONSULTING, INC.
7122 Worcester Drive
Suite A
Spring, Texas 77379
Office: 281-209-1724

Mr. Karl Schaack, P.E., RRC
Cell: 281/827-9250
Email: kschaack@priceconsulting.com

END OF DOCUMENT 00 01 02

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

DOCUMENT 00 01 10

TABLE OF CONTENTS

INTRODUCTORY INFORMATION

	<u>Pages</u>
Document 00 01 01 - Project Title Page	1
Document 00 01 02 - Project Directory	1
Document 00 01 10 - Table of Contents	2
Document 00 01 15 - List of Drawing Sheets	1

PROCUREMENT REQUIREMENTS

	<u>Pages</u>
Document 00 22 13 - Supplemental Information to Bidders	1
Document 00 73 00 - Supplementary Conditions	17

GENERAL REQUIREMENTS

Division 1 - General Requirements

<u>Section</u>	<u>Pages</u>
01 00 00 - General Requirements	2
01 11 00 - Summary of Work	3
01 21 00 - Allowances	3
01 31 19 - Project Meetings	2
01 33 00 - Submittal Procedures	4
01 35 16 - Alteration Project Procedures	4
01 43 00 - Quality Requirements	2
01 43 39 - Mock-ups	1
01 50 00 - Temporary Facilities and Controls	5
01 60 00 - Product Requirements	3
01 70 00 - Execution and Closeout Requirements	4
01 74 00 - Cleaning and Waste Management	2

Division 2 - Sitework

<u>Section</u>	<u>Pages</u>
02 07 20 - Minor Demolition and Renovation Work	12

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

Divisions 3 through 4 - NOT USED

Division 5 - Metal

<u>Section</u>	<u>Pages</u>
05 51 33 - Ladders	3

Division 6 - Wood and Plastics

<u>Section</u>	<u>Pages</u>
06 10 10 - Rough Carpentry	3

Division 7 - Thermal and Moisture Protection

<u>Section</u>	<u>Pages</u>
07 01 60 - Miscellaneous Roof Repairs	6
07 22 16 - Roof Board Insulation	6
07 52 00 - Modified Bitumen Membrane Roofing	14
07 54 00 - Fluid-Applied Roof Coating	4
07 62 00 - Sheet Metal Flashing and Trim	10
07 72 00 - Tieback Anchors	4
07 92 00 - Joint Sealants	6

Division 8 - NOT USED

Division 9 - Finishes

<u>Section</u>	<u>Pages</u>
09 91 00 - Painting	4

Divisions 10 through 22 - NOT USED

Division 23 - Mechanical

<u>Section</u>	<u>Pages</u>
23 01 25 - Temporary Mechanical Disconnects	2

Divisions 24 through 25 - NOT USED

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

Division 26 - Electrical

<u>Section</u>	<u>Pages</u>
26 01 25 - Temporary Electrical Disconnects	2
26 41 00 - Lightning Protection System	3

Divisions 27 through 48 - NOT USED

END OF DOCUMENT 00 01 10

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

DOCUMENT 00 01 15

LIST OF DRAWING SHEETS

SHEET R1.00	COVER SHEET
SHEET R1.01	GENERAL NOTES
SHEET R2.00	EXISTING OVERALL ROOF PLAN
SHEET R2.01	NEW OVERALL ROOF PLAN
SHEET R2.02	NEW PARTIAL ROOF PLAN
SHEET R2.03	NEW PARTIAL ROOF PLAN
SHEET R2.04	NEW PARTIAL ROOF PLAN
SHEET R2.05	NEW PARTIAL ROOF PLAN
SHEET R2.06	MOISTURE SURVEY PLAN
SHEET R2.07	NEW TIE-BACK LAYOUT PLAN
SHEET R3.00	WEST ELEVATION
SHEET R3.01	SOUTH ELEVATION
SHEET R3.02	EAST ELEVATION
SHEET R4.00	BUILDING SECTION
SHEET R5.00	DETAILS
SHEET R5.01	DETAILS
SHEET R5.02	DETAILS
SHEET R5.03	DETAILS
SHEET R5.04	DETAILS
SHEET R5.05	DETAILS

END OF DOCUMENT 00 01 15

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

DOCUMENT 00 22 13

SUPPLEMENTAL INFORMATION TO BIDDERS

PART ONE - GENERAL

1.01 GENERAL:

A. The following data is presented for informative purposes only. The construction components listed were encountered by Price Consulting, Inc. personnel and may not be representative of the entire area. Contractor is responsible for verifying all field conditions that may impact both the bid and the proposed manufacturer's requirements.

1.02 CONSTRUCTION SUMMARY:

A. The roof construction observed at core locations consists of the following:

1. Areas "A", "C", "D", "E", "F", "H", and "I": Granule-surfaced modified bitumen cap sheet, 3-ply of fiberglass felts; 1-inch perlite insulation board; 2.5-inch polyisocyanurate insulation board, and fluted steel deck.
2. Areas "B", "F", and "G": Smooth-surfaced single ply membrane; 3-inch thick polyisocyanurate insulation board, and fluted steel deck.

PART TWO - PRODUCTS

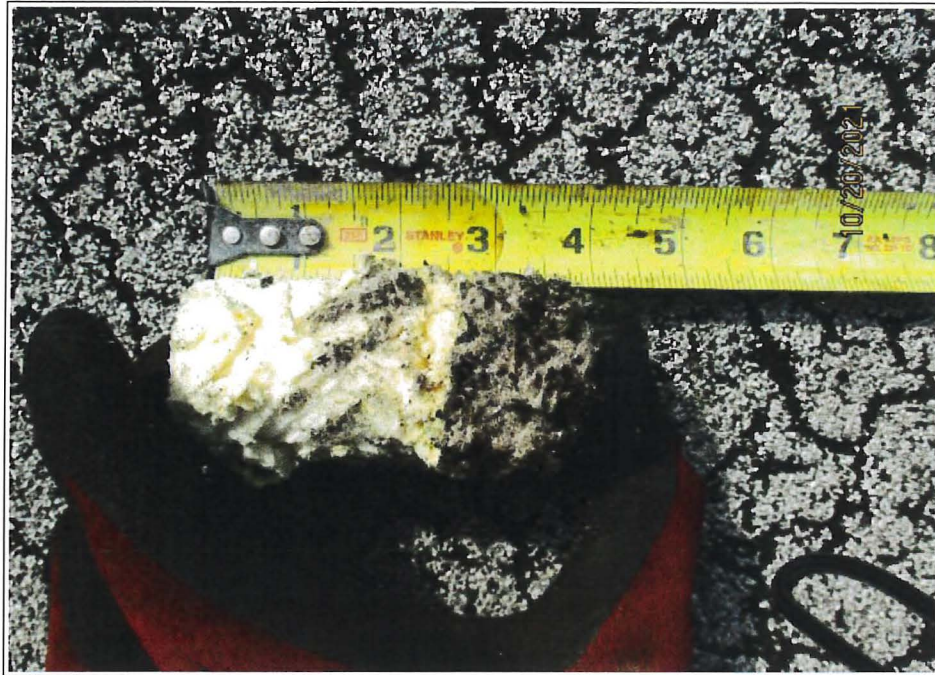
Not Used.

PART THREE - EXECUTION

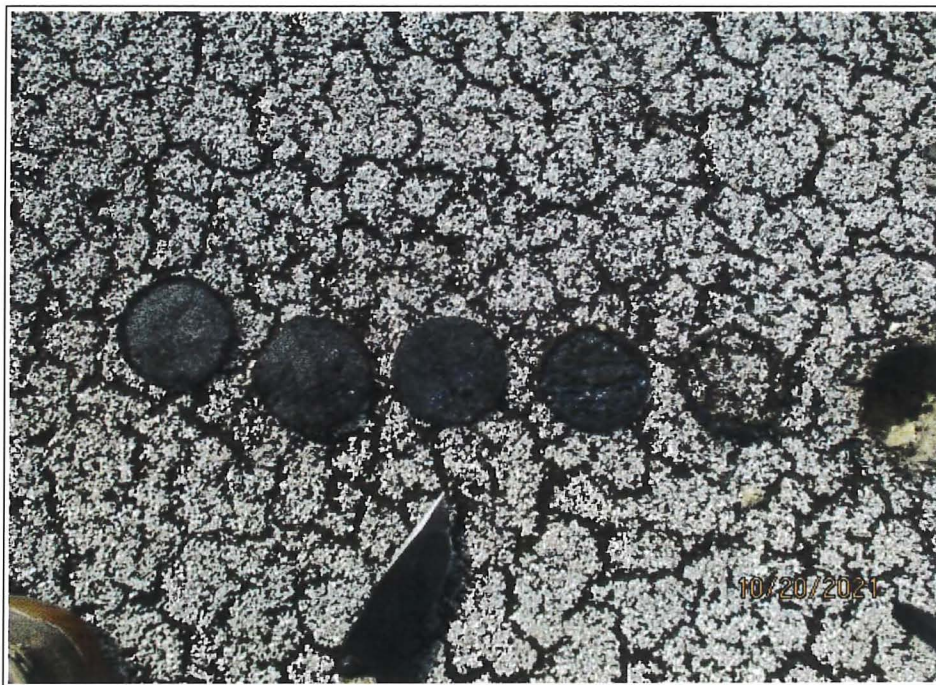
Not Used.

END OF DOCUMENT 00 22 13

LSC/CYFAIR CAMPUS - ARTS BUILDING
CYPRESS, TEXAS



1. VIEW OF ROOF CORE ON AREA "A"



2. VIEW OF ROOF CORE ON AREA "A"

LSC/CYFAIR CAMPUS - ARTS BUILDING
CYPRESS, TEXAS



3. VIEW OF ROOF CORE ON AREA "B"



4. VIEW OF ROOF CORE ON AREA "B"

LSC/CYFAIR CAMPUS - ARTS BUILDING
CYPRESS, TEXAS



5. VIEW OF ROOF CORE ON AREA "C"



6. VIEW OF ROOF CORE ON AREA "C"

LSC/CYFAIR CAMPUS - ARTS BUILDING
CYPRESS, TEXAS



7. VIEW OF ROOF CORE ON AREA "D"



8. VIEW OF ROOF CORE ON AREA "F"

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

DOCUMENT 00 73 00

SUPPLEMENTARY CONDITIONS OF THE CONTRACT

The following supplements modify the "General Conditions of the Contract for Construction", AIA Documents A201, 2017. Where a portion of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect. The "General Conditions" are a part of these documents whether or not included within this Project Manual.

ARTICLE 1 GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

Add the following subparagraphs:

1.1.8 IDENTIFICATION OF PARTIES

The following definitions apply to parties named in the various Documents:

- | | |
|---------------------------|---|
| 1. Owner: | Lone Star College System
20515 State Highway 249
Houston, Texas 77070-2607 |
| 2. Consultant / Engineer: | Price Consulting, Inc.
7122 Worcester Drive
Suite A
Spring, Texas 77379 |

1.1.9 BID DOCUMENTS

Bid Documents shall consist of all documents bound into or referenced in the Project Manual, the Drawings, and Addenda related thereto. The Project Manual contains the Proposal Requirements, Sample Forms, Conditions of the Contract, the Specifications, and the List of Drawings.

1.1.10 ADDENDA, ADDENDUM

Documents issued by the Engineer/Consultant prior to the opening of Bid that modify or clarify the Bid Documents. The addenda becomes a part of the Bid and Contract Documents.

1.1.11 ALTERNATE(S)

A separate amount stated on the Bid Form which, if accepted by the Owner, will be added to or deducted from the Base Bid Amount as indicated. If accepted, the work that corresponds to the "Alternate" or "Alternative" will become part of the agreement between Owner and Contractor. "Alternates" or "Alternatives" shall remain valid for a period of **90 days** after receipt of Bids, unless indicated otherwise herein.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

1.1.12 APPROVED, APPROVED EQUIVALENT, APPROVED EQUAL, OR EQUAL

The terms Approved Equivalent, Approved Equal, and OR Equal, relate to the substitution of products or systems approved in writing by the Engineer/Consultant. The substitution procedure process to be followed prior to receipt of Bids is described in the Instructions to Bidders.

1.1.13 BASE BID AMOUNT or BID BASE PRICE

The Contractor's Bid price for the Base Work, not including any Alternates.

1.1.14 CONTRACT TIME

The period of time including Anticipated Weather Days which is established in the Contract Documents, Section 01 11 00, for Substantial Completion of the Work. This period of time is NOT subject to authorized adjustments for Weather.

1.1.15 NOTICE TO PROCEED

A written notice that shall be given by the Owner to the Contractor that directs the Contractor to start the Work.

1.1.16 PROVIDE

Whenever the word "provide" is used in these documents, it shall mean the same as "furnish and install".

1.1.17 PUNCH LIST

A comprehensive list prepared by the Contractor prior to Substantial Completion to establish all items to be completed or corrected; this list may be supplemented by the Engineer/Consultant or Owner. Reference Paragraph 9.8.2 of the General Conditions.

1.1.18 UNIT PRICE(S)

A stipulated sum for a unit of Work as described in the Contract Documents. The Owner may add or deduct Unit Price work at the amounts stated on the Proposal Form and such amounts shall not be subject to additional mark up by the Contractor or his subcontractors.

1.2 EXECUTION, CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

Add the following paragraph:

1.2.4 In the event of conflicts or discrepancies within the Contract Documents, interpretations will be based on the following priorities (with each item listed having greater priority over the next listed item):

1. The signed Change of Orders.
2. The signed Agreement.
3. The Addenda, with those of later date having precedence over those of earlier date.
4. The Supplementary Conditions.
5. The General Conditions of the Contract for Construction.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

6. The Drawings, Schedule and the Specifications: Where conflicts occur between the drawings and specifications, between different drawings, between different portions of this section of the specifications, or between different sections of the specifications, the more stringent requirements and the greater quantity shall apply.

ARTICLE 2 OWNER

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

2.2.5 Delete paragraph 2.2.5 and substitute the following:

2.2.5 The Contractor will be furnished electronic copies of Drawings and Project Manuals. Hard copy sets will be furnished at the cost of reproduction, shipping and handling. These costs to be paid by the Contractor.

2.5 OWNER'S RIGHT TO OCCUPY THE PROJECT

2.5.1 The Owner and Contractor may agree that the Owner may occupy or use without prejudice to the right of either party, any completed or largely completed portions of the project, notwithstanding the time for completing the entire Work or such portions may not have expired. Such occupancy and use shall not constitute acceptance of any work not in accordance with the Contract Documents.

2.5.2 If such use delays the completion of the Project, the Contractor shall be entitled to extension of time, which claim or claims shall be in writing with supporting data attached, prior to such occupancy.

2.5.3 Refer to Article 11 Insurance and Bonds regarding property insurance requirements in the event of such occupancy.

ARTICLE 3 CONTRACTOR

3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

Add the following paragraphs:

3.2.3 The Contractor shall not be entitled to additional compensation for the "rework portion" of any additional work or additional work caused by his failure to carefully study and compare the contract documents prior to execution of the work.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

3.2.4 The Contractor shall make a reasonable attempt to interpret the Contract Documents before asking the Engineer/Consultant for assistance in interpretation. The Contractor shall not ask the Engineer/Consultant for observation of work prior to the Contractor's field superintendent's inspection of the work and his determination that the work complies with the Construction Documents. The Contractor shall arrange meetings prior to commencement of the work of all major subcontractors to allow the subcontractor to demonstrate his understanding of the documents to the Engineer/Consultant and to allow the subcontractor to ask for any interpretation he may require.

3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

Add the following subparagraphs:

3.3.4 The Contractor shall plan the sequence of operations for and coordinate the routing of mechanical and electrical work including both horizontal and vertical control.

3.3.5 The Contractor shall, prior to constructing concrete form work or excavation, verify location and elevation of all existing improvements and grades that control or impact finish floor elevation, and flow lines of sanitary and storm sewers, gutters, ditches, road, and depth of buried utilities and report to the Engineer/Consultant any discrepancies between documented locations and elevations and actual locations and elevations as founded by the Contractor.

3.5 WARRANTY

Add the following subparagraphs:

3.5.2 In the event of failure of a product, either during construction or the warranty period, the Contractor shall take appropriate measures to assure immediate correction or replacement of the defective product.

3.5.3 Reference Division 1 section Contract Closeout for warranty documents required prior to final payment.

3.6 TAXES

Add the following subparagraph:

3.6.2 The Owner is exempt from the Texas Sales Tax on any purchases, lease or rental of tangible personal property and will issue Certificates of Exemption from the Texas State Sales Tax on materials furnished by Contractors on construction projects. The successful Bidder shall provide a written statement to the Owner (with a copy to the Engineer/Consultant) as to prorating of costs for skilled crafts, labor and materials for the project prior to awarding of a Construction Contract. The Contractors and Subcontractors shall obtain Certificates of Resale from their

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

suppliers in order to avoid payment of State Sales Tax on materials incorporated in projects. Failure to obtain Certificates of Resale from their suppliers shall make the Contractor or subcontractors responsible for the Tax.

3.7 PERMITS, FEES AND NOTICE

3.7.4 Delete paragraph 3.7.4 in its entirety and substitute the following:

3.7.4 If the Contractor performs Work which he knew or should have known to be contrary to a applicable laws, statues, ordinances, building codes, local rules or regulations, without such notice to the Engineer/Consultant, the Contractor shall assume full responsibility for such Work and shall bear the attributable costs.

3.8 ALLOWANCES

Delete paragraphs 3.8.1, 3.8.2, and clauses 3.8.2.1, 3.8.2.2, and 3.8.2.3 their entirety. Reference Section 01 21 16 – Contingency Allowances for requirements.

3.9 SUPERINTENDENT / FOREMAN

Add the following subparagraph:

3.9.2 The Contractor, within five days after the award of the Contract and prior to beginning any field operations, shall furnish to the Owner and the Engineer/Consultant in writing, the name and professional qualifications of the person proposed by the Contractor as the Project Superintendent/Foreman. The Contractor shall not assign nor substitute any person as superintendent/foreman to whom the Owner or the Engineer/Consultant has made reasonable objection. No increase to Contract Time or Contract Sum shall be allowed in the event the Owner or Engineer/Consultant objects to any proposed superintendent/foreman. The selected superintendent/foreman shall remain at the site and acting as superintendent/foreman as long as that person remains in the employ of the Contractor or unless otherwise approved by the Engineer/Consultant.

3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

At subparagraphs 3.12.5, add the following sentence:

If, in the opinion of the Engineer/Consultant, the Shop Drawings are incomplete, indicate an inadequate understanding of the work covered by the Shop Drawings, or indicate a lack of study and review by the Contractor prior to submittal to the Engineer/Consultant, the Shop Drawings will be returned, without review to the Contractor for correction of deficiencies and subsequent submittal.

→ **ROOF REPLACEMENT**

**LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

Add the following subparagraphs:

3.12.11 The Contractor shall submit drawings, data and samples to the Engineer/Consultant at least 30 days prior to the date the Contractor needs the reviewed submittals returned. Where colors are to be selected by the Engineer/Consultant, submit all product color samples in adequate time to allow the Engineer/Consultant to prepare a complete and coordinated selection schedule. All submittals requiring color selection shall be submitted to the Engineer/Consultant within four weeks of the date of the Contract for Construction.

3.12.12 Reference Division 1 section Submittals for additional requirements.

→ **3.15 CLEAN UP**

Add the following subparagraph:

3.15.3 Prior to the Engineer/Consultant inspection for Substantial Completion the Contractor shall clean exterior and interior surfaces exposed to view; remove temporary labels, stains, and foreign substances; polish transparent and glossy surfaces; clean equipment and fixtures to sanitary condition; replace air filters and clean strainers in mechanical equipment; clean roofs, gutters, and downspouts; remove obstructions and flush debris from drainage systems; clean site; sweep paved areas and rake clean other surfaces; remove trash and surplus materials from the site; and, except where otherwise required by the Construction Documents, make the Work ready in all respects for immediate and full use by the Owner.

3.18 INDEMNIFICATION

3.18.1 In the first sentence add a comma and the word "defend" after the word "indemnify".

→ Add the following paragraphs:

3.19 SUBSTITUTIONS OF PRODUCTS AND SYSTEMS

3.19.1 The materials, products, and the systems covered by these specifications have been selected as a standard because of quality, particular suitability, or record of satisfactory performance. It is not intended to preclude the use of equivalent or better materials, products, or systems provided that same meets the requirements of the particular project and have been approved in a written addendum as a substitution prior to the submission of Proposals. If prior written approval has not been obtained, the Proposal shall be based upon the materials, products, and systems specified in the Proposal Documents and no substitutions will be permitted, except as provided hereinafter. Requests for substitution of materials must be made on the included Pre-Proposal Substitution Request Form.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

3.19.2 If, after award of contract, the Contractor or one of his Subcontractors or suppliers determine that any of the products or systems specified will perform in a manner that will limit the Contractor's ability to satisfactorily perform the work or to honor Warranty, the Contractor shall promptly notify the Engineer/Consultant, in writing, providing detailed substantiation for his position. Any changes deemed necessary by the Owner and Engineer/Consultant, including substitution of materials and change in Contract Sum, if any, shall be accomplished by appropriate modification.

3.19.3 Reference Document Instructions to Proposers for additional requirements.

3.20 RECORD DRAWINGS

3.20.1 At the completion of the project the Contractor shall submit one complete set of "as-built" drawings in electronic format in ACAD 2020 or newer and PDF, revised to show all changes made during construction. The Contractor shall submit one bound set of direct prints made from the ACAD files for use by the Engineer/Consultant in reviewing the submitted documents. Contractor shall pay all costs of producing the Required Documents. Reference Section 01 70 00 – Execution and Closeout Requirements for additional requirements.

3.21 WAGE RATES – PREVAILING

3.21.1 No employee used in construction shall be paid less than the minimum wage rate provided in Article 5159d, Vernon's Civil Statutes, The Texas Minimum Wage Act of 1970.

3.22 ANTITRUST VIOLATIONS

3.22.1 To permit the Owner to recover any damages suffered in antitrust violations, the Owner/Contractor Agreement shall include the following wording, "Contractor hereby assigns to Owner any and all claims for overcharges associated with this contract which arise under the antitrust laws of the United States, 15 U.S.C.A. Section 1 et.seq. (1973)". The Contractor shall include this provision in his agreement with each Subcontractor and Supplier. Each subcontractor shall include such provisions in agreements with Sub-Subcontractors and Suppliers.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

ARTICLE 4 ADMINISTRATION OF THE CONTRACT

4.5 MEDIATION

Add the following paragraphs:

4.5.4 Request for mediation by a party to this Agreement shall be provided in writing to the other party to this Agreement. Request for mediation shall be made within a reasonable time after the claim, dispute or other matter in question has arisen. No request for mediation may be made after the date when institution of legal or equitable proceedings based on such claim, dispute or other matter in question would be barred by applicable statutes of limitation.

4.5.5 The Owner will be represented at mediation by a person authorized to recommend settlement to the Owner's board of trustees regarding the claim, dispute or other matter in question. The other party to this Agreement shall be represented at mediation by a person authorized to settle any such claim, dispute or other matter in question.

4.5.6 The person serving as mediator shall be selected by mutual consent of the parties to this Agreement. If the parties are unable to agree on the selection of a mediator, each party shall designate a person qualified to serve as a mediator, and the persons so designated will select another qualified person to serve as mediator of the claim, dispute or other matter in question. The mediator may not impose his or her own judgment on the issues for that of the parties. However, the mediator shall act as an advocate for resolution and shall use his or her best efforts to assist the parties in reaching a mutually acceptable settlement.

4.5.7 Results of mediation are not binding unless voluntarily accepted by the parties to this Agreement. Unless the parties voluntarily accept the results of mediation and settle the claim, dispute or other matter in question, mediation does not preclude or prohibit any other legal or equitable remedies or proceedings available to either party to this Agreement regarding any claim, dispute or other matter in question.

ARTICLE 5 SUBCONTRACTORS

5.2 AWARD OF SUBCONTRACTORS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

5.2.1 Delete paragraph 5.2.1 in its entirety and substitute the following:

5.2.1 As soon as practicable after Award of the Contract but no later than 10 days prior to the submittal date for the Contractor's first Application for Payment, Contractor shall furnish to the Owner and Engineer/Consultant, in writing, the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the portions of the Work. Regarding proposed

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

persons or entities to perform portions of the Work, the Engineer/Consultant will promptly reply to the Contractor in writing stating whether or not the Owner or the Engineer/Consultant, after review, has reasonable objection to any such proposed person or entity.

Add the following paragraph:

5.2.5 The Contractor shall submit the list of proposed Subcontractors on an original AIA Document G805, or on copy made form AIA Electronic Format with License Number displayed.

ARTICLE 7 CHANGES IN THE WORK

7.3 CONSTRUCTION CHANGE DIRECTIVES

Add the following under 7.3.3.1 regarding lump sums:

Lump sums for material and labor shall be limited to markups for overhead and profit as follows:

- a. For the Contractor for work performed by the Contractor's own forces, not to exceed a maximum markup of 10 percent of that cost.
- b. For the Contractor for work performed by the Contractor's Subcontractor(s), not to exceed 5 percent of the amount due the Subcontractor(s).
- c. For each Subcontractor or Sub-subcontractor involved, for work performed by that Subcontractor's or Sub-subcontractor's own forces, not to exceed 10 percent of the cost.
- d. For each Subcontractor, for work performed by the Subcontractor's Sub-subcontractor(s), not to exceed 5 percent of the amount due the Sub-subcontractor(s).
- e. Cost to which overhead and profit is to be applied shall be determined in accordance with Subparagraph 7.3.6.
- f. In order to facilitate checking for quotations for extras or credits, all proposals of Contractors, Subcontractors, and Sub-subcontractors shall be accompanied by complete and detailed work sheets showing itemization of costs including units of: labor, materials, and other costs.
- g. Reference Division 1 section "Cash Allowance" for restrictions on markup for material and labor performed under an Allowance.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

ARTICLE 8 TIME

8.1 DEFINITIONS

8.1.2 Delete this subparagraph and substitute the following:

8.1.2 Unless agreed otherwise, the date inserted on the Agreement form and the Date of Commencement of the Work shall be as follows:

.1 The date inserted on the first page of the Agreement form will be the date the Owner formally awards the Contract. As soon as feasible after receipt of Proposals, the Engineer/Consultant will present Agreement forms to the Contractor for his review and signature: the Contractor will be allowed a maximum of five days from the date the prepared Agreements are presents to him to (1) obtain the required bond forms and insurance certificates and (2) return the executed Agreements and supporting documents to the Engineer/Consultant for transmittal to the Owner for his final review and execution.

.2 The Date of Commencement of the Work is the date that a written Notice to Proceed is delivered to the Contractor by the Owner and constitutes day zero of the stated Completion Time. If no written Notice to Proceed is issued by the Owner, then the Date of the Commencement of the Work shall be the date inserted on the first page of the Agreement form.

8.1.4 Delete paragraph 8.1.4 in its entirety in regards to weather days.

8.3 DELAYS AND EXTENSIONS OF TIME

8.3.1 Delete this subparagraph and substitute the following:

8.3.1 If the Contractor is delayed at any time in progress of the Work by an act of neglect of the Owner or Engineer/Consultant, or of an employee of either, or of a separate contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, or other causes beyond the Contractor's control, or by other causes which the Engineer/Consultant determines may justify the delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Engineer/Consultant may determine.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

Add the following paragraph:

8.4 LIQUIDATED DAMAGES

8.4.1 The Work to be performed under this Contract shall be substantially complete within the time listed on the Agreement or by such dates thereafter as may be established in any written extensions granted under Article 8. The parties hereto agree that time is of the essence of this contract and that the pecuniary damages which would be suffered by the Owner, if the Contractor does not complete all Work called for in the Contract Documents by the specified date, are in their very nature difficult of ascertainment. It is therefore expressly agreed as a part of the consideration inducing the Owner to execute this Contract that the Owner may charge the Contractor a sum equal to **\$500.00 per day** for each and every calendar day beyond the agreed date which the Contractor shall require for Substantial Completion of the Work included in the Contract. It is expressly understood that the said sum per day is agreed upon as a fair estimate of the pecuniary damages which will be sustained by the Owner in the event that the Work is not completed within the agreed time, or within the legally extended time, if any, otherwise provided for herein. Said sum shall be considered a liquidated damages only and in no sense shall be considered a penalty, said damage being caused by additional compensation to personnel, for loss of interest on money and other miscellaneous increased costs, all of which are difficult of exact ascertainment.

ARTICLE 9 PAYMENTS AND COMPLETION

9.2 SCHEDULE OF VALUES

Add the following subparagraphs:

9.2.2 In order to facilitate the processing of Applications for Payment, the Schedule of Values shall be submitted on AIA G703 – Continuation Sheet (or computer-generated documents providing same information and specifically approved by the Engineer/Consultant), and shall include the following:

- .1 Costs for Contractor's fee, bonds and insurance, mobilizations, etc., shall be listed as separate line items.
- .2 Costs for various construction items shall be detailed. For example, concrete work shall be sub-divided into footings, grade beams, floor slabs, paving, etc. These subdivisions shall appear as individual line items.
- .3 On major subcontracts, such as mechanical, electrical and plumbing, the schedule shall indicate line items and amounts in detail (for example: underground, major equipment, fixtures, installation of fixtures, start up, etc.)
- .4 Costs for subcontract work shall be listed without any addition of General Contractor's costs for overhead, profit or supervision.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- .5 Where work occurs at more than one site or building, for the Owner's accounting purposes and to facilitate the checking of the Contractor's Applications for Payment, costs shall be scheduled separately, for each site or building, on the Continuation Sheets.

9.3 APPLICATIONS FOR PAYMENT

9.3.2 Delete paragraph 9.3.2 in its entirety and substitute the following:

9.3.2 Payments will be made on account of materials or equipment (1) incorporated in the Work and (2) suitably stored at the site or (3) suitably stored at some off-site location provided the following conditions are met for off-site storage:

- .1 The Owner agrees in advance to such off-site storage.
- .2 The locations must be agreed to, in writing, by the Owner and Surety.
- .3 The location must be a bonded warehouse.
- .4 Surety must agree, in writing, to each request for payment.
- .5 The Contractor must bear the cost of the Owner's and Engineer/Consultant expenses related to visiting the off-site storage area, monthly, so long as the material is in storage.
- .6 Payments for materials or equipment stored on or off the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Owner's title to such materials or equipment or otherwise protect the Owner's interest, including applicable insurance (naming the Owner as insured) and transportation to the site for those materials and equipment stored off the site. Under no circumstances will the Owner reimburse the Contractor for down payments, deposits, or other advance payments for materials or equipment.

Add the following Paragraph:

9.3.4 Contractors shall submit applications in quadruplicate using standard American Institute of Architects documents AIA G702 – Applications and Certificate for Payment, and AIA G703 – Continuation Sheets (or computer-generated documents providing same information and specifically approved by the Engineer/Consultant). All blanks in the form must be completed and signatures of Contractor and notary public must be original on each form.

→ **ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

9.6 PROGRESS PAYMENTS

9.6.1 Delete paragraph 9.6.1 in its entirety and substitute the following:

9.6.1 Based upon the applications for payment and supporting documents submitted to the Engineer/Consultant by the Contractor and certification by the Engineer/Consultant, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided in the Contract Documents for the period ending the last day of the month as follows:

-
- .1 Not later than twenty-five days following the end of the period covered by the Application for Payment, **ninety percent** of the portion of the Contract Sum properly allocable to labor, materials, and equipment incorporated in the Work and **ninety percent** of the portion of the Contract Sum properly allocable to materials and equipment suitably stored at the site or at some other locations agreed upon in writing (subject to the conditions listed in Article 9.3.2), for the period covered by the Application for Payment, less the aggregate of previous payments made by the Owner.
 - .2 Upon Substantial Completion of the entire Work, a sum sufficient to increase the total payments to **ninety percent** of the Contract Sum, less such amounts as the Engineer/Consultant shall determine for all incomplete Work and unsettled claims as provided in the Contract Documents.

9.8 SUBSTANTIAL COMPLETION

Add the following subparagraph:

9.8.6 Reference Division 1 section "Contract Closeout" for additional requirements.

→ **9.10 FINAL COMPLETION AND FINAL PAYMENT**

Add the following subparagraphs:

9.10.6 Reference Division 1 section "Contract Closeout" for additional requirements.

9.10.7 Final payment, constituting the entire unpaid balance of the Contract Sum shall be paid by the Owner to the Contractor thirty-one days after Substantial Completion of the work unless otherwise stipulated in the Certificate of Substantial Completion, or reason to the contrary subsequently discovered, provided the work has then been completed, the contract fully performed, and Final Certificate for Payment has been issued by the Engineer/Consultant.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY OF PERSONS AND PROPERTY

Add the following subparagraph:

10.2.2.1 If reasonable safeguard are likely to be inadequate to prevent bodily injury or death to persons resulting from a material or substance encountered on the site by the Contractor, the Contractor shall, upon observing the condition, immediately stop work in the affected area and report the condition to the Owner and Engineer/Consultant in writing.

10.3 HAZARDOUS MATERIALS

Add the following subparagraph:

10.3.4 The Contractor, prior to final payment, shall submit a statement, typed on the company's letterhead, certifying: "To the best of the undersigned's information, knowledge and belief, neither asbestos, asbestos-containing materials, nor PCBs have not been used or incorporated into the Work and neither lead nor lead-bearing materials have not been incorporated into potable water systems." In addition, the Contractor shall obtain such written statements from Subcontractors. All statements shall be signed and notarized.

10.5 Delete paragraph 10.3.6 in it's entirety.

ARTICLE 11 INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

Under paragraph 11.1.1, add the following clauses:

- .9 Liability Insurance shall include all major divisions of coverage and be on a Comprehensive basis including:
 - a. Premises Operations (including X, C, and U coverages).
 - b. Independent Contractor's Protective.
 - c. Products and Completed Operations.
 - d. Personal Injury Liability with Employment Exclusion deleted.
 - e. Contractual, including specified provision for Contractor's obligations under Paragraph 3.18.
 - f. Owned, non-owned and hired motor vehicles.
 - g. Broad Form Property Damage including Completed Operations.
 - h. Cross liability (insured vs. insured) and
 - i. Aggregate Limit shall apply per Location.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- .10. If the General Liability coverages are provided by a Commercial General Liability Policy on a claims-made basis, the policy date or Retroactive Date shall predate the Contract; the termination date of the policy or applicable extended reporting period shall be no earlier than the termination date of coverages required to be maintained after final payment, certified in accordance with Subparagraph 9.10.2.

Under paragraph 11.1.2, add the following:

The insurance required by Subparagraph 11.1.1: Reference Exhibit "A" Insurance Requirements Addendum.

- .10. Provision shall be included for Waiver of Subrogation against the Owner, the Consultant/Engineer and his consultants for all coverages described under subparagraph 11.1.2.

At paragraph 11.1.3, add the following sentence:

Proof of insurance shall be evidenced on an original Certificate of Insurance-Construction, AIA Document G705 2001 edition with an original signature of the Authorized Representative. Policy exclusions and/or restrictions shall be clearly explained on the Certificate or in an attached letter from the issuing Agency. Blank areas on the Certificate shall have "not covered" written across the printed areas when coverage is not provided.

Add the following subparagraphs:

11.1.5 Insurance shall be underwritten by a company rated not less than B + XII in Best's latest published guide, or as otherwise acceptable to the Owner.

11.1.6 The Contractor shall require all direct, major subcontractors and suppliers to obtain and maintain in force during the course of the Work performed hereunder, adequate insurance coverage in accordance with the Contractor's normal practice.

11.3.1.3 Delete item 11.3.1.3 in its entirety and substitute the following:

11.3.1.3 Contractor shall pay costs not covered because of the application of Property Insurance deductibles, but not exceeding Five Thousand Dollars per occurrence.

11.3.1.4 Delete item 11.3.1.4 in its entirety and substitute the following:

11.3.1.4 This Property Insurance shall cover portions of the Work stored off-site in bonded warehouses after written approval of the Owner and the value established in the approval, and also portions of the Work in transit provided the carrier's liability has not been waived.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

11.3.2 Delete paragraph 11.3.2 in its entirety.

11.3.9 Delete the third and fourth sentences in their entirety and substitute the following:

→ The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with mediation and legal proceedings as provided for under paragraph 4.5.

11.3.10 Delete paragraph 11.3.10 in its entirety and substitute the following:

11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, resolution shall be reached through mediation and legal proceedings as provided for under paragraph 4.4.

11.4 PERFORMANCE BOND AND PAYMENT BOND

Add the following subparagraphs:

→ 11.4.3 The Performance Bond Form and Labor and Material Payment Bond Form included herein shall be executed and submitted to the Owner in duplicate, copy to Engineer/Consultant, prior to commencement of the work. The bonding companies must be acceptable to the Owner. Surety companies underwriting Performance and Payment Bonds shall be listed in A.M. Best Company Rating Guide, and shall be rated B+, with Class XII or better. The bonding company shall be licensed in Texas to write this line of business. A reputable insurance agency located within the same county as the project locations, or an adjacent county shall represent the Surety Company in all matters concerning claims or issues of the Project. Bonds shall be original documents, shall have a bond number clearly affixed and shall have the official seal of the bonding company in raised print. Valid bonds shall be delivered to the Owner no later than date of execution of the contract.

→ 11.4.4 Each bond shall be of penal sum equal to 100% of the Contract Sum and shall be compatible with the provisions of the governing authority. The Contractor shall file copies of each bond with the county clerk and furnish the Owner with a file receipt, copy to Engineer/Consultant. The bonds shall remain in force throughout the warranty period of the contract. The work shall not be started until the bonds and issuing companies have been accepted as satisfactory by the Owner. The original bonds shall be delivered to the Owner with and attached authorized power of attorney.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

11.4.5 Claims must be sent to the Contractor and his Surety in accordance with Article 5160, Revised Civil Statutes. The Owner will furnish in accordance with such Article, a copy of the Payment Bond as provided therein to claimants upon request. All claimants are cautioned that no lien exists on the funds unpaid to the Contractor on such contract, and that reliance on notices sent to the Owner may result in loss or their rights against the Contractor and/or his Surety. The Owner is not responsible in any manner to a claimant to collection of unpaid bills, and accepts no such responsibility because of any representation by any agent or employee.

ARTICLE 13 MISCELLANEOUS PROVISIONS

Add the following Subparagraph:

13.5.7 Additional requirements regarding testing laboratory services are enumerated hereinafter in Division 1 section Testing Laboratory Services.

ARTICLE 14 TERMINATION OF SUSPENSION OF THE CONTRACT

14.3.2 Delete the second sentence "Adjustment of the Contract Sum shall include profit."

14.4.3 Delete the phrase "...along with reasonable overhead and profit on the Work not executed".

END OF DOCUMENT 00 73 00

SECTION 01 00 00

GENERAL REQUIREMENTS

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. This Section governs the entire Work. Refer to Construction Documents for additional scope of work.

1.02 MATERIALS AND WORKMANSHIP:

- A. Use materials that are:
 - 1. New and of high quality suited to the use intended.
 - 2. Suitable for the function intended.
 - 3. Corresponding in quality to related materials in the absence of a complete Specification.
 - 4. Of good appearance where exposed to view.
 - 5. Of one manufacturer or source for the same specific purpose, with uniform appearance and physical properties.
 - 6. Plainly marked, and delivered to the site in their original unopened containers when the nature of the materials is suitable for containers.
- B. Follow supplier's instructions for the uses, limitations, and installation of his products. When full instructions do not accompany the products, request them before proceeding.
- C. Perform high quality professional workmanship. Join materials to uniform, accurate fit so they meet with straight lines, free of smears or overlaps.
- D. Install materials appropriately level, plumb, and at accurate right angles or flush with adjoining materials. Attach materials that will not fail until materials joined are broken or permanently deformed.

1.03 MISCELLANEOUS DUTIES:

- A. Layout: Establish and maintain bench marks, and all other grades, lines, and levels necessary for the Work. Report errors or inconsistencies before commencing work. Confirm proper placement of the construction on the Site after all lines are staked out.
- B. Verify existing conditions and their compatibility to the Construction Documents. Variations must be brought to the attention of Engineer/Consultant before proceeding.
- C. Not-in-Contract Work: Arrange to accommodate. When information is inadequate, request further instructions before proceeding.
- D. Access Facilities: Provide safe, reasonably convenient access facilities to the Work for the Owner and authorized inspectors and observers.

ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS

1.04 REPLACEMENT MATERIAL:

- A. For Owner's Future Use: If any specific amounts are called for in the individual sections, provide the specified amounts. If none are specified and a surplus is left, request instructions from Owner before discarding surplus.
- B. The testing laboratory shall be approved by owner and paid for by Contractor for testing requirements as noted in individual specification sections.

END OF SECTION 01 00 00

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

SECTION 01 11 00

SUMMARY OF WORK

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Roof replacement/recover and related renovation work of the existing facility known as Lone Star College CyFair Campus - Arts Building. Work includes, but is not limited to, the following:
1. Area "D":
 - a. Remove and properly dispose of existing roofing, insulation board, and sheet metal down to the existing steel deck and repair existing deck as necessary.
 - b. Install new wood blocking, nailers, and/or plywood at perimeters, curbs, parapet walls, and penetrations.
 - c. Mechanically fastened base insulation into existing metal deck.
 - d. Install successive layers of flat and tapered polyisocyanurate and cover board set in foam adhesive.
 - e. Install new 2-ply modified bitumen membrane.
 - f. Install new modified bitumen membrane flashings at parapet walls, risewalls, and curbs.
 - g. Install new sheet metal copings on parapet wall.
 2. Areas "A", "C", "E", "H", and "I"
 - a. Remove and replace existing roof membrane and insulation in designated areas as denoted on Moisture Survey Plan.
 - b. Install cover board mechanically attached over existing roof membrane to remain.
 - c. Install new 2-ply modified bitumen membrane.
 - d. Install new modified bitumen membrane flashings at parapet walls, risewalls, and curbs.
 - e. Install new sheet metal edge flashing and copings at perimeters.
 - f. Install new pipe supports at designated locations.
 - g. Install new sheet metal counter flashings at curbs, penetrations, and risewalls.
 - h. Raise, lower, or modify all utility lines, piping, equipment, or other items which affect the installation of the new roof system.
 - i. Raise curbs, equipment, etc., as necessary and denoted on roof plan to achieve a minimum flashing height of 8-inches (200mm) above the finished roof.
 - j. Install walk pads at designated areas.
 - k. Install new roof-top tieback anchors at designated locations.
 - l. Install new wall-mounted roof access ladders at designated locations.
 - m. Remove, retain masonry, install new through-wall flashing and re-install masonry at designated rise walls.
 - n. Install new roof hatch with handrail and ladder extension device.
 - o. Remove and re-install/replace and re-certify lightning protection system

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

3. Areas "B", "F", and "G":
 - a. Clean and repair single ply roofs and apply elastomeric coating.
 - b. Remove and re-install/replace and re-certify lightning protection system.
 - c. Replace sealants in ACM panels along perimeters.

1.02 WEATHER PROTECTION:

- A. Upon beginning work on the existing roofs, Contractor shall patch and protect existing roofing as required to prevent leaks.
- B. Contractor shall have at the work site, a sufficient amount of moisture proof coverings to provide quick temporary protection to exposed decking, unfinished/open roof, or open building in the event of a rapid change in the weather.

1.03 CONTRACTOR'S USE OF PREMISES:

- A. Contractor to procure and post all permits required by Harris Count and/or governing entity for scope of work being performed.
- B. Confine operations at site to areas permitted by law, ordinances, permits and to limits of Contract as shown on Contract Documents.
- C. Do not unreasonably encumber site with materials or equipment.
- D. Do not load structure with weight that will endanger structure.
- E. Assume full responsibility for protection and safekeeping of products stored on premises.
- F. Move stored products which interfere with operations of Owner.
- G. Obtain and pay for use of additional storage or work areas needed for operations.
- H. Coordinate use of premises under direction of Owner's Representative.
- I. Use of Site for Work and Storage:
 1. Restrict Work to areas indicated on Drawings.
 2. Store materials off site except for minor amounts of material which may be stored at designated staging area as approved by Owner.
 3. Access site in areas approved by Owner.
 4. Restrict parking to specific areas as approved by Owner.
 5. Restrict debris removal to Owner-approved area of building site.
 6. Do not allow construction traffic on existing roof membrane except as absolutely necessary to perform new work. Provide protection over existing roof membrane at traffic and work areas.
- J. Maintenance of Access and Operations:
 1. Do not perform operations that would interrupt or delay Owner's daily operations.
 2. Maintain access to existing building, facilities, parking, streets, and walkways; especially fire lanes.
 3. Schedule demolition and renovation operations with Owner in such a manner as to allow Owner operations to continue with minimum interruption.
 4. During period of construction, do not obstruct exit ways of Owner-occupied areas in any manner.
- K. Maintenance of Existing Services:
 1. Do not disrupt existing utility services to existing building.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

2. Maintain environmental control in existing building, especially temperature, humidity, and dust control.
- L. Building Access:
 1. Access to roof construction areas shall be by way of exterior ladder and/or scaffolding on the face of the building or as designated by Owner.
 2. Contractor will not have access to building interior except as pre-arranged with Owner.

1.04 OWNER OCCUPANCY:

- A. Owner will occupy premises during period of construction. Cooperate with Owner's Representative in all construction operations to minimize conflict and to facilitate Owner usage. Access to interior will be provided upon prior scheduled notice.
- B. Contractor shall conduct his operations so as to ensure least inconvenience to Owner's operations.
- C. Contractor shall take precautions to avoid excessive noise or vibration that would disturb Owner's operations. When directed by Owner, Contractor shall perform certain operations at designated time in order to minimize disturbance to Owner's operations.
- D. Contractor shall take all necessary precautions to assure a watertight condition in the operation portion of the building during construction.
- E. Refer to Section 01 35 16 for provisions on security, special sequence of Work, maintenance of access and operations, maintenance of existing utilities and services, and building access restrictions.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 11 00

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

SECTION 01 21 00

ALLOWANCES

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Include allowances stated in Contract Documents in the contract sum.
- B. Designate delivery dates for Products specified under each allowance in the construction progress schedule.
- C. Designate quantities of materials required under each unit cost allowance in the Schedule of Values.

1.02 ALLOWANCES FOR PRODUCTS:

- A. Amount of Each Allowance Includes:
 - 1. Cost of product to Contractor or Subcontractor, less any applicable trade discounts.
 - 2. Delivery to site.
 - 3. Labor required under allowance, except when labor is specified to not be included in allowance.
- B. In addition to amount of each allowance, include in contract sum Contractor's costs for:
 - 1. Handling at site, including unloading, uncrating, and storage.
 - 2. Protection from elements and from damage.
 - 3. Labor for installation and finishing where labor is specified to not be a part of allowance.
 - 4. Other expenses required to complete installation.
 - 5. Contractor's and Subcontractor's overhead and profit.

1.03 SELECTION OF PRODUCTS UNDER ALLOWANCES:

- A. Consultant's Duties:
 - 1. Consult with Contractor in consideration of Products and suppliers or installers.
 - 2. Maintain log of unit pricing allowances and quantities.
 - 3. Make selection in consultation with Owner. Obtain Owner's written decision, designating:
 - a. Product, model, and finish.
 - b. Accessories and attachments.
 - c. Supplier and installer, as applicable.
 - d. Cost to Contractor, delivered to site or installed, as applicable.
 - e. Manufacturer's Warranties.
- B. Transmit Owner's decision to Contractor.
 - 1. Prepare Change Orders as required.
- C. Contractor's Duties:
 - 1. Assist Consultant and Owner in determining qualified suppliers or installers.
 - 2. Obtain proposals from suppliers and installers when requested by Consultant.
 - 3. Make appropriate recommendations for consideration of Consultant.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

4. Notify Consultant promptly of:
 - a. Any reasonable objections Contractor may have against any supplier or party under consideration for installation.
 - b. Any effect on Construction Schedule anticipated by selections under consideration.

1.04 CONTRACTOR RESPONSIBILITY FOR PURCHASE, DELIVERY, AND INSTALLATION:

- A. On notification of selection, execute purchase agreement with designated supplier.
- B. Arrange for and process Shop Drawings, Product Data, and Samples, as required.
- C. Make arrangements for delivery.
- D. Upon delivery, promptly inspect products for damage or defects.
- E. Submit claims for transportation damage.
- F. Install and finish products in compliance with requirements of referenced Specification Sections.

1.05 ADJUSTMENT OF COSTS:

- A. Should net cost be more or less than specified amount of allowance, adjust contract sum accordingly by Change Order.
 1. Amount of Change Order will recognize any changes in handling costs at site, labor, installation costs, overhead, profit, and other expenses caused by selection under allowance.
 2. For products specified under unit cost allowance, unit cost shall apply to quantity listed in Schedule of Values.
 3. For products specified under unit allowance, unit cost allowance shall apply to quantities actually used with nominal amount for waste, as determined by receipts, invoices, or by field measurement.
- B. Submit any claims for anticipated additional costs at site, or other expenses caused by selection under allowance, prior to execution of work.
- C. Submit documentation for actual additional costs at site or other expenses caused by selection under allowance within sixty days after completion of execution of Work.
- D. Failure to submit claims within designated time will constitute waiver of claims for additional costs.
- E. At contract closeout, reflect approved changes in contract amounts in final statement of accounting.

1.06 CONSTRUCTION CONTINGENCY:

- A. Include in the Contract amount Construction Contingency Allowance in the amounts shown in Paragraph 3.01.
- B. Construction Contingency Allowance:
 1. Use only to cover cost of hidden, concealed, or otherwise unforeseen conditions that develop during project.
 2. Work which is clearly changed in scope shall be authorized and paid for only by means of change order executed in accordance with established Owner procedures.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

3. Include in Base Bid, profit and overhead to cover amount of contingency, as each contingency authorization processed will not include any profit or overhead for Contractor.
4. Proceed with accomplishing work only after receiving properly executed contingency authorization executed by Owner.
5. Do not bill Owner for any work authorized by this procedure until work has been accomplished.
6. Return to Owner any part of contingency allowance that is not used during construction of project.
7. At completion of project, Contracting Officer will reconcile all work accomplished through properly executed contingency allowance authorizations and provide for refund of any unused portion of contingency to Owner through properly executed change order.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

3.01 SCHEDULE OF ALLOWANCES:

- A. Include an allowance to replace 200 square feet of fluted steel deck in Base Bid.
- B. Include an allowance to repair 400 square feet of fluted steel deck in Base Bid.
- C. Include an allowance to replace a total of 4,000 square feet of existing membrane and insulation down to fluted steel deck at multiple locations as depicted on Sheet R2.05 in Base Bid.
- D. Include an allowance to repair 100 square feet of existing single ply membrane comprised of 100 individual areas 1-ft x 1-ft in size.

END OF SECTION 01 21 00

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS – CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

SECTION 01 22 00

UNIT PRICES

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Unit prices for calculation of work, complete in place, to be added or deleted from the project.

1.02 MEASUREMENT AND PAYMENT:

- A. It is the intent of the Proposal Form that aggregate proposal amount as submitted shall cover work required by Contract Documents in place, complete, and ready for use.
- B. Unit prices include costs to fully complete work in place, including providing labor, materials, tools, equipment, services, supplies, incidentals, necessary operations, profit, taxes, overhead, maintenance, and warranties.
- C. No costs in connection with work required by Contract Documents for proper and successful completion of Contract will be paid outside of or in addition to prices submitted.
- D. Work not specifically set forth as pay items shall be considered subsidiary obligations of Contractor and costs shall be included in prices named.
- E. Method of measurement and basis of payment shall be as stipulated in following paragraphs.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

3.01 UNIT PRICE ITEMS:

<u>Item</u>	<u>Unit</u>
1. Wood Nailers:	
2 x 4 wood nailer:	Per linear foot
2 x 6 wood nailer:	Per linear foot
2 x 8 wood nailer:	Per linear foot
2 x 12 wood nailer:	Per linear foot

ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS – CENTER FOR ARTS BUILDING
CYPRESS, TEXAS

3. Replace Cast Iron Roof Drain Bowl: Each
4. Remove masonry and install new through-wall flashing Per Linear Foot
5. Roof Deck: Remove, replace, and/or repair damaged/deteriorated decking, matching existing type, weight, gauge, and dimension:
 - a. Metal Deck Replacement: Per Square Foot
 - b. Metal Deck Repair: Per Square Foot
6. Remove/replace membrane and wet insulation Per Square Foot
7. Repair single ply membrane Per Square Foot

3.02 AUTHORIZATION, RECORD KEEPING, AND PAYMENT FOR UNIT PRICE ITEMS:

- A. Consultant's Field Representative will authorize Contractor when Unit Price Items are to be installed by Contractor. No payment will be made for any Unit Price Items installed by Contractor that is not authorized by Consultant's Field Representative or Owner.
- B. Consultant's Field Representative will maintain a record of all installed Unit Price Items and this record shall be utilized to produce the Change Order to include the Unit Price Items in Contractor's contract.

END OF SECTION 01 22 00

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

SECTION 01 31 19

PROJECT MEETINGS

PART ONE - GENERAL

1.01 PRE-CONSTRUCTION MEETING:

- A. A Pre-construction Meeting will be held at the site at a time to be designated by Owner.
- B. Representatives of Contractor, including project superintendent, foreman, and any subcontractors, shall meet with Owner or his appointed representative.

1.02 AGENDA FOR PRE-CONSTRUCTION MEETING

- A. Meet with Owner and Engineer at project site or other designated locations at such intervals as directed by Owner to maintain an optimum degree of communications between all interested parties, including selected subcontractors and suppliers, at such times as their interests may be involved.
- B. Attendance:
 - 1. Owner's Representative.
 - 2. Consultants/Engineer's Representative.
 - 3. Contractor.
 - 4. Subcontractors.
- C. Sign-in list for attendees including names, contact information, and company name.
- D. Contract Review: Project communications and problem resolution.
- E. Job Site Conditions and Requirements:
 - 1. Services (temporary):
 - a. Water.
 - b. Power.
 - c. Sanitary facilities.
 - d. Parking areas.
 - 2. Site Access and Restrictions:
 - a. Set-up areas, material storage, and handling.
 - b. Protection of buildings, grounds, and building interior.
 - 3. Working Area and Preparation:
 - a. Review work flow and schedule.
 - b. Preparation work.
 - c. Protection of existing building.
- F. Technical Sections:
 - 1. Function of project personnel.
 - 2. Material storage.
 - 3. Coordination of work.
 - 4. System review.
 - 5. Manufacturer inspections.
- G. Safety and Security - Review Contractor responsibilities, and establish Owner monitoring procedures.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

1.03 AGENDA FOR PROJECT MEETING

- A. Attendance:
 - 1. Owner (Representative, if desired by Owner).
 - 2. Consultant/Engineer's Representative.
 - 3. Contractor.
 - 4. Subcontractors.
- B. Sign-in list for attendees, including names, contact information, and company name.
- C. Project Review:
 - 1. Problem resolution.
 - 2. Project communication.
 - 3. Review projected work flow and schedule.
 - 4. Progress payment processing.
- D. Job Site Conditions:
 - 1. Review set-up area, material storage, and handling.
 - 2. Review work to date against schedule.
 - 3. Review quality of work to-date.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 31 19

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Submittals required by Specification Sections and as listed in attached List of Submittals.

1.02 REQUIRED SUBMITTALS:

- A. Applicator's License Certificate: Copy of the material manufacturer's agreement/contract indicating date application was approved and expiration date.
- B. Copy of the Contractor's executed insurance certificate.
- C. Material manufacturer's roof assembly letter indicating approval/acceptance of specified roof system including roof system components, general installation requirements, performance criteria of proposed systems, warranty to be issued for project, and referencing supporting test data/reports.
- D. Copy of the Contractor's executed payment and performance bonds.
- E. Shop drawings of details.
- F. Manufacturer's product data sheets and Material Safety Data Sheets (MSDS) on each material proposed for usage.
- G. Sample of warranties that are to be issued upon project completion.
- H. Submit list of subcontractors.
- I. Detailed project schedule showing work phasing and proposed daily progress schedule together with annotated roof plan depicting anticipated daily progress.
- J. Permits, notices, and approvals of governing bodies or agencies.

1.03 SHOP DRAWINGS:

- A. Prepare shop drawings for those details that are proposed for the project. Indicate on a plan/elevation, the proposed location of detail presented on shop drawing.
- B. Indicate joints, types, and locations of fasteners, shapes, sizes, expansion joints, special conditions, and installation procedures for each flashing condition. Note critical dimensions, gauge, and finish of sheet metal for each flashing condition.
- C. Submit shop drawings showing layout, joining, profiles, and anchorages of fabricated work, including flashings and trim.

1.04 PRODUCT DATA:

- A. Submit manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other standard descriptive data for each material proposed for use in construction of roof assembly and related flashings and components.
 - 1. Clearly mark each copy to identify pertinent materials, products, or models.
 - 2. Show dimensions and clearances required.
 - 3. Show performance characteristics and capacities.
 - 4. Indicate the Specification Section that applies to each submittal.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

1.05 SAMPLES:

- A. Physical examples to illustrate materials, equipment, and workmanship; and to establish standards by which completed Work is judged, if requested.

1.06 CONTRACTOR RESPONSIBILITIES:

- A. Review shop drawings, product data, and samples prior to submission. Initial, sign, or stamp, certifying the Contractor's review of the submittal.
- B. Verify:
 - 1. Field measurements.
 - 2. Field construction criteria.
 - 3. Catalog numbers and similar data.
- C. Coordinate each submittal with requirements of Work and of Contract Documents.
- D. Contractor's responsibility for errors and omissions in submittals is not relieved by Consultant review of submittals.
- E. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by the Consultant/Engineer's review of submittals, unless Consultant gives written acceptance of specific deviations.
- F. Notify Consultant, in writing at time of submission, of deviations in submittals from requirements of Contract Documents.
- G. Do not begin work which requires submittals until return of submittals with Consultant/Engineer's stamp and initials or signature indicating review and indication to proceed as noted. Work performed prior to submission and approval of submittals may be subject for rejection.

1.07 SUBMISSION REQUIREMENTS:

- A. Schedule submissions to the Consultant after Contract award.
- B. Submit electronic submittals.
- C. Submit two of each sample requested.
- D. Accompany submittals with transmittal containing:
 - 1. Date.
 - 2. Project title and number.
 - 3. Contractor's name and address.
 - 4. The number of each submittal.
- E. Provide submittals compiled together with a Cover and Table of Contents.

1.08 RE-SUBMISSION REQUIREMENTS:

- A. Product Data and Samples: Submit new data and samples as required for initial submittal.
- B. Shop Drawings:
 - 1. Revise initial drawings as required and re-submit as specified for initial submittal.
 - 2. Indicate on drawings any changes which have been made other than those requested by Owner.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

1.09 DISTRIBUTION OF SUBMITTALS AFTER REVIEW:

- A. Consultant will retain copy of approved submittals.
- B. Consultant will forward copy of approved submittals to Owner.
- C. Consultant will return approved copy to Contractor.
- D. Contractor shall distribute copy of submittals which carry Consultant/Engineer's stamp as required for construction, including Contractor's file, jobsite file, subcontractors, suppliers, and fabricators.

1.10 LIST OF SUBMITTALS:

SECTION 01 33 00 - SUBMITTAL PROCEDURES

- Submittals – Submit documents electronically and submit 2 of each product sample.

SECTION 01 70 00 - EXECUTION AND CLOSEOUT REQUIREMENTS

- Warranties and Bonds.
- Evidence of Payment and Release of Liens.

SECTION 02 07 20 - MINOR DEMOLITION AND RENOVATION WORK

- Product Data and MSDS.
- Samples of all fasteners proposed for use.

SECTION 05 51 33 - LADDERS

- Product Data.
- Shop Drawings.

SECTION 07 22 16 - ROOF BOARD INSULATION

- Product Data and MSDS.
- Shop Drawings, where applicable.
- Samples, if requested.
- Manufacturer's Installation Instructions.

SECTION 07 52 00 - MODIFIED BITUMEN MEMBRANE ROOFING

- Product Data and MSDS.
- Shop Drawings, where applicable.
- Samples, if requested.
- Manufacturer's Installation Instructions.
- Sample Warranty.
- Roof system manufacturer's documentation that proposed roof system will meet or exceed wind uplift pressure requirements.

ROOF REPLACEMENT

LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING CYPRESS, TEXAS

SECTION 07 54 00 - FLUID-APPLIED ROOF COATING

- Product Data and MSDS.
- Samples, if requested.
- Manufacturer's Installation Instructions.
- Sample Warranty.

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

- Product Data and MSDS.
- Shop Drawings, where applicable.
- ANSI/SPRI/FM 4435 ES-1 certification criteria.
- Color Chart and Color Samples.
- Sample Warranty.

SECTION 07 72 00 - TIEBACK ANCHORS

- Product Data and SDS.
- Roof plan of layout.
- Shop drawings.

SECTION 07 92 00 - JOINT SEALANTS

- Product Data and MSDS.
- Samples, if requested.
- Color Chart.
- Sample Warranty.

SECTION 09 91 00 - EXTERIOR PAINTING

- Product Data and MSDS.
- Color Samples.

SECTION 26 41 00 - LIGHTNING PROTECTION SYSTEM

- Product Data and MSDS.
- Roof plan of lightning protection layout.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 33 00

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

SECTION 01 35 16

ALTERATION PROJECT PROCEDURES

PART ONE - GENERAL

1.01 DESCRIPTION:

- A. Summary: The procedures and administrative requirements of this Section apply to all of the following Sections of the Specification which are involved in alterations to the existing building.
- B. Extent Notes: Cut into or partially remove portions of the existing building as necessary to make way for new construction. Include such work as:
 - 1. Cutting, moving, or removal of items shown to be cut, moved, or removed.
 - 2. Cutting, moving, or removal of items not shown to be cut, moved, or removed, but which must be cut, moved, or removed to allow new work to proceed. Work or items which are to remain in the finished work shall be patched or reinstalled after their cutting, moving, or removal, and their joints and finishes made to match adjacent or similar work.
 - 3. Removal of existing surface finishes as needed to install new work and finishes.
 - 4. Removal of abandoned items and removal of items serving no useful purpose, such as abandoned piping.
 - 5. Repair or removal of dangerous or unsanitary conditions resulting from alterations work.

1.02 SCHEDULING AND ACCESS:

- A. Work Sequence: Contractor shall submit detailed project plan with work sequence and phasing schedule.
- B. Security:
 - 1. Be solely responsible for job site security.
 - 2. Protect completed work and stored items from vandalism and theft.
 - 3. Contact Owner for access to all security areas.
- C. Maintenance of Access and Operations:
 - 1. During period of construction, Owner will continue to occupy the building and perform normal activities in existing building. Maintain proper and safe access to Owner-occupied areas at all times.
 - 2. Schedule demolition and remodeling operations with Owner in such a manner as to allow Owner operations to continue with minimum interruption.
 - 3. During period of construction, do not obstruct existing exit ways of Owner-occupied areas in any manner.
- D. Maintenance of Existing Services:
 - 1. Maintain environmental control in existing building, especially temperature, humidity, and dust control.
 - 2. Provide temporary lines and connections as required to maintain existing mechanical and electrical services in building.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

3. Equipment handling shall be limited to Owner-approved hours.
 4. Notify Owner a minimum of forty-eight hours prior to each required interruption of mechanical or electrical service in building. Such interruptions shall be only at such times and for lengths of time as approved by Owner. In no event shall interruption occur without prior approval of Owner.
- E. Temporary Barricades:
1. Provide and erect barricades as necessary to protect ground personnel, employees, passersby, etc., from hazards resulting from the Work during construction operation.
 2. Prevent public access to construction activities, equipment, and storage areas.
- F. Building Access:
1. Contractor will limit access to building interior except:
 - a. To install temporary enclosures, protections, and equipment.
 - b. During roof vent handling operations.
 - c. For designated work at interior locations.
 - d. For project or medical emergency.
 2. Access to roof construction areas shall be by way of contractor-provided exterior ladder or interior access way as pre-approved by Owner for construction personnel.

1.03 ALTERATIONS, CUTTING, AND PROTECTION:

- A. Extent:
1. Perform cutting and removal of work so as not to cut or remove more than is necessary and so as not to damage adjacent work.
 2. Conduct work in such a manner as to minimize noise and to minimize accumulation and spread of dirt and dust.
 3. Perform cutting for openings with carborundum saw with approved dust arrestor.
- B. Securement of Openings: Protect all openings made in existing building with barricades to prevent accidents to Owner's and Contractor's personnel. If required by Owner, provide a workman at ground level inside the building at all times during the tear-off operations and when the work is being performed. It will be the responsibility of this individual to alert personnel in the area of the work being performed overhead, to watch for falling debris, and to broom clean the area each day of any dirt that may result from the work operations.
- C. Responsibility and Assignment of Trades:
1. Contractor shall assign the work of moving, removal, cutting, patching, and repair to trades under his supervision so as to cause the least damage to each type of work encountered, and so as to return the building as much as possible to the appearance of new work.
 2. Patching of finish materials shall be assigned to mechanics skilled in the work of the finish trade involved.
- D. Protection:
1. Protect remaining finishes, equipment, and adjacent work from damage caused by cutting, moving, removal, and patching operations. Protect surfaces which will remain a part of the finished work.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

2. Cover existing walls and floors where necessary to prevent damage from construction operations.
 3. During demolition, cutting, and construction, provide positive dust control by wetting dusty debris and by completely sealing openings to Owner-occupied areas with temporary seals so as to prevent spread of dust and dirt to interior areas.
 4. After materials are installed, properly protect Work until final acceptance.
 5. Repair any damage resulting from construction operations without cost to Owner.
 6. Provide continuous security at openings cut into existing exterior walls and roofs during non-working hours. Prevent unauthorized entry into the existing facility through areas demolished or accessed as part of the Work.
- E. Special Protection:
1. Comply with welding and cutting precautions specified in Section 01 50 00 - Temporary Facilities and Controls. In addition, provide Type I fire retardant enclosure around area of welding.
 2. Provide temporary weather protection over open roof penetrations until final flashing is completed.
 3. During equipment handling, provide a roof applicator at project with sufficient materials for temporary patching and sealing.
 4. Provide roof applicator at jobsite continuously during rainstorms which may occur while job is in progress to make temporary or emergency repairs.
- F. Debris:
1. Remove debris from the site daily. Removed material becomes property of the Contractor. Load removed material directly on trucks for removal from site. Dispose of removed material legally. Do not allow debris to enter sewers.
 2. Do not allow material accumulations to endanger structure.
 3. Cover and secure material accumulations as necessary to prevent the material from spreading over the rooftop or becoming airborne.
 4. Submit material storage and disposal plan for review prior to job start.

1.04 PATCHING, EXTENDING, AND MATCHING:

- A. Patch and extend existing work using skilled mechanics that are capable of matching the existing quality of workmanship. The quality of patched or extended work shall not be less than that which exists.
- B. In areas where any portion of an existing finished surface is damaged, lifted, stained, or otherwise made or found to be imperfect, patch or replace the imperfect portion of the surface with matching material.
- C. Provide adequate support or substrate for patching of finishes.
- D. Quality:
 1. In the Sections of the product and execution of Specifications which follow these General Requirements, no concerted attempt has been made to describe each of the various existing products that must be used to patch, match, extend, or replace existing work. Obtain all such products in time to complete the Work on schedule. Such products shall be provided in quality which is in no way inferior to the existing products.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

2. The quality of the products that exist in the building, as apparent during pre-bid site visits, shall serve as the Specification requirement for strength, appearance, and other characteristics.
- E. Transitions:
 1. Where new work abuts or finishes flush with existing work, make the transition as smooth and workmanlike as possible. Patched work shall match existing adjacent work in texture and appearance so as to make the patch or transition invisible to the eye at a distance of no closer than 3 feet (1m).
 2. Where masonry or other finished surface is cut in such a way that a smooth transition with new work is not possible, terminate the existing surface in a neat fashion along a straight line at a natural line of division and provide trim appropriate to the finished surface.
- F. Restore existing work that is damaged during construction to a condition equal to its condition at the time of the start of the Work, and to satisfaction of Owner.

1.05 REPAIR:

- A. Replace work damaged in the course of alterations, except at areas approved by Owner for repair.
- B. Where full removal of extensive amounts of almost-suitable work would be needed to replace damaged portions, then filling, straightening, and similar repair techniques, followed by finishing, will be permitted.
- C. If the repaired work is not brought up to the standard for new work, Owner will direct that it be cut out and replaced with new work.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 35 16

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

SECTION 01 43 00

QUALITY REQUIREMENTS

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. General Quality Control.
- B. Manufacturers' Field Services.

1.02 QUALITY CONTROL, GENERAL:

- A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce work of specified quality.
- B. Contractor shall be approved by manufacturer to perform the work for the specified guarantee period. Contractor shall have completed previous projects utilizing same materials and provide same warranty as specified herein.
- C. Examine each phase of Work and have defective conditions corrected before starting subsequent operations which would cover, or are dependent upon, work in question.
- D. Where visual examination is not sufficient, use instruments with qualified operators to examine work.
- E. Utilize Owner's testing laboratory when services are necessary to assist Contractor in evaluating quality.

1.03 WORKMANSHIP:

- A. Comply with industry standards, except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
- B. Utilize qualified personnel who have experience with the specified materials to produce workmanship of specified quality.
- C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.
- D. Provide finishes to match accepted samples.

1.04 MANUFACTURER'S FIELD SERVICES:

- A. When specified in respective Specification Section, require manufacturer to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, and to make appropriate recommendations.
- B. Notify manufacturer's representative a minimum of two weeks prior to date of final inspection. Manufacturer's representative shall conduct an inspection of the completed roof before the final inspection, or shall attend the final inspection.

PART TWO - PRODUCTS

Not Used.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 43 00

SECTION 01 43 39

MOCK-UPS

PART ONE - GENERAL

1.01 DESCRIPTION:

- A. Preparation of mock-ups representing proposed finished roofing, flashing, and sheet metal assemblies for review and approval.

1.02 QUALITY ASSURANCE:

- A. Contractor to prepare mock-ups utilizing materials proposed for the finished product and to simulate the desired appearance of the finished product.
- B. Construct mock-ups at locations on the building for review.
- C. Mock-ups shall be of appropriate size to depict finishes and connections.
- D. Materials, finishes, thickness, attachments, dimensions, and profiles shall be as specified herein and as shown within the project.
- E. Owner or Owner's Representative reserves the right to require any modifications deemed necessary. No requests for extra costs will be entertained unless an upgrade of the original design is involved.
- F. Mock-ups shall constitute standard of acceptance for remaining work.

1.03 SCHEDULE OF MOCK-UPS:

- A. Typical metal edge/fascia conditions; size 10 feet minimum; 2 color options.
- B. Typical metal coping; size 10 feet minimum; 2 color options.
- C. Typical counter flashing; size 10 feet minimum.
- D. Typical through-wall flashing; size 10 feet minimum.
- E. Typical sealant joint; size 2-feet; 2 color options.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 43 39

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART ONE - GENERAL

1.01 SANITARY FACILITIES:

- A. Provide adequate temporary chemical toilets at time Work is commenced.
- B. Maintain facilities in compliance with applicable health laws and regulations. Keep clean and unobtrusive.
- C. Upon completion of Work, remove these facilities and all traces thereof.

1.02 STORAGE OF MATERIALS:

- A. Provide suitable non-combustible, watertight coverings for storage of materials subject to damage by weather. Covering shall be of sufficient size to hold materials required on site at one time. Pallets shall be raised at least 6-inches (150mm) above ground, on heavy joists or sleepers.
- B. If temporary storage sheds are used, locate storage areas where directed, maintain in good condition, and remove storage sheds when so directed. Locate storage areas of combustible construction a minimum of 30 feet (10m) from existing building.
- C. Store materials off site as necessary due to space limitations on the subject site.
- D. Cover and protect materials subject to damage by weather, including during transit.
- E. Do not use building as storage facility.
- F. Provide additional storage at no cost to Owner in the event that additional storage area is required beyond that provided at project site.
- G. Stored materials shall be available for inspection by Owner at all times.
- H. Store flammable and volatile liquids in sealed containers located a minimum of 20 feet from existing buildings.
- I. Transport flammable or volatile liquids in, and use from, U.L. listed safety cans.
- J. Remove flammable or volatile liquids away from building at the end of each day.
- K. Deliver material and equipment in manufacturer's original packaging with all tags and labels intact and legible. Handle and store material and equipment in such a manner as to avoid damage. Liquid products shall be delivered sealed, in original containers. Store roll goods in an upright position.
- L. Proper storage of materials is the sole responsibility of Contractor. Protect all materials susceptible to moisture including, but not limited to, all roll goods, insulation, cant strip, wood, and plywood in dry, above ground, watertight storage. Keep all labels intact and legible, clearly showing the product, manufacturer, and other pertinent information.
- M. Reject any materials becoming wet or damaged and remove from the jobsite immediately. Any insulation found to be improperly stored at the jobsite shall be considered wet at the discretion of Owner's Representative and removed from the jobsite.
- N. Maintain products liable to degrade as a result of being frozen above 40 degrees Fahrenheit (4 degrees Celsius) in heated storage.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- O. Random samples of all materials susceptible to moisture will be taken at various stages of the installation to ensure no significant variations in moisture.
- P. Distribute material, debris, and equipment over the roof deck to avoid damage to the structural deck. Place materials and equipment to be stored on the roof as nearly direct over structural members as can be determined. Secure equipment, material, and debris on the roof to prevent movement by wind or other elements. Contractor assumes full responsibility for loading on the structural deck or roofing materials during roof replacement operations. Owner's Representative reserves the right to reject any loadings deemed unacceptable.
- Q. Remove from site and/or secure material during times of inclement weather.

1.03 TEMPORARY WATER:

- A. Contractor will arrange service and pay for all water service required for building purpose.
- B. Provide hoses for conveyance. Provide all necessary temporary piping and fixtures.

1.04 TEMPORARY ELECTRICAL ENERGY:

- A. Contractor will arrange and pay for all electricity required for building purposes.
- B. Provide all necessary temporary wiring (in conduit if requested by Owner), extensions, and temporary lighting devices.

1.05 TEMPORARY LADDERS, SCAFFOLDS, HOISTS:

- A. Furnish and maintain temporary ramps, scaffolds, hoists, or chutes as required for proper execution of Work.
- B. Such apparatus, equipment, and construction shall meet requirements of applicable federal, state, and local safety and labor laws.

1.06 GUARDRAILS, BARRICADES, AND TEMPORARY COVERINGS:

- A. Provide barricades as required to protect natural resources, site improvements, existing property, adjacent property, and passers-by.
- B. Where pedestrian traffic is through or adjacent to work areas, provide necessary guardrails and barricades to protect pedestrians and to prevent pedestrian access to Work areas.
- C. Provide overhead protection for all building entrances and exits when work is performed above or adjacent to the subject exit/entrance.
- D. Provide suitable temporary watertight coverings over roof openings as required to protect interior equipment from inclement weather.
- E. Provide suitable protection for stairs, elevator, and/or walls and floors in areas used for contractor roof access.
- F. Provide temporary 6-foot (2m) chainlink fence around setup areas.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

1.07 PROTECTION:

- A. Maintain bench marks, monuments, and other reference points. If disturbed or destroyed, replace as directed.
- B. Protect existing adjacent streets, sidewalks, curbs, buildings, and property including trees, lawns, and plants.
- C. Refer to Section 01 35 16 for protection requirements of existing building.

1.08 TEMPORARY FIRE PROTECTION (Alternate No.1):

- A. During construction, Contractor and his subcontractors and sub-subcontractors and their agents and employees shall comply with fire safety practices as outlined in NFPA Pamphlet 241 and local fire protection codes, and in addition shall:
 - 1. Provide following stored pressure extinguishers during entire construction period:
 - a. One U.L. rating 4A-60B:C dry chemical fire extinguisher.
 - b. One U.L. rating 2A 2-1/2 gallon water fire extinguisher.
 - c. One U.L. rating 10B:C carbon dioxide fire extinguisher with horn and hose assembly.
 - 2. Provide fire extinguishers together in each of following areas:
 - a. Each 3000 square feet of work area or fraction thereof.
 - b. Each temporary structure including construction office and storage and tool and workshop sheds.
 - 3. Contractor's superintendent or other assistant superintendents shall be appointed as project fire warden for entire construction period.
 - 4. Train workmen in proper use of each type fire extinguisher.
 - 5. Post telephone number of fire department, specific information regarding location of on-site fire fighting equipment, and procedures to be followed in event of fire.
 - 6. Maintain free access at all times to fire extinguisher equipment, street fire hydrants, and outside connections for standpipe hose systems.
 - 7. Maintain all exit facilities and access thereto, free of material and other obstructions.
 - 8. Fire extinguishers will be inspected and labeled yearly by a qualified licensed firm.
 - 9. Fire extinguishers to be inspected and recorded monthly per Fire Marshals Requirements.

1.09 TEMPORARY AIR FILTRATION:

- A. During construction, place charcoal filters over the air handler intake ducts to prevent odors from entering the hospital conditioned spaces.

1.10 EMPLOYEE CONTROL:

- A. Do not allow construction employees to enter Owner-occupied areas. Maintain construction traffic in designated access routes.
- B. Smoking is not allowed in or on College property.

1.11 PARKING FACILITIES:

- A. On-site parking is limited and may not be available for contractor's use.

ROOF REPLACEMENT

LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING CYPRESS, TEXAS

1.12 CLEANING DURING CONSTRUCTION:

- A. Oversee cleaning and ensure that building and grounds are maintained free from accumulations of waste materials and rubbish.
- B. Sprinkle dusty debris with very fine water mist to control accumulation of dust. Do not use water in quantity so as to puddle.
- C. At not less than every day during progress of work, clean up work areas and access areas and dispose of waste materials, rubbish, and debris.
- D. At Contractor's option, on-site dump containers may be used for collection of waste materials, rubbish, and debris. Locate containers a minimum of 30 feet (10m) away from building entrances at a location acceptable to Owner. If used, remove containers when filled.
- E. Do not allow waste materials, rubbish, and debris to accumulate and become an unsightly or dangerous condition.
- F. Remove waste materials, rubbish, and debris from site and legally dispose of at public or private dumping areas off Owner's property.
- G. Keep streets and access to site free of rubbish and debris.
- H. Lower waste materials in a controlled manner with as few handlings as possible. Do not drop or throw materials from heights.
- I. Secure roof access at all times.

1.13 LEAK (WATER) DAMAGE CONTROL:

- A. In the event of rain during construction operations, immediately inspect interior of building for leaks.
- B. Coordinate with Owner for access to building.
- C. Continue to inspect building on a regular basis until rain ceases.
- D. If leaks are discovered during rains, immediately cover and protect equipment with fire retardant sheeting in the area of the leak. Immediately notify Owner of leak condition.
- E. Perform emergency repairs to stop leaks.
- F. Take all necessary precautions to protect the existing building finishes from damage. Repair all new areas of damage caused by the negligence of Contractor, at Contractor's expense. Owner's On-site Representative shall determine damage caused by Contractor negligence.

1.14 PERMITS:

- A. Obtain and pay for all required local and state permits, licenses, and registrations. Work may be subject to ordinances, laws, codes, and regulations.
- B. Prior to bidding, notify Owner and Consultant of any violation, omission, or questions of compliance. Required corrections to Specifications will be made via Addenda prior to receipt of Bids.
- C. Be responsible for full compliance and bear cost of additional work not specified that may be required by authorities having jurisdiction.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

1.15 REGULATORY REQUIREMENTS:

- A. International Building Code (IBC), latest edition; as amended by Harris County and/or governing entity.
- B. Occupation Safety and Health Administration (OSHA) requirements, as applicable.
- C. United States Environmental Protection Agency (EPA) requirements, as applicable.
- D. Adhere to all limitations, cautions, and regulatory standards referenced by the manufacturer of each material provided.
- E. Adhere to all items within Lone Star College System "Contractor Safety Requirements".

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 50 00

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Material and Equipment Incorporated Into Work:
 - 1. Conform to applicable specifications and standards.
 - 2. Comply with size, make, type, and quality specified, or as specifically approved in writing by Owner.
 - 3. Manufactured and Fabricated Products:
 - a. Design, fabricate and assemble in accordance with recognized industry standards.
 - b. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.
 - c. Two or more items of same kind shall be identical, by same manufacturer.
 - d. Products suitable for service conditions.
 - e. Adhere to equipment capacities, sizes, and dimensions shown or specified unless variations are specifically approved in writing.
- B. Do not use material or equipment for purposes other than that for which it is designed or is specified.

1.02 REUSE OF EXISTING MATERIAL:

- A. Except as specifically indicated or specified, materials and equipment removed from existing structure shall not be used in completed Work.
- B. For material and equipment specifically indicated or specified to be reused in Work:
 - 1. Use special care in removal, handling, storage, and reinstallation to assure proper function in completed Work.
 - 2. Arrange for transportation, storage, and handling of products which require off-site storage, restoration, or renovation. Pay costs for such work.

1.03 MANUFACTURER'S INSTRUCTIONS:

- A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in installation, including two copies to Consultant.
 - 1. Maintain one set of complete instructions at jobsite during installation and until completion.
 - 2. Submit two copies to Consultant with appropriate Product Data submittal.
 - 3. Consultant will forward one copy to Owner.
- B. Handle, install, connect, clean, condition, and adjust products in strict accordance with such instructions and in conformity with specified requirements.
 - 1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Consultant for further instructions.
 - 2. Do not proceed with work without clear instructions.

ROOF REPLACEMENT

LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING CYPRESS, TEXAS

- C. Perform Work in accordance with manufacturer's instructions. Do not omit preparatory steps or installation procedures unless specifically modified or exempted by Contract Documents.

1.04 TRANSPORTATION AND HANDLING:

- A. Arrange deliveries of products in accordance with construction schedules. Coordinate to avoid conflict with work and conditions at site.
 - 1. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
 - 2. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that products are properly protected and undamaged.
- B. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

1.05 SUBSTITUTIONS AND PRODUCT OPTIONS:

- A. Contractor's Options:
 - 1. For products specified only by reference standard, select any product meeting that standard, by any manufacturer.
 - 2. For products specified by naming several products or manufacturers, select any product and manufacturer named.
 - 3. Products specified by naming only one product and manufacturer shall be interpreted as mandatory work requirement. For products other than the named product, substitution will be considered only as per conditions of contract.
- B. Contractor's Representation: Request for substitution constitutes a representation that Contractor:
 - 1. Has investigated proposed product and determined that it is equal to or superior in all respects to that specified.
 - 2. Will provide same warranties for substitution as for product specified.
 - 3. Will coordinate installation of accepted substitution into Work and make such other changes as may be required for Work to be complete in all respects.
 - 4. Waives all claims for additional costs, under his responsibility, related to substitution which subsequently becomes apparent.
- C. Substitutions will be not be considered if:
 - 1. They are indicated or implied on Shop Drawings or Product Data submittals without formal request submitted in accordance with this Section.
 - 2. They are submitted after time limit specified above.
 - 3. Acceptance will require substantial revision of Contract Documents.
- D. Owner's decision shall be final.

PART TWO - PRODUCTS

Not Used.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 60 00

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART ONE - GENERAL

1.01 GENERAL:

- A. Comply with requirements stated in Conditions of the Contract and in Specifications for administrative procedures in closing out the Work.

1.02 SUBSTANTIAL COMPLETION:

- A. Contractor: Shall notify Engineer/Consultant that Project is substantially complete and schedule time for inspection.
- B. Engineer/Consultant will make an inspection after notification.
- C. Should Engineer/Consultant consider Work not complete:
 - 1. He will immediately notify Contractor, in writing, stating reasons.
 - 2. Contractor shall complete Work and send second written notice to Engineer/Consultant certifying Project is substantially complete.
 - 3. Engineer/Consultant will reinspect Work.

1.03 FINAL INSPECTION:

- A. Contractor shall submit written certification that:
 - 1. Contract Documents have been reviewed.
 - 2. Project has been inspected for compliance with Contract Documents.
 - 3. Work has been completed in accordance with Contract Documents.
 - 4. Equipment and systems have been tested in presence of Owner's Representative and are operational.
 - 5. Project is complete and ready for final inspection.
- B. Engineer/Consultant will make final inspection after notification from Contractor.
- C. Should Engineer/Consultant consider Work complete in accordance with requirements of Contract Documents, he will request Contractor to make Project Closeout submittals.
- D. Should Engineer/Consultant consider Work not complete:
 - 1. He will notify Contractor in writing, issuing inspection list to Contractor with noted items requiring further consideration.
 - 2. Contractor shall take immediate steps to remedy the stated deficiencies and submit initialed inspection list with photographic documentation of completed items to Engineer/Consultant certifying Work is complete.
 - 3. Engineer/Consultant will reinspect Work.

1.04 REINSPECTING COSTS:

- A. Should Engineer/Consultant be required to perform subsequent inspections of the Work due to the failure of the Contractor to correct deficient work, Owner will compensate Engineer/Consultant for additional services and deduct amount paid to Engineer/Consultant from the final payment to Contractor.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

1.05 CLOSE-OUT SUBMITTALS:

- A. Evidence of compliance with requirements of governing authorities.
- B. Warranties and Bonds: Refer to requirements of this Section.
- C. Evidence of Payment and Release of Liens: Refer to requirements of General and Supplementary Conditions.
- D. Consent of Surety.
- E. As-built Drawings.

1.06 WARRANTY/GUARANTEE:

- A. Submit original and duplicate copies of both Contractor's Warranty and Manufacturer's Guarantee to Engineer/Consultant for review. After review, Engineer/Consultant will forward Warranty and Guarantee to Owner. Engineer/Consultant shall approve final pay application (retainage) upon receipt of both Contractor's Warranty and Manufacturer's Guarantee.

1.07 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS:

- A. Final Release and Waiver of Liens:
 - 1. Contractor's Waiver of Liens.
 - 2. Separate waivers of liens for subcontractors, suppliers, and others with lien rights against property of Owner, together with complete list of those parties.
- B. All submittals shall be notarized and sealed before delivery to Engineer/Consultant.

1.08 FINAL ADJUSTMENT OF ACCOUNTS:

- A. Submit final statement of accounting to Engineer/Consultant.
- B. Statement shall reflect all adjustments.
 - 1. Original Contract Sum.
 - 2. Additions and Deductions resulting from:
 - a. Previous Change Orders.
 - b. Deductions for uncorrected Work.
 - c. Deductions for Reinspection Payments.
 - 3. Total Contract Sum, as adjusted.
 - 4. Previous payments.
 - 5. Sum remaining due.
- C. Engineer/Consultant will prepare final Change Order, reflecting approved adjustments to Contract Sum not previously made by Change Orders.

1.09 FINAL APPLICATION FOR PAYMENT:

- A. Submit final application in accordance with requirements of General Conditions.
- B. Owner and Engineer/Consultant shall review all data supplied for conformance with Contract Documents. When approved, Owner will accept the Work, release Contractor (except as to conditions of the Performance Bond, any legal rights of Owner, required guarantees, and correction of Faulty Work after final Payment), and make final payment to Contractor.
- C. Final payment will not be approved or released until receipt of proper close-out documents.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

PART TWO - PRODUCTS

2.01 OWNER'S MANUAL AND TOOLS:

- A. Provide Owner's Manuals at time of substantial completion, bound and identified with lettering imprinted on face of binder, "Owner's Manual" which shall consist of the following:
 - 1. Typewritten record of all tests made of materials, equipment, and systems. All such records shall state the date tests were conducted, the names of all persons making and witnessing the tests, and shall cite any unusual conditions relevant to the tests.
- B. Owner's Manual shall be furnished electronically, and shall have been approved by the Engineer/Consultant for content and format prior to final preparation.
- C. Provide and deliver to Engineer/Consultant one hard copy of Owners Manual, for delivery to Owner.
- D. Complete all cleaning operations required by Section 01 74 00 – Cleaning and Waste Management, and other Sections of the Technical Specifications.
- E. Deliver to Owner, with a copy of Delivery Certificate to Engineer/Consultant, all replacement materials required by all Sections of these Specifications.
- F. Provide the following prior to project closeout:
 - 1. Consent of Surety.
 - 2. Contractor's Affidavit of Release of Liens.
 - 3. Contractor's Affidavit of Payments of Debts and Claims.
 - 4. Contractor's Guarantee.
 - 5. Building Permits.
 - 6. Certificate of Substantial Completion.
 - 7. Subcontractor and Supplier Contact List.
 - 8. Contractor's Letter regarding Asbestos Removal.
 - 9. Contractor and Subcontractor Warranties.
 - 10. Approved Permit Drawings and As-built Drawings.

PART THREE - EXECUTION

3.01 INSPECTION:

- A. Immediately prior to expiration of the warranty period, Contractor shall make an inspection of the Work in the company of Engineer and Owner. Engineer/Consultant and Owner shall be given not less than five days notice prior to anticipated date of inspection.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- B. Where any portion of the Work has proven to be defective and requires replacement, repair, or adjustment, Contractor shall immediately provide materials and labor necessary to remedy such defective Work and shall execute such Work without delay until completed to the satisfaction of Engineer/Consultant and Owner, even though the date of completion of the corrective work may extend beyond the expiration date of the guarantee period. Maintenance during warranty period is to be done by Contractor at his expense.

END OF SECTION 01 70 00

SECTION 01 74 00

CLEANING AND WASTE MANAGEMENT

PART ONE - GENERAL

1.01 GENERAL:

- A. Maintain premises free from accumulations of waste, debris, and rubbish caused by construction operations.
- B. At completion of Work, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials. Clean all sight-exposed surfaces. Leave project clean and ready for occupancy.

1.02 REQUIREMENTS OF REGULATORY AGENCIES:

- A. Codes and Standards: Applicable federal, state, and local codes and regulations relative to environmental safety regulations.
- B. Hazards Controls: Store volatile waste in covered metal containers and remove from premises daily. Prevent accumulation of wastes which create hazardous conditions.
- C. Pollution Control: Conduct clean-up and disposal operations to comply with local ordinances and anti-pollution laws.
 - 1. Burning or burying of rubbish and waste materials on the project site is prohibited.
 - 2. Disposal of volatile fluid wastes (such as mineral spirits, oil, or paint thinner) in storm or sanitary sewer systems or into streams or waterways is prohibited.

PART TWO - PRODUCTS

2.01 CLEANING MATERIALS:

- A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART THREE - EXECUTION

3.01 DURING CONSTRUCTION:

- A. Keep work area and all occupied property in neat and orderly condition at all times. Oversee cleaning and ensure that building and grounds are maintained free from accumulations of waste materials and rubbish. Sprinkle dusty debris with very fine water mist to control accumulation of dust. Do not use water in quantity so as to puddle. Do not allow waste and other materials such as rubbish, debris, wrappers, etc., to accumulate and become unsightly or hazardous. Promptly remove

ROOF REPLACEMENT

LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING CYPRESS, TEXAS

equipment and excess materials as they become no longer needed for the progress of the work. At not less than every day during progress of work, clean up work and access areas and dispose of waste materials, rubbish, and debris. Legally dispose of waste materials, rubbish, and debris at public or private dumping areas off Owner's property.

- B. At the completion of work, restore work area to its original condition. Lower waste materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights. Keep street and access to site free of rubbish and debris.
- C. Contractor shall be responsible for damage to or destruction of property of any sort resulting from the work or caused by defective work, or the use of unsatisfactory materials or workmanship.
- D. Contractor shall be responsible for the preservation of all private property, trees, fences, etc., along the adjacent street, right-of-way, etc., and shall use every precaution necessary to prevent damage or injury thereto. Use suitable precautions to prevent damage to pipes, conduits, and other structures.
- E. If damage to any structures, utilities, or other improvement occurs by reason of Contractor's operations even though special precautions have been employed, Contractor shall be entirely responsible for such damage and shall make all repairs as required to the satisfaction of Owner.
- F. Do not injure, destroy, or trim landscaping without authorization by Owner. Landscaping damage will be replaced by Contractor with new stock or with other stock satisfactory to Owner at the expense of Contractor.

3.02 FINAL CLEANING:

- A. Employ skilled workmen for final cleaning.
- B. Remove grease, mastics, adhesives, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior surfaces.
- C. Repair, patch, and touch-up marred surfaces to match adjacent finishes.
- D. Broom clean paved surfaces; rake clean other surfaces of grounds.
- E. Clean stairwell, elevators, and loading dock areas utilized for Work.
- F. Prior to final completion or Owner occupancy, conduct an inspection of sight-exposed interior and exterior surfaces and all work areas to verify that entire Work area is clean.
- G. Restore building finishes, pavements, walks, landscaping, or other components and/or materials at the site to its original condition prior to start of Work.

END OF SECTION 01 74 00

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

SECTION 02 07 20

MINOR DEMOLITION AND RENOVATION WORK

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Removing existing roofing, insulation, flashing, and sheet metal.
- B. Repairing and/or replacing decking.
- C. Modifying existing roof penetrations, equipment supports, curbs, reglets, piping, utility services, and exterior wall finishes to provide proper flashing height and flashing detail.
- D. Installing new nailers, blocking, and sheathing at designated locations.
- E. Raising through wall flashings in masonry rise walls at required locations.
- F. Replacing roof hatch.
- G. Performing other miscellaneous and incidental work required to install complete roofing system as specified and to obtain specified manufacturer's warranty.

1.02 RELATED SECTIONS:

- A. 06 01 10 - Rough Carpentry.
- B. 07 01 60 - Miscellaneous Roof Repairs.
- C. 07 22 16 - Roof Board Insulation.
- D. 07 52 00 - Modified Bitumen Membrane Roofing.
- E. 07 54 00 - Fluid-Applied Roof Coating.
- F. 07 62 00 - Sheet Metal Flashing and Trim.
- G. 07 92 00 - Joint Sealants.
- H. 09 91 00 - Painting.
- I. 26 41 00 - Lightning Protection System.

1.03 REFERENCES:

- A. American Society for Testing and Materials (ASTM).
- B. Corps of Engineers (CRD).

1.04 PROJECT CONDITIONS:

- A. Environmental Requirements:
 - 1. Do not remove existing roofing and flashing in inclement weather or when rain is predicted with 30 percent possibility or greater.
 - 2. When ambient temperature is below 60 degrees Fahrenheit (15 degrees Celsius), expose only enough temperature sensitive materials required within four hour period.
 - 3. Do not expose materials to constant temperature in excess of 180 degrees Fahrenheit (82 degrees Celsius).
- B. Emergency Equipment: Maintain on-site adequate materials necessary to apply emergency temporary weather protection of incomplete work area in event of sudden storms or inclement weather.
- C. Smoking is prohibited on roof areas, in existing building, and Owner's property.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

1.05 SEQUENCING AND SCHEDULING:

- A. Sequence demolition and renovation with sequence of new work to maintain facility in dry, watertight condition on daily basis.
- B. Coordinate roof work so that no more existing items are removed in one day than can be replaced with new materials in same day.
- C. Coordinate work with Owner's operational requirements.
- D. Coordinate demolition work and removal with roofing work to maintain facility in dry, watertight condition on a daily basis.

1.06 WARRANTY:

- A. Provide Contractor's warranty covering defects in installed materials and workmanship for period of two years from date of final acceptance.

PART TWO - PRODUCTS

2.01 MATERIALS:

- A. Wood Members, Nailers, and Blocking Lumber: Noncombustible Standard Grade Fir or No. 2 Southern Yellow Pine bearing UL label, Kiln-dried after treatment, complying with American Lumber Standards of manufacturer's association under whose rules lumber is produced, minimum size 2-inches (50mm) by 6-inches (150mm), nominal.
- B. Treatment for Wood Members: Pressure-preservative treated in accordance with AWPA C2, C9 standards, Above Ground Contact Alkaline Copper Quat Type C (ACQ-C) or Copper Azole Type A (CBA-A) at 0.25 pounds per cubic foot for (ACQ-C) or 0.20 pcf for (CBA-A) wood.
- C. Plywood: Exterior grade fire-rated sheathing; 1/2-inch thick, nominal; Grade: CDX.
- D. Gypsum Sheathing/Roof Board: 1/2-inch (13mm) thick moisture resistant gypsum core such as "Dens-Deck Primed" by Georgia Pacific or "SecuRock" by U.S. Gypsum.
- E. Fasteners:
 - 1. Wood Substrate:
 - a. Securement of metal flanged items such as flashing pans, metal edge/fascia, cleats, etc., shall be nails, No. 11 gauge, double hot-dipped galvanized, ASTM A153, steel or stainless steel wire with 3/8-inch (9mm) diameter head and ring shank fasteners for anchoring flanges of sheet metal fabrications shall be of sufficient length to achieve a minimum 1-1/4-inch embedment into solid wood substrate such as "R-103-A Stormguard Asphalt and Fiberglass Shingle Nail" by Maze Nails (800/435-5949).
 - b. Securement of wood to wood shall be nails, No. 11 gauge, double hot-dipped galvanized steel or stainless steel wire nail with ring shank and 9/32-inch (7mm) diameter head such as "Stormguard PTL Anchor-Down Nail" by Maze Nails (800/435-5949); 10d or length required to provide 1-inch (25mm) penetration minimum into substrate.

ROOF REPLACEMENT

LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING CYPRESS, TEXAS

- c. Securement of exposed items to wood substrate shall be No. 14 stainless steel screw with stainless steel washer and integral rubber seal; length required to provide 1-inch (25mm) penetration minimum into substrate.
 - d. Fasteners for securing roofing materials to wood substrate shall be a hardened stainless steel nail with a 1-inch (25mm) diameter round head and ring shank; length to provide 1-inch (25mm) penetration into substrate, as manufactured by Simplex Nail Co.
 - e. Fasteners for securing steel to wood substrate shall be No. 10 stainless steel wood screw with stainless steel washer and integral rubber seal, length to achieve 1-inch embedment into wood.
 - f. Fasteners for securing wood nailer to wood nailer in vertical position shall be 20 gauge galvanized steel plate, 2-inches wide by 4-inches long such as "MP 24 Mending Plate" by Simpson Strong-Tie Co., Inc. and "A34 Framing Anchor" by Simpson Strong-Tie Co., Inc. for corner connections.
2. Concrete Substrate:
- a. Fasteners for securing sheet metal items such as surface-mounted counterflashings, termination/compression bars, etc., to concrete substrate shall be a pre-assembled drive anchor with a coated steel or steel alloy drive screw, a lead/zinc alloy expansion anchor body (1/4-inch (6mm) diameter, 1-1/2-inch [38mm] length) and a stainless steel washer with integral rubber seal (1-1/8-inch diameter) such as "Zamac Hammer-Screw" as manufactured by Dewalt, or "Coated Drive Pin Fastener" by Elevate.
 - b. Fasteners for securing wood blocking to concrete substrate at roof perimeters shall be stainless steel sleeved stud expansion bolt, 1/2-inch (13mm) diameter (minimum), with 3/4-inch diameter stainless steel washer such as "Kwik Bolt II" by Hilti, "Tru Bolt Wedge" by ITW Ramset, or "Lok/Bolt" by Powers Fasteners, Inc. Fasteners for securing wood blocking to concrete substrate for miscellaneous applications shall be 1/4-inch diameter, 2-3/4-inch long coated screw with hex head such as "Tapcon" by ITW Buildex.
3. Masonry Substrate:
- a. Fasteners for securing wood to solid masonry at roof perimeters shall be stainless steel expansion anchor, 3/8-inch (9mm) diameter (minimum), with 3/4-inch diameter steel washer such as "Countersunk Kwik Bolt II" by Hilti. Fasteners for securing wood to solid masonry for miscellaneous applications shall be 1/4-inch diameter, 2-3/4-inch long coated screw with hex head such as "Tapcon" by ITW Buildex.
 - b. Fasteners for securing wood to hollow base masonry shall be 3/8-inch (9mm) diameter (minimum), stainless steel threaded rod, with 3/4-inch diameter stainless steel washer, nut, and screen tube such as "HIT C-20 Adhesive Anchor" by Hilti.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- c. Fasteners for securing sheet metal items to concrete substrate shall be a pre-assembled drive anchor with a coated steel or steel alloy drive screw, a lead/zinc alloy expansion anchor body (1/4-inch (6mm) diameter, 1-1/2-inch [38mm] length) and a stainless steel washer with integral rubber seal (1-1/8-inch diameter) such as "Zamac Hammer-Screw" as manufactured by Dewalt, or "Coated Drive Pin Fastener" by Elevate.
- 4. Steel Substrate:
 - a. Fasteners for securing plywood to steel substrate shall be self-drilling, 1-1/2-inch long coated No. 10 screw with wafer head such as "Traxx Wood to Metal Fastener" by ITW Buildex. Fasteners for securing wood nailers/blocking to steel substrate shall be self-drilling coated heavy duty screw, 1/4-inch (6mm) diameter (minimum), with 5/8-inch (16mm) diameter washer such as "No. 14 Heavy Duty Screw" by OMG Roof Products.
 - b. Fasteners for securing steel to steel substrate shall be self-tapping No. 14, 1-1/2-inch long stainless steel screw with stainless steel washer and bonded integral rubber seal.
- 5. Plywood Clip: 20 gauge galvanized steel H-clip such as "PSCL Panel Sheathing Clip" by Simpson Strong-Tie Co., Inc. (800/999-5099).
- 6. Receiver in Reglet: Soft, malleable lead sheet, size and shape to fit in joint and maintain compression against receiver.
- F. Rust Inhibitive Primer: 100 percent acrylic resin primer such as "Uniflex Rust Inhibitor Metal Primer" by Sherwin Williams, or approved equal.
- G. Piping/Conduit Supports: Pre-manufactured assembly with molded plastic/rubber base, 10-inches by 16-inches (250mm by 400mm); 1/2-inch (13mm) threaded rods and accessory bar, "Type PP-10 with Strut" for conduit/condensate or "Type PP-10 with Roller" for steel/gas piping as manufactured by PHP System/Design, Houston, Texas (800/797-6585); Models 48-R-AH and 24-R-AH by Miro Industries, Inc. (800/768-9678); or approved equal.
- H. Pipe Hanger: Pre-manufactured pipe supports constructed from 1-7/8-inch by 1-7/8-inch (47mm by 47mm) 12 gauge channel steel with rectangular support bases. Use roller pipe hangers for supporting steel pipes and clevice (saddle) type hanger for supporting insulated pipe such as Models "Type PS-1-2", "Type PSE-2-2", and "Type PS-E-Custom" as manufactured by PHP System/Design, Houston, Texas (800/797-6585); or approved equal.
- I. Equipment Supports: Pre-manufactured supports constructed from 1-7/8-inch by 1-7/8-inch (47mm by 47mm) 12 gauge channel steel with rectangular support bases and steel angle supports. Provide threaded rod to connect supports such as "Type RTU-20" as manufactured by PHP System/Design, Houston, Texas (800/797-6585); or approved equal.
- J. Duct Support: Pre-manufactured supports constructed from 1-7/8-inch by 1-7/8-inch (47mm by 47mm) 12 gauge tube steel with rectangular molded plastic/rubber support bases such as Model "Type PPH-D" as manufactured by PHP System/Design, Houston, Texas (800/797-6585); or approved equal.

ROOF REPLACEMENT

LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING CYPRESS, TEXAS

- K. Non-shrink Grout: Quick-setting grout formula meeting Corps of Engineers specification CRD-C-621, Type D and ASTM C-1107, Grade C, such as "Five Star Instant Grout" by Five Star Products, Inc., "Sika Grout 212" by Sika Corp., or approved equal.
- L. Roof Drain: 15-inch (375mm) diameter (minimum), coated cast iron body with combination flashing clamp/gravel guard and cast iron strainer to accommodate existing pipe such as "Wade 3000", "Zurn Z-100", "Smith 1010", or "Josam 25000".
- M. Storm Water Piping: Storm water piping shall be cast iron pipe and fittings, coated inside and outside, manufactured in accordance with ASTM A 74, FS WW-P-401, and CISPI 301. Weight of pipe shall be as required by code for location and duty. Joints shall be fabricated by the use of "push-on" type gasketed joints or "no-hub" mechanical joints, such as manufactured by Fernco (800/521-1283).
- N. Storm Water Pipe Hangers: Type and spacing as required by governing code. Spacing shall not be greater than 5 feet (1.5m) on-center.
- O. Splash Blocks: Pre-cast concrete; minimum size of 2-inches (50mm) thick by 18-inches (450mm) by 30-inches (750mm).
- P. Roof Hatch Railing System: Powder-coated steel tubular rail system complying with OSHA fall protection regulation 1910.23 with self-closing gate such as "Roof Hatch Safety Rail" by SafePro LP, "PRS Roof Hatch Protection System" by Premier Rail Systems, "SRCG" by Babcock-Davis, "Roof Hatch Guardrail" by Leading Edge Safety, or approved equal.
- Q. Roof Hatch: 12-inch (300mm) high, 14 gauge paint bond G-90 galvanized steel curb with 3-1/2-inch (87.5mm) horizontal fastening flange, integral cap flashing, same gauge as curb and fully welded corners and joints with pre-punched holes, size 30-inches by 36-inches (750mm by 900mm), such as "Type S-50" by The Bilco Co, "BRHP" by Babcock-Davis, or approved equal.
- R. Roof Access Ladder Extension Device: Telescoping tubular post, hot-dipped galvanized, spring-balanced automatic locking position such as "Ladder UP-Model LU-2" by Bilco.
- S. Metal Deck Repair Material: 22-gauge galvanized metal deck to match existing profile.
- Q. Masonry Materials:
 - 1. Mortar Materials:
 - a. Portland Cement: ASTM C 150, Type 1.
 - b. Hydrated Lime: ASTM C 207, Type S.
 - c. Aggregate for Mortar: ASTM C 144.
 - d. Water: Clean, free of oil, acids, alkalis, and organic matter.
 - e. Colored Mortar Aggregate:
 - 1) Natural or manufactured, hand selected to produce mortar color.
 - 2) Provide sand with rounded edges for pointing mortar.
 - 3) Match size, texture, and gradation of existing mortar as closely as possible.
 - f. Colored Mortar Pigment:
 - 1) Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- 2) Use only pigments with record of satisfactory performance in masonry mortars.
2. Masonry Units:
 - a. Units to match existing in shape, size, color, texture, and material; ASTM C216, Grade SW.
 - b. Building Masonry: Provide masonry complying with ASTM C 62 of same dimensions as existing masonry work concealed from view.
3. Mortar Mixes:
 - a. Measurement and Mixing:
 - 1) Measure cementitious and aggregate materials in dry condition by volume or equivalent weight.
 - 2) Do not measure by shovel; use known measure.
 - 3) Mix materials in clean mechanical batch mixer.
 - b. Mixing Repair Mortar:
 - 1) Thoroughly mix cementitious and aggregate materials together before adding water.
 - 2) Mix again adding only enough water to produce damp, unworkable mix which will form when pressed into ball.
 - 3) Maintain mortar in this dampened condition for one to two hours.
 - 4) Add remaining water in small portions until mortar of desired consistency is reached.
 - 5) Use mortar within thirty minutes of final mixing.
 - 6) Do not retemper or use partially hardened material.
 - c. Admixtures: Do not use admixtures in mortar.
 - d. Mortar Proportions, Repair Mortar for Brick: One part Portland cement, one part lime, and four and one-half to six parts mortar aggregate.
 - e. Colored Mortar:
 - 1) Produce mortar of color required with selected ingredients.
 - 2) Do not adjust proportions without Consultant's acceptance.
 - f. Color Pigmented Mortar: Do not exceed pigment-to-cement ratio of 1-to-10 by weight.
 - g. Admixtures: Do not use admixtures in mortar.
 - h. Mortar Proportions:
 - 1) Pointing Mortar:
 - a) One part white Portland cement, two parts lime, and six parts colored mortar aggregate.
 - b) Add colored mortar pigment to produce mortar colors.

ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS

PART THREE - EXECUTION

3.01 EXAMINATION:

- A. Examine existing building and existing roofing to determine existing physical conditions that affect removal of existing roofing and installation of new roofing.
- B. Verify that required barricades and other protective measures are in place.

3.02 PREPARATION:

- A. Take measures to maintain watertight conditions during term of Contract.
- B. Install interior protection and dust partitions where deck penetrations shall be removed or replaced.
- C. Protect adjacent surfaces.
- D. Roof Drains:
 - 1. Examine existing drain lines for debris or blockage.
 - 2. Clean drains and drain lines, removing debris, excessive bitumen, or aggregate. Flush with water to ensure that drains flow freely.
 - 3. Cap drains with drain plugs during daily operations.
 - 4. Remove plugs after daily clean-up and prior to onset of rainfall.

3.03 MINOR DEMOLITION OPERATIONS:

- A. Execute demolition in careful and orderly manner with least possible disturbance or damage to adjoining surfaces and structure.
- B. Avoid excessive vibrations in demolition procedures that would be transmitted through existing structure and finish materials.
- C. Partial Roof Removal:
 - 1. Remove existing roofing and insulation in areas designated on drawings and as referenced in Section 07 01 60.
 - 2. In designated areas where roofing to remain, remove and dispose of membrane flashings and sheet metal flashings from walls, curbs, perimeters, and penetrations.
- D. Complete Roof Removal:
 - 1. In designated areas, remove existing roofing, insulation, and flashings; abandoned and obsolete equipment; metal flashings, vents, curbs, and other such items; and sheet metal down to roof deck.
 - 2. Trim existing counter flashings as required for installation of new materials.
 - 3. Do not stockpile debris on roof surface. Promptly dispose of obsolete equipment and debris at authorized disposal site each day. Use chutes to transfer debris from roof surface to dumpsters.
 - 4. Provide protective method, such as plywood set on minimum 1-inch (25mm) EPS insulation, when hauling debris over existing roof membrane.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

3.04 MINOR RENOVATION WORK:

- A. Prepare substrates in accordance with roofing manufacturer's recommendations.
- B. Fluted Steel Decking:
 - 1. Replace damaged steel deck with like deck material.
 - 2. Extend section of new steel decking between underlying structures and minimum 6-inches beyond edge of existing sound deck.
 - 3. Attach new steel deck material to structure on two sides and to existing sound steel deck on remaining two sides.
 - 4. Apply primer/paint on cut edges of steel deck and welds.
- C. Nailers:
 - 1. Replace wood nailers and curbs with new nailers and curbs as required.
 - 2. Install wood nailers to match height of new insulation board.
 - 3. Secure 2X base nailer into structure and/or substrate for anchorage of cleats and/or fascias of sheet metal fabrications, width as necessary to extend beyond horizontal flange of sheet metal fabrication.
 - 4. Clean and prepare existing surfaces to receive wood nailers and curbs.
 - 5. Install 2 X 6 wood nailer, minimum, as base nailer at perimeters or tops of parapet walls. Nailers shall match width of wall and provide minimum 1-inch per foot slope toward roof.
 - 6. Install wood nailers and curbs continuously with 1/4-inch (6mm) gap between each section. Set level and true. Pre-drill nailers prior to attachment. Countersink fastener in base nailer so that washer and head of fastener or nut are recessed below top of nailer.
 - 7. Securely fasten to structure with appropriate fasteners to resist minimum 175 pounds per linear foot (780N per 300mm) force in any direction and spaced 12-inches on-center. Use of powder-actuated fasteners is prohibited. Place a fastener within 3-inches (75mm) of each end of each section of wood blocking.
 - 8. Secure nailers to concrete deck with appropriate fasteners spaced 24-inches (600mm) on-center. Secure nailer with a minimum of two fasteners per nailer.
 - 9. Stagger joints in subsequent layers of nailers from joints in underlying layer of nailers a minimum of 12-inches (300mm).
 - 10. Install nailers so that ends and sides of adjoining nailers are aligned to form right angles (nominal) at corners.
 - 11. Weave ends of subsequent layers of nailers at corners so that ends of nailers do not align.
 - 12. Secure nailers to metal deck with screws spaced 12-inches (300mm) on-center, 6-inches (150mm) on-center, 10 foot (3m) from each corner.
 - 13. Secure nailers to wood substrate using nails 24-inches (600mm) on-center, staggered. Install nails on an angle.
 - 14. Secure nailers with self-tapping steel fastener to structural steel with self-drilling screw or through-bolt spaced 12-inches on-center.
 - 15. If attaching wood nailer to concrete masonry block, install stainless steel threaded rod spaced 12-inches (300mm) on-center in fully grouted cell/core of CMU.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

16. Reduce fastener spacing 50 percent at a distance of 10 feet (3m) from each corner.
 17. Secure new nailer to existing nailer or curb when increasing curb height utilizing appropriate fasteners, gusset plates, and framing anchors.
- D. Plywood/Gypsum Sheathing:
1. Install new sheathing at walls, curbs, and over unsuitable substrates to receive new roofing. Replace damaged, deteriorated, or non-salvageable existing sheathing.
 2. Secure sheathing to substrate with flat head fasteners (type appropriate for substrate) spaced 12-inches (300mm) on-center.
 3. Secure sheathing to wood substrate with nails spaced 6-inches (150mm) on-center.
 4. Install new sheathing at metal curbs. Secure sheathing to substrate with flat head fasteners (type appropriate for substrate) spaced 12-inches (300mm) on-center. Trim exposed ends of screws on inside of hatch/curb.
- E. Equipment and Curb Renovation:
1. Remove, retain, and reinstall existing equipment as required to facilitate new flashing.
 2. Securely fasten equipment on curbs after new flashing is installed with grommetted screws spaced 12-inches on-center, minimum, two per each side of equipment.
 3. Curb flashing height shall be 8-inches (200mm) minimum above newly finished roof surface.
 4. Include raising of curb flashing to provide minimum 8-inch (200mm) height in Base Bid cost.
- F. Rooftop Equipment:
1. Move and elevate air conditioning units and other rooftop equipment as required to install roofing materials complete and in accordance with plans and specifications.
 2. When units or equipment are to be moved, disconnect and move to protected area to prevent damage to parts or components. Reset and reconnect at Contractor's expense.
 3. Disconnection and reconnection shall be performed by mechanical and/or electrical company licensed to perform such work and approved by Owner's Representative.
 4. Install equipment on top of curb or pre-manufactured support. Secure equipment to curb with grommetted fasteners spaced 12-inches (300mm) on-center, minimum two fasteners per side. Set equipment on top of pre-manufactured support and secure to support. Install support on a layer of heavy-duty protection pad on top of a cut section of single-ply protection pad.
 5. Install sheet metal strapping over top of equipment housing and secure into side of curb.
- G. Curbs and Ducts:
1. Secure and modify curbs, ducts, and other work which pass through roof as required to receive new roofing system.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

2. Seal joints in sheet metal ducts and vent hoods with reinforcing fabric and elastomeric coating. Apply coating to exposed surfaces of ducts and vent hoods.
- H. Condensate Lines: Raise and reroute existing condensate lines and supports as required. Provide positive drainage of piping. Reinstall existing and install new condensate lines at existing or new units where discharge is directed onto roof. Route lines to discharge into nearest drainage medium (i.e. drain, gutter, etc.).
- I. Hold-down Straps: Install stainless steel sheet metal straps over existing CMU ballast at satellite/antenna support bases. Secure straps to existing steel bases with stainless steel fasteners.
- J. Piping and Conduit Modifications:
1. Schedule piping and unit downtime for equipment modifications to coordinate with Owner's operations. Switchover time shall be limited to meet Owner's requirements.
 2. Replace existing supports for units and associated piping with new supports.
 3. Provide temporary supports to maintain unit and piping in operational condition except during switchover.
 4. Furnish new fittings, piping, and accessories to match existing to replace deteriorated, damaged, or non-functional components or to accommodate new unit elevation, where necessary.
 5. Provide auxiliary make-up air units to supply HVAC needs during equipment downtime, when required.
 6. Upon completion of roof installation, paint steel piping and replace or clean aluminum jacketing of insulated pipe.
- K. Piping Supports:
1. Furnish and install new supports for piping (conduit, gas, water, condensate, etc.).
 2. Install supports at maximum spacing of 10 feet (3m) on-center and within 2 feet (600mm) of changes in plane or direction. Space supports for piping 10-inches (250mm) in diameter or larger and multiple pipes 8 feet (2.4m) on-center.
 3. Install over a layer of heavy-duty protection pad set on top of a layer of modified bitumen protection pad adhered to roof surface.
- L. Roof Drains and Sleeves to Remain:
1. Secure and modify drains and sleeves to receive new roofing system.
 2. Verify drain bowls and pipes are properly secured and sealed.
 3. Remove, replace, lower, or raise drain bowl as required to accommodate new roofing system, including insulation and deck conditions.
 4. Replace damaged, missing, or otherwise non-salvageable drain components with new components. Replace plastic strainers with cast iron units.
 5. Drill and tap existing drain bowls as required for complete assembly of drain. Secure clamp rings with stainless steel bolts and washers. Clamp rings to be secured throughout project. Wire brush, clean, and paint existing cast iron clamp rings and strainers to be reinstalled.
 6. Paint new strainers and clamp rings prior to installation.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

7. Water test each roof drain with inflatable plug. Position plug in leader so test will cover connection of pipe to bowl. Extend "test" water on top of roof membrane beyond clamping ring. Maintain "test" water for one hour while performing interior observations for water leakage. Replace drain bowl assemblies that cannot be made watertight during leak test. Provide photographic documentation of water tests and results to Owner.
- M. Plumbing Vents:
1. Extend plumbing vents or modify as necessary to accommodate new roof installation.
 2. Provide pipe extensions and no-hub couplings where necessary to achieve minimum 8-inch (200mm) height above top of newly finished roof surface.
 3. Utilize same material type and size as existing for new extension.
- N. Roof Hatch:
1. Remove existing roof hatch and install new roof hatch to accommodate new roof system.
 2. Secure hatch to substrate with appropriate fasteners at pre-drilled hole locations in flange.
 3. Secure plywood to hatch curb.
 4. After installation of membrane flashing, secure counter flashing to hatch flashing with appropriate fasteners spaced 6-inches on-center.
 5. Attach ladder extension device and safety railing system to hatch.
 6. Clean and paint interior and exterior of roof hatch assembly.
- O. Sheet Metal Fabrications:
1. Remove and replace ferrous rooftop sheet metal fabrications to match existing.
 2. Modify existing sleeves and umbrellas on existing equipment as scheduled.
 3. Repair and renovate non-ferrous rooftop and drainage system sheet metal fabrications as required for permanent watertight installation.
 4. Paint sheet metal with metal primer.
- P. Duct Vent Supports: Install supports at minimum spacing of 5 feet (2.4m) on-center.
- Q. Masonry Removal/Rebuilding:
1. At locations needed or as indicated to install new through-wall flashing, carefully remove masonry by hand to accommodate new through-wall flashing. Cut out full units from joint to joint and in manner to permit salvage of existing unit and replacement with full size units.
 2. Support and protect masonry indicated to remain which surrounds removal area.
 3. Salvage as many whole, undamaged masonry units as possible.
 4. Remove mortar, loose particles, and soil from salvaged masonry units by cleaning with brushes and water. Store retained units for reuse.
 5. Clean remaining masonry at edges of removal areas by removing mortar, dust, and loose debris in preparation for rebuilding.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

6. Thoroughly mix cementitious and aggregate materials together before adding water for mortar. Then mix again adding only enough water to produce damp, unworkable mix which will retain its form when pressed into a ball. Maintain mortar in this dampened condition for one to two hours. Add remaining water in small portions until mortar of desired consistency is reached. Use mortar within thirty minutes of final mixing; do not retemper or use partially hardened material.
7. Install salvaged masonry units to replace removed units. Fit replacement units into bonding and coursing pattern of existing. If cutting is required, use motor driven saw designed to cut masonry with clean, sharp, unchipped edges.
8. Install new stainless steel sheet metal and flexible through-wall flashings as referenced in Section 07 62 20 Sheet Metal Flashing and Trim.
9. Lay replacement masonry units with completed filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet masonry units using wetting methods that ensure units are nearly saturated but surface dry when laid. Maintain joint width for replacement units to match existing.
10. Tool exposed mortar joints in repaired areas to achieve smooth concave-profile finish.
11. Install weep holes spaced 24-inches (600mm) on-center or at intervals of two masonry units by omitting mortar in head joint.
12. Prior to installing sections of masonry, remove only excess mortar in cavity behind mortar previously installed.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

3.05 EQUIPMENT ATTACHMENT

<u>Curb Size and Equipment Type</u>	<u>Equipment Attachment</u>	<u>Number of No.14 Screws Each Side of Curb or Flange</u>
12-inch X 12-inch curb with relief air hood	Hood screwed to curb	2
12-inch X 12-inch relief air hood with flange	Flange screwed to 22 gauge steel deck	3
24-inch X 24-inch curb with relief air hood	Hood screwed to curb	5
24-inch X 24-inch relief air hood with flange	Flange screwed to 22 gauge steel deck	8
24-inch X 24-inch curb with exhaust fan	Fan screwed to curb	3
36-inch X 36-inch curb with exhaust fan	Fan screwed to curb	3
5'-9" X 3'-8" curb with 2'-8" high HVAC unit	HVAC unit screwed to curb	5

3.06 CLEANING:

- A. Materials, equipment, and debris resulting from demolition operations shall become property of Contractor. Remove and dispose of demolition debris in accordance with applicable city, state, and federal laws at authorized disposal site.
- B. Leave substrate clean and dry, ready to receive roofing system.

END OF SECTION 02 07 20

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

SECTION 05 51 33

LADDERS

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Installation of wall-mounted fixed access ladders at designated locations on exterior of building.

1.02 RELATED SECTIONS:

- A. 02 07 20 - Minor Demolition and Renovations.
- B. 07 52 00 - Modified Bitumen Membrane Roofing.

1.03 REFERENCES:

- A. American National Standards Institute (ANSI): A14.3-1984, Fixed Ladders, Safety Requirements.
- B. American Society for Testing and Materials (ASTM):
- C. American Welding Society (AWS): D1.1-90, Structural Welding Code - Steel.
- D. OSHA 1910.27 and 1910.23: Fixed Ladders.
- E. OSHA 1910.29: Fall Protection systems and falling object protection.

1.04 SYSTEM DESCRIPTION:

- A. Design Criteria: Rungs shall withstand 1,000 pound (455 kg) loading without failure.

1.05 SEQUENCING AND SCHEDULING:

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages. Coordinate delivery of items to project site.

1.06 QUALITY ASSURANCE:

- A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten years experience.
- B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five years demonstrated experience in installing products of the same type and scope as specified.

1.07 DELIVERY, STORAGE, AND HANDLING:

- A. Store products in manufacturer's unopened packaging until ready for installation. Protect all components off the ground, away from standing water on a hard, level surface.

1.08 PROJECT CONDITIONS:

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

1.09 WARRANTY:

- A. At project closeout, submit an executed copy of the manufacturer's five year standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.

PART TWO - PRODUCTS

2.01 MANUFACTURER:

- A. Precision Ladders, LLC; Morristown, TN; www.precisionladders.com.
- B. O'Keeffe's Inc., San Francisco, CA; www.okeeffees.com.
- C. FIXFAST USA, Whitestown, IN; <https://www.fixfastusa.com>
- D. Or approved equal.

2.02 LADDERS:

- A. Fixed Access Ladder: Tubular rail fixed ladder with walk-thru roof over rail extensions and fall arrest/protection cable system for heights greater than 24-ft, "Model FLH-05" by Precision Ladders, "Model 502" by O'Keeffe's, "Model RI31" by FIXFAST USA, or approved equal.

2.03 MATERIALS:

- A. Aluminum Extrusions: Alloy 6063-T6.
- B. Bolts, Nuts, and Washers: 1/2-inch diameter stainless steel bolts or threaded rod, washers, and nuts, ASTM A 307 or A 325.
- C. Fasteners: Self-locking stainless steel.
- D. Welding Materials: AWS D1.1; type required for materials being welded.

2.04 COMPONENTS:

- A. Tubular Side Rails: 0.125-inch minimum wall thickness by 3-inches by 1-inch tubular side rails.
- B. Rungs: 2-1/4-inch by 3/4-inch by 1/4-inch extruded aluminum with serrated top surface spaced 12-inches on-center maximum.
- C. Walk-thru Roofover Rail Extension: 42-inch side rail extensions with 1-1/4-inch square tube hand rails.
- D. Mounting Brackets: 8-1/2-inch by 2-inch by 3-inch by 1/4-inch thick, minimum, aluminum angle.
- E. Ladder Fall Arrest System: Fall arrest kit includes fall arrest mounting brackets, tensioner, termination device, sign and stainless hardware; Capacity: For single person use; 1400 lbs (635 kg) rated; Performance Standard: Units designed and manufactured to meet or exceed OSHA 1910.29 and ANSI A14.3.

2.05 FABRICATION:

- A. Use materials of size and thickness as required to produce strength and durability in finished product for use intended. Work to dimensions using proven details of fabrication and support.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- B. Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.
- C. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to radius of approximately 1/32-inch (.008mm). Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work. Perform welding of aluminum ladders with full penetration inert-gas heliarc welds.
- D. Weld corners and seams continuously, complying with AWS D1.1. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
- E. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of Phillips flathead countersunk type screws or bolts.
- F. Provide anchorage for wall mounting to supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use and proper flashing heights at rooftop rise walls.
- G. Cut, reinforce, drill, and tap miscellaneous metal work to receive finish hardware and similar items.

2.06 FINISH:

- A. Manufacturer's standard aluminum mill finish.

PART THREE - EXECUTION

3.01 INSTALLATION:

- A. Install ladder plumb and level, accurately fitted, free from distortion or defects.
- B. Perform field welding in accordance with AWS D1.1.
- C. Fastening to In-place Construction:
 - 1. Provide anchorage devices and fasteners where necessary for wall mounting ladder to in-place construction.
 - 2. Include threaded fasteners for through-bolts, and other connectors as required. Secure ladder to existing masonry wall with through-bolts installed through masonry wall and anchored to interior face of wall with stainless steel plate, washer and nuts.
 - 3. Apply non-bleed silicone sealant around fastener penetrations and mounting brackets/plates.

3.02 SCHEDULE:

- A. Install ladders in designated locations.

END OF SECTION 05 51 33

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

SECTION 06 01 10

ROUGH CARPENTRY

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Installation of wood nailers at curbs, perimeters, penetrations, walls, and as necessary to install new systems.
- B. Exterior sheathing.

1.02 RELATED SECTIONS:

- A. 02 07 20 - Minor Demolition and Renovation Work
- B. 07 54 00 - Thermoplastic Single-ply Roofing.
- C. 07 62 00 - Sheet Metal Flashing and Trim.

1.03 QUALITY ASSURANCE:

- A. Provide sufficient workmen and supervisors who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of construction involved and the materials and techniques specified.
- B. All work shall conform to pertinent standards.

1.04 DELIVERY, STORAGE, AND HANDLING:

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

PART TWO - PRODUCTS

2.01 MATERIALS:

- A. Wood Members, Nailers, and Blocking Lumber: Noncombustible Standard Grade Fir or No. 2 Southern Yellow Pine bearing UL label, Kiln-dried after treatment, complying with American Lumber Standards of manufacturer's association under whose rules lumber is produced, minimum size 2-inches (50mm) by 6-inches (150mm), nominal.
- B. Treatment for Wood Members: Pressure-preservative treated in accordance with AWWA C2, C9 standards, Above Ground Contact Alkaline Copper Quat Type C (ACQ-C) or Copper Azole Type A (CBA-A) at 0.25 pounds per cubic foot for (ACQ-C) or 0.20 pcf for (CBA-A) wood.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- C. Plywood:
 - 1. Exterior Sheathing:
 - a. Thickness: 1/2-inch and 3/4-inch, nominal.
 - b. Grade: C - D.
 - c. Exterior grade
- D. Fasteners:
 - 1. Wood Substrate:
 - a. Securement of metal flanged items such as flashing pans, metal edge/fascia, cleats, etc., shall be nails, No. 11 gauge, stainless steel wire with 3/8-inch (9mm) diameter head and ring shank fasteners for anchoring flanges of sheet metal fabrications shall be of sufficient length to achieve a minimum 1-inch embedment into solid wood substrate such as "R-103-A Stormguard Asphalt and Fiberglass Shingle Nail" by Maze Nails (800/435-5949).
 - b. Securement of wood to wood shall be nails, No. 11 gauge, stainless steel wire nail with ring shank and 9/32-inch (7mm) diameter head such as "Stormguard PTL Anchor-Down Nail" by Maze Nails (800/435-5949); 10d or length required to provide 1-inch (25mm) penetration minimum into substrate. Securement of exposed items to wood substrate shall be No. 14 stainless steel screw with stainless steel washer and integral rubber seal; length required to provide 1-inch (25mm) penetration minimum into substrate.
 - c. Fasteners for securing roofing materials to wood substrate shall be a hardened stainless steel nail with a 1-inch (25mm) diameter round head and ring shank; length to provide 1-inch (25mm) penetration into substrate, as manufactured by Simplex Nail Co.
 - 2. Plywood Clip: 20 gauge galvanized steel H-clip such as "PSCL Panel Sheathing Clip" by Simpson Strong-Tie Co., Inc. (800/999-5099).

PART THREE - EXECUTION

3.01 INSTALLATION:

- A. Nailers:
 - 1. Replace wood nailers and curbs with new nailers and curbs as required.
 - 2. Install wood nailers to match height of new insulation board.
 - 3. Secure 2X base nailer into structure and/or substrate for anchorage of cleats and/or fascias of sheet metal fabrications, width as necessary to extend beyond horizontal flange of sheet metal fabrication.
 - 4. Clean and prepare existing surfaces to receive wood nailers and curbs.
 - 5. Install 2 X 6 wood nailer, minimum, as base nailer at perimeters or tops of parapet walls. Nailers shall match width of wall and provide minimum 1-inch per foot slope toward roof.
 - 6. Install wood nailers and curbs continuously with 1/4-inch (6mm) gap between each section. Set level and true. Pre-drill nailers prior to attachment. Countersink fastener in base nailer so that washer and head of fastener or nut are recessed below top of nailer.

ROOF REPLACEMENT

LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING CYPRESS, TEXAS

7. Securely fasten to structure with appropriate fasteners to resist minimum 175 pounds per linear foot (780N per 300mm) force in any direction and spaced 12-inches on-center. Use of powder-actuated fasteners is prohibited. Place a fastener within 3-inches (75mm) of each end of each section of wood blocking.
 8. Secure nailers to concrete deck with appropriate fasteners spaced 24-inches (600mm) on-center. Secure nailer with a minimum of two fasteners per nailer.
 9. Stagger joints in subsequent layers of nailers from joints in underlying layer of nailers a minimum of 12-inches (300mm).
 10. Install nailers so that ends and sides of adjoining nailers are aligned to form right angles (nominal) at corners.
 11. Weave ends of subsequent layers of nailers at corners so that ends of nailers do not align.
 12. Secure nailers to metal deck with screws spaced 12-inches (300mm) on-center, 6-inches (150mm) on-center, 10 foot (3m) from each corner.
 13. Secure nailers to wood substrate using nails 24-inches (600mm) on-center, staggered. Install nails on an angle.
 14. Secure nailers with self-tapping steel fastener to structural steel with self-drilling screw or through-bolt spaced 12-inches on-center.
 15. If attaching wood nailer to concrete masonry block, install stainless steel threaded rod spaced 12-inches (300mm) on-center in fully grouted cell/core of CMU.
 16. Reduce fastener spacing 50 percent at a distance of 10 feet (3m) from each corner.
 17. Secure new nailer to existing nailer or curb when increasing curb height utilizing appropriate fasteners, gusset plates, and framing anchors.
- B. Plywood/Gypsum Sheathing:
1. Install new sheathing at walls, curbs, and over unsuitable substrates to receive new roofing. Replace damaged, deteriorated, or non-salvageable existing sheathing.
 2. Secure sheathing to substrate with flat head fasteners (type appropriate for substrate) spaced 12-inches (300mm) on-center.
 3. Secure sheathing to wood substrate with nails spaced 6-inches (150mm) on-center.
 4. Install new sheathing at roof hatches and metal curbs. Secure sheathing to substrate with flat head fasteners (type appropriate for substrate) spaced 12-inches (300mm) on-center. Trim exposed ends of screws on inside of hatch/curb.

3.02 CLEAN UP:

- A. Premises shall be kept in a neat and orderly condition.
- B. After installation of all rough carpentry, contractor shall remove all construction debris and equipment from job site.

END OF SECTION 06 01 10

SECTION 07 01 60

MISCELLANEOUS ROOF REPAIRS

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Performing repairs to existing roofs consisting of the following:
 - 1. Replacing wet insulation and associated roof membrane and flashings at designated locations.
 - 2. Repairing single ply membrane.

1.02 REFERENCES:

- A. American Society for Testing and Materials (ASTM).
- B. National Roofing Contractors Association (NRCA): NRCA Roofing and Waterproofing Manual; recent edition.

1.03 SUBMITTALS:

- A. Product Data and MSDS: Submit for each material and product proposed for use to complete the specified work.

1.04 QUALITY ASSURANCE:

- A. Applicator:
 - 1. Single applicator with minimum of five years documented previous successful experience in repairs of similar systems.
 - 2. Approved by manufacturer for application of manufacturer's products.
- B. Installation:
 - 1. Install materials in accordance with procedures and standards set forth by respective industry association.
 - 2. Install roofing materials in accordance with manufacturer's current published application procedures and general recommendations of National Roofing Contractors Association.

1.05 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.
- B. Store materials in accordance with manufacturer's recommendations.
- C. Store goods on clean, raised platforms. Store other materials in dry area, protected from water and direct sunlight.
- D. Provide continuous protection of materials against deterioration for duration of project.
- E. Distribute materials stored on roof levels to prevent concentrated loads on deck or structural members.
- F. Positively secure materials to prevent displacement by wind.
- G. Tarp for protection from exposure.

ROOF REPLACEMENT

LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING CYPRESS, TEXAS

1.06 PROJECT CONDITIONS:

- A. Environmental Requirements:
 - 1. Apply materials in dry weather.
 - 2. Unless directed by Owner's Representative, do not install materials in inclement weather or when rain is predicted (40 percent or more possibility) or when ambient temperature is below 40 degrees Fahrenheit (4 degrees Celsius).
 - 3. Do not expose stored roofing materials and accessories to constant temperature in excess of 180 degrees Fahrenheit (82 degrees Celsius).
- B. Restore to original condition or replace work and materials damaged during handling.
- C. Maintain on-site equipment and material necessary to apply emergency temporary protection to roof and building in event of sudden storms or inclement weather.

1.07 WARRANTY:

- A. Contractor's Warranty: Furnish written warranty agreeing to maintain repaired areas in watertight condition for period of two years after date of acceptance by Owner.

PART TWO - PRODUCTS

2.01 MATERIALS:

- A. Granule-surfaced Modified Bitumen Sheet: Granule-surfaced polyester-reinforced torch-applied APP or SBS modified bitumen sheet material to be used for repairing/replacing cap sheet, such as "APP 180" by Elevate; "DynaWeld Cap G" by Johns Manville, or approved equal.
- B. Asphalt Primer: Cut-back asphalt primer meeting ASTM D 41.
- C. Insulation Board: Rigid, closed cell polyisocyanurate rigid board insulation utilizing non-chlorine/non-ozone depleting blowing agent, bonded to non-asphaltic coated fiberglass facers, ASTM C 1289, Type II, Class 2, Grade 2 (20 psi), thickness to match existing where materials removed; Maximum Board Sizes of 4-ft x 4-ft for adhered applications and 4-ft x 8-ft for mechanical attachment; such as "Sopra ISO+" by Soprema, "ENRGY 3 CGF" by Johns Manville, "Resista" by Elevate, "DerbiBoard CA" by DerbiGum, "Paratherm CA" by Siplast, or approved equal.
- D. Insulation Adhesive: Low-Rise Foam Adhesive: Dual-component Reaction-cure Adhesive: Two-part spray-applied low-rise urethane foam adhesive such as "OlyBond 500" by OMG, "JM 2-Part UIA" by Johns Manville, "DuoTack 365" by Soprema; or approved equal.
- E. Single ply Roof Membrane: Thermoplastic Single Ply Membrane; 60-mil thick, grey-colored, TPO single-ply membrane to match existing conditions.
- F. Base Insulation Fasteners: CR-10 fluorocarbon coated meeting or exceeding FM 4470, self-tapping heavy duty screws of sufficient length to penetrate the steel deck a minimum of 3/4-inch (19mm), minimum 3-inch (75mm) diameter steel plates with recessed #3 Phillips screw head for use with insulation, such as "#14 Heavy Duty Roofing Fastener" as manufactured by OMG, "PerLock Heavy Duty Fastener" by DerbiGum, "Parafast HD Fastener" by Siplast, "HD Fastener" by Johns Manville, or as approved by manufacturer to achieve the designated uplift criteria.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

2.02 ASBESTOS CONTAINING MATERIALS:

- A. No asbestos containing materials may be used on jobsite or incorporated into work.

2.03 CLEANING MATERIALS:

- A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.
- C. Contractor to furnish all cleaning materials.

PART THREE - EXECUTION

3.01 DURING CONSTRUCTION:

- A. Keep work area and all occupied property in neat and orderly condition at all times. Oversee cleaning and ensure that building and grounds are maintained free from accumulations of waste materials and rubbish. Sprinkle dusty debris with very fine water mist to control accumulation of dust. Do not use water in quantity so as to puddle. Do not allow waste and other materials such as rubbish, debris, wrappers, etc., to accumulate and become unsightly or hazardous. Promptly remove equipment and excess materials, as they become no longer needed for the progress of the work. At not less than every day during progress of work, clean up work areas and access areas and dispose of waste materials, rubbish, and debris. Legally dispose of at public or private dumping areas off Owner's property. At the completion of work, restore work area to its original condition. Lower waste materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights. Keep streets, drives, walkways, and other areas access to site free of rubbish and debris.
- B. Contractor shall be responsible for damage to or destruction of property of any character resulting from the work or caused by defective work, or the use of unsatisfactory materials or workmanship.
- C. Contractor shall be responsible for the preservation of all private property, trees, fences, etc., along the adjacent street, right-of-way, etc., and shall use every precaution necessary to prevent damage or injury thereto. Contractor shall use suitable precautions to prevent damage to pipes, conduits, and other structures.
- D. If damage to any structures, utilities, or other improvement occurs by reason of Contractor's operations, even though special precautions have been employed, Contractor shall be entirely responsible for such damage and shall make all repairs as required to the satisfaction of Owner.

3.02 EXAMINATION OF SURFACES:

- A. Verify that substrates are smooth and clean to extent needed for work.
- B. Correct conditions requiring correction or completion prior to installation of roofing system. Notify Owner's Representative of unacceptable conditions.
- C. Do not proceed until defects are corrected.
- D. Verify location of interior ducts, electrical lines, piping, conduit, and similar obstructions. Perform work in manner to avoid contact with above-mentioned items.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- E. Verify debris has been removed.
- F. Start of work under this Part Three constitutes acceptance of deck substrate and site conditions by contractor.

3.03 PREPARATION:

- A. Existing Roofing: Minimize traffic and take precautions to protect existing roof membrane.
- B. Seal openings, projections, and penetrations in substrate to prevent damage to building. Damage to building or interior caused by work shall be corrected by Contractor at his expense.
- C. Carefully broom clean substrate immediately prior to roofing application.
- D. Protect adjacent surfaces.

3.04 GENERAL:

- A. Do not apply roofing materials when water in any form (i.e. rain, dew, ice, frost, snow, etc.) is present on substrates.
- B. Consider material manufacturer's technical specifications part of this specification and use as reference for specific application procedures and recommendations.

3.05 MINOR DEMOLITION OPERATIONS:

- A. Execute demolition in careful and orderly manner with least possible disturbance or damage to adjoining surfaces and structure.
- B. Avoid excessive vibrations in demolition procedures that would be transmitted through existing structure and finish materials.

3.06 REPAIR PROCEDURES:

- A. Roof Membrane/Insulation Replacement:
 - 1. Cut out and remove existing roof membrane and existing "wet" insulation at designated locations indicated on Moisture Survey Plan. Remove insulation until dry insulation is encountered.
 - 2. Install new insulation in thickness to match existing thickness of roofing to remain.
 - 3. Mechanically fasten insulation layer to roof deck. Fully engage and seat fastener. Do not overtighten or strip threads. Bent, deformed, or unseated fasteners or plates are unacceptable. Fasteners to must penetrate top flange (rib) of metal deck minimum 3/4-inch (19mm). Do not overdrive fasteners. Remove and replace overdriven, stripped, or non-engaged fasteners. Properly seat mechanical fasteners and keep heads flush with plates.
 - 4. Adhere insulation to previously installed layers and set in ribbons of low-rise foam adhesive spaced 6-inches on-center.
 - 5. Apply one-ply of granule-surfaced modified bitumen material over new insulation extending 12-inches (300mm) beyond edge of existing roofing to remain.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

B. Single Ply Roof Membrane Repairs:

1. Apply a cut-section of single ply membrane over damaged area of existing single ply roof membrane including punctures, cuts, and other physical damage. Assume repairs to be 12-inches x 12-inches in size performed at 100 individual locations.
2. Extend membrane repair a minimum of 4-inches beyond subject damage in each direction.
3. Install new membrane repair hot-air welded to existing membrane and apply cut-edge sealant along perimeter of repair.
4. Hot-air weld loose areas of existing seams. Apply patch, 12-inches X 12-inches, over areas of existing seams that cannot be effectively welded.

3.07 GENERAL CLEANING:

- A. Remove trash and debris from jobsite as well as that generated by repair operations from roof to dumpster daily.
- B. Dispose of demolition debris in accordance with applicable city, state, and federal laws at authorized disposal site.
- C. Materials, equipment, and debris resulting from demolition operations shall become property of Contractor.

3.08 FINAL CLEANING:

- A. Employ skilled workmen for final cleaning.
- B. Remove grease, mastics, adhesives, dust, dirt, stains, labels, fingerprints, and other foreign materials resulting from repair work from sight-exposed interior and exterior surfaces.
- C. Repair, patch, and touch up marred surfaces to match adjacent finishes.
- D. Broom clean paved surfaces.
- E. Prior to final completion or Owner occupancy, conduct an inspection of sight-exposed interior and exterior surfaces and all work areas to verify that entire Work area is clean.
- F. At completion of Work, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials.

3.09 PROTECTION:

- A. Provide special protection or avoid traffic on completed work.

END OF SECTION 07 01 60

SECTION 07 22 16

ROOF BOARD INSULATION

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Installation of base layers of polyisocyanurate insulation, tapered insulation crickets, and secondary/cover board insulation on steel deck on designated Area "D".
- B. Installation of cover board insulation over existing roofing at designated Areas "A", "C", "E", "H", and "I".

1.02 RELATED SECTIONS:

- A. 02 07 20 - Minor Demolition and Renovation.
- B. 07 01 60 - Miscellaneous Roof Repairs.
- C. 07 52 00 - Modified Bitumen Membrane Roofing.
- D. 07 62 00 - Sheet Metal Flashing & Trim.

1.03 REFERENCES:

- A. American Society for Testing and Materials (ASTM).
- B. Standards:
 - 1. FM Global Approval Guide.
 - 2. Underwriters Laboratories: Building Materials Directory.
 - 3. National Roofing Contractors Association (NRCA): The NRCA Roofing and Waterproofing Manual.
 - 4. ASCE 7-16: "Minimum Design Loads for Buildings and Other Structures."
 - 5. Polyisocyanurate Insulation Manufacturer's Association: Technical Bulletin 109 – "Storage and Handling Recommendations for Polyisocyanurate".

1.04 QUALITY ASSURANCE:

- A. Regulatory Requirements:
 - 1. Classified by Underwriters Laboratories Inc. as Class A rated material.
 - 2. Follow local, state, and federal regulations, safety standards, and codes. When conflict exists, the more restrictive document shall govern.
 - 3. Minimum R-25 insulation for new roofing.
- B. Installation:
 - 1. Install in accordance with manufacturer's current published application procedures, general requirements of NRCA, and as supplemented by these documents.
 - 2. Consider roof system manufacturer's technical specifications part of this Specification and use as reference for specific application procedures.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- C. Install roof system in manner to resist minimum wind uplift pressures on Areas "A", "C", "D", "E", "H", and "I" as follows: -45 psf for Zone 1; -67.5 psf for Zone 1; -90 psf for Zone 2; and -120 psf for Zone 3. Pressures are based on 139 mph wind speeds, Exposure B, Risk Category III/IV, Enclosed Building, and Safety Factor of 2.0.

1.05 DELIVERY, STORAGE, AND HANDLING:

- A. Store materials in accordance with manufacturer's recommendations.
- B. Outdoor Storage:
1. Tarp and shield insulation from moisture and exposure to sun.
 2. Elevate insulation above substrate 4-inches minimum.
 3. Secure insulation to resist high winds.
 4. Do not use insulation which has been determined "wet" or which has been wet and has dried.
 5. Distribute insulation stored on roof deck to prevent concentrated loads that would impose excessive stress or strain on deck or structural members, or impede drainage.
 6. Remove manufacturer plastic shrink wrapping from materials prior to covering with protective tarps/canvas.

1.06 SEQUENCING AND SCHEDULING:

- A. Plan roof layout with respect to roof deck slope to prevent rainwater drainage into completed roofing.
- B. Do not install more insulation than can be made watertight in same day.

1.07 PROJECT CONDITIONS:

- A. Environmental Recommendations:
1. Apply roofing and insulation in dry weather.
 2. Do not proceed with roof construction during inclement weather or when precipitation is predicted with 30 percent or more possibility.
 3. Do not apply insulation over wet or moist deck or in foggy conditions.
 4. Consider days when wind speeds are 30 mph or greater as "inclement weather" days.
- B. Maintain on site equipment and material necessary to apply emergency temporary weather protection to incomplete work in event of sudden precipitation.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

PART TWO - PRODUCTS

2.01 ROOF INSULATION:

- A. Base Layer Insulation: Rigid, closed cell polyisocyanurate rigid board insulation utilizing non-chlorine/non-ozone depleting blowing agent, bonded to non-asphaltic coated fiberglass facers, ASTM C 1289, Type II, Class 2, Grade 2 (20 psi), two layers of 2.2-inch thickness; maximum board size 4-ft x 8-ft for mechanical attachment and 4-ft x 4-ft for adhered applications; such as "Sopra ISO+" by Soprema, "ENRGY 3 CGF" by Johns Manville, "Resista" by Elevate, "DerbiBoard CA" by DerbiGum, "Paratherm CA" by Siplast, "EnergyGuard Ultra" by GAF, or approved equal.
- B. Tapered Insulation for Field of Roof: Rigid, closed cell polyisocyanurate foam core bonded to coated fiberglass facers suitable to receive cold process adhesive; thickness at low point tapered at 1/4-inch per linear foot; such as "Tapered AC Foam III" by Atlas, "Tapered Resista" by Elevate, "Tapered EnergyGuard Ultra" by GAF, or approved equal.
- C. Cover Board: Moisture-resistant, 1/2-inch thick gypsum or cement core roof board such as "Dens Deck Primed" by Georgia Pacific, "SecuRock" by US Gypsum, "DEXCell Cement Board" by National Gypsum, or approved equal.
- D. Tapered Perlite Insulation: Perlite complying with ASTM C-728 to be used for crickets, saddles, tapered edge strips, and drain sumps such as "Tapered Fesco Edge Strip" by Johns Manville, or approved equal.

2.02 RELATED MATERIALS:

- A. Insulation Fasteners: CR-10 fluorocarbon coated meeting or exceeding FM 4470, self-tapping heavy duty screws of sufficient length to penetrate the steel deck a minimum of 3/4-inch (19mm), minimum 3-inch (75mm) diameter steel plates with recessed #3 Phillips screw head for use with insulation, such as "#14 Heavy Duty Roofing Fastener" by OMG, "PerLock Heavy Duty Fastener" by DerbiGum, "Parafast HD Fastener" by Siplast, "HD Fastener" by Johns Manville, or as approved by manufacturer to achieve the designated uplift criteria.
- B. Heat Resistant Insulation: Molded hydrous calcium silicate-based or perlite-based heat resistant rigid pipe insulation, 2-inches in thickness and sized for installation around circular/tubular element such as "Sproule Pipe Insulation" or "Thermo-12 Gold" by Industrial Insulation Group, 800/334-7997.
- C. Compressible Fill Insulation: Foil or paper faced compressible fiberglass batten roll insulation of proper size and thickness to insert at openings at penetrations, perimeters, and curbs such as manufactured by Owens Corning.

ROOF REPLACEMENT

LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING CYPRESS, TEXAS

D. Insulation Adhesive:

1. Low-Rise Foam Adhesive: Dual-component Reaction-cure Adhesive: Two-part spray-applied low-rise urethane foam adhesive such as "OlyBond 500" by OMG, "JM 2-Part UIA" by Johns Manville, "ISO Spray R" by Elevate, "DuoTack 365" by Soprema, or approved equal.

PART THREE - EXECUTION

3.01 EXAMINATION:

- A. Roof system manufacturer's representative shall inspect roof deck and associated substrates and provide written acceptance of conditions.
- B. Manufacturer's approved roofing contractor shall inspect and approve deck and substrates.
- C. Roofing contractor shall examine roof deck and related substrates and verify that there are no conditions that would prevent roof system manufacturer's approved application of roof system. These conditions include, but are not limited to, the following:
 1. Inadequate support or anchorage of decking or substrates to structure.
 2. Accumulations of moisture.
 3. Tears, holes, cracks, or punctures.
 4. Ridges, uneven conditions, or gaps.
 5. Rust or other forms of deterioration.
 6. Presence of foreign materials.
- D. Start of work constitutes acceptance of substrate and site conditions.

3.02 PROTECTION:

- A. Provide special protection from traffic on yet to be removed roofing and newly installed roof materials.

3.03 PREPARATION:

- A. Do not install insulation until defects in roof deck and substrates are corrected in order to meet roof system manufacturer's requirements and to ensure that deck conditions will not restrict roof drainage.
- B. Broom sweep and clean areas to receive new insulation.
- C. Perform pull-out resistance tests in general accordance with ANSI/SPRI FX-1-2006 with each of the specified screw fasteners on the existing metal deck. Provide results of pull-tests to roof material manufacturer for determination of the type and number/spacing of fasteners to be used for the application and designated as such in roof assembly/system letter to be issued by manufacturer.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

3.04 APPLICATION:

A. General:

1. Stagger end joints of insulation boards 1/2 of overall length of board.
2. Butt joints tightly allowing no more than 1/4-inch (6mm) wide gaps between units. Fill joints between adjacent boards with like insulation or foam adhesive.
3. Do not use warped, bent, or otherwise damaged insulation boards.
4. Field cut and fit insulation at penetrations, curbs, and walls.
5. After installation of initial layer of insulation, install subsequent layers of insulation directly over preceding layer.
6. Stagger all joints (side and end) between layers of insulation.
7. Install tapered insulation in field of roof to achieve a resulting 1/4-inch per foot (minimum) slope on designated roof areas.
8. Field cut tapered insulation boards to create crickets at upslope sides of curbs, along walls, and between drains and to form sumps at drains to direct water to drainage medium.
9. Prepare existing roof on designated areas to receive cover board installation as referenced in Section 02 07 20.

B. Mechanical Attachment of Insulation:

1. Mechanically fasten insulation layer to roof deck in accordance with manufacturer's criteria and results of pull-tests to achieve specified wind uplift resistance.
2. Fully engage and seat fasteners. Do not overtighten or strip threads. Bent, deformed, or unseated fasteners or plates are unacceptable.
3. Fasteners must penetrate top flange (rib) of metal deck a minimum 3/4-inch (19mm). Do not overdrive fasteners. Remove and replace overdriven, stripped, or non-engaged fasteners.
4. Properly seat mechanical fasteners and keep heads flush with plates. Cupped plates or unseated screw heads are not acceptable.
5. Do not rupture or deform surface of the insulation by mechanically fastening.
6. Install fasteners in accordance with approved spacing/number per board. Position fasteners 6-inches from sides and ends of boards and throughout field of boards as designated.

C. Adhered Layers of Insulation:

1. Stagger end joints of insulation boards 1/2 of overall length of board. Stagger joints of subsequent insulation layers from underlying insulation layer.
2. Butt joints tightly allowing no more than 1/4-inch (6mm) wide gaps between units. Fill joints between adjacent boards with low-rise foam adhesive. Do not use warped, bent, or otherwise damaged insulation boards.
3. Field cut and fit insulation boards at penetrations, curbs, and walls. Field cut tapered insulation boards to create crickets at upslope sides of curbs, along walls, and to form sumps at drains.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

4. Ribbon Application of Low-rise Foam Adhesive: Dispense 3/4-inch to 1-inch (19mm to 25mm) diameter continuous ribbon of adhesive placed 3-inches (75mm) inside each edge/side of the insulation board in picture-frame fashion. Dispense remaining ribbons of adhesive between "picture-frame" placed adhesive ribbon spaced 12-inches (300mm) on-center in the field of the roof, spaced 6-inches (150mm) on-center within an 8-foot wide area along the roof perimeters, and spaced 3-inches on-center within an 8-foot by 8-foot area at corners.
 5. Firmly set insulation boards in the ribbons of foam adhesive following application of the adhesive when adhesive has risen to proper height and walk-in the insulation to spread the adhesive ribbons, ensuring maximum contact. Do not push or slide insulation into position. Set weighted objects on sides, ends, and corners of boards until insulation is firmly attached (approximately 20 to 45 minutes).
 6. On additional insulation layers, dispense ribbons of adhesive in direction perpendicular to the direction of the beads that were dispensed on the underlying layer.
 7. Fill voids or open joints in top layer of insulation with spray-foam adhesive to provide monolithic surface to receive new membrane.
 8. Adhere partial boards and tapered edge strips with adhesive ribbon positioned in picture-frame fashion along perimeter of board and remaining adhesive ribbons spaced in accordance with location on roof (field, perimeter, or corner).
- D. Heat Exhaust Vents:
1. Install heat resistant insulation around existing heat exhaust flue, vent pipes, or other penetrations that experience elevated operation temperature.
 2. Install new sheet metal base around insulation and strip flange into new roof.
- E. Insulation Filler: Install compressible fiberglass insulation at openings in deck at penetrations, perimeters, expansion joints, and/or curbs.
- 3.05 CLEANING:**
- A. Remove debris and material wrappers from roof to dumpster daily. Leave insulation clean, dry, and ready to receive new roofing.
- 3.06 ADJUSTING:**
- A. Remove damaged insulation and install acceptable new units before installation of roof system.
- 3.07 PROTECTION:**
- A. Provide special protection from traffic on completed work.

END OF SECTION 07 22 16

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

SECTION 07 52 00

MODIFIED BITUMEN MEMBRANE ROOFING

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Installation of two-ply modified bitumen roof membrane and related flashings.

1.02 RELATED SECTIONS:

- A. 02 07 20 - Minor Demolition and Renovation Work.
- B. 07 22 16 - Roof Board Insulation.
- C. 07 62 00 - Sheet Metal Flashing and Trim.

1.03 REFERENCES:

- A. American Society for Testing and Materials (ASTM).
- B. FM Global Approval Guide.
- C. Underwriters Laboratories (UL): Building Materials Directory.
- D. National Roofing Contractors Association (NRCA): The NRCA Roofing and Waterproofing Manual.
- E. ASCE 7-16: "Minimum Design Loads for Buildings and Other Structures."
- F. Cool Roof Rating Council (CRRC).
- G. SPRI: Application Guidelines for Modified Bitumen Roofing Systems.
- H. FM Global Property Loss Prevention Data Sheets
 - 1. DS 1-28 "Wind Design".
 - 2. DS 1-29 "Roof Deck Securement and Above-deck Roof Components".
 - 3. DS 1-33 "Safeguarding Torch-applied Roof Installations"
 - 4. DS 1-49 "Perimeter Flashing".

1.04 QUALITY ASSURANCE:

- A. Application:
 - 1. Approved by manufacturer of accepted roofing system.
 - 2. A single applicator with a minimum of five years previous successful experience in installations of similar systems.
 - 3. Demonstrated successful installation in three other comparable buildings will be preferred. Submit subcontractor qualification statement.
- B. Manufacturer Requirements:
 - 1. Roof Membrane Assembly: Classified by Underwriters' Laboratories, Inc. as a Class A roof covering with no slope limitations.
 - 2. Roof Membrane Assembly: Classified by FM Global as a Class 1, approved assembly and Class 1-SH (Severe Hail) exposure.
 - 3. Manufacturer to have direct actual in-house experience in the manufacturing of the specified or similar products for a period of a minimum of twenty years.
 - 4. Manufacturer to have documented project history of installation of the specified or similar products in the United States for a period of a minimum of twenty years.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

5. Manufacturer to provide authorized documentation of the physical/ mechanical properties from the testing laboratory of Manufacturer of the actual materials utilized for the project indicating compliance with applicable ASTM standards D 5147 and D 6298.
 6. Manufacturer's top membrane ply product shall be tested by CRRRC and meet the following requirements: Initial Solar Reflectance of 0.70 (minimum) and Thermal Emittance of 0.75 (minimum); and 3-yr Aged Solar Reflectance of 0.55 (minimum) and 3-yr Aged Thermal Emittance of 0.75 (minimum).
 7. Manufacturer's products shall comply with the following standards:
 - a. Polyester/Fiberglass composite reinforcement SBS modified bitumen sheet, ASTM D 6162, Grade S or G, Type 1 – 3.
 - b. Fiberglass-reinforced SBS modified bitumen sheet, ASTM D 6163, Type 1 – 3, Grade S or G.
 - c. Polyester-reinforced SBS modified bitumen sheet, ASTM D 6164, Type 1 – 3, Grade S or G.
 - d. Polyester-reinforced APP modified bitumen sheet, ASTM D 6222, Type 1 or 2, Grade S or G.
- C. Regulatory Requirements:
1. Classified by Underwriters' Laboratories, Inc. as a Class A roof covering.
 2. Classified by FM Global as a Class 1A assembly.
 3. Follow local, state, and federal regulations, safety standards and codes.
 4. Install roof system in manner to resist minimum wind uplift pressures on Areas "A", "C", "D", "E", "H", and "I" as follows: -45 psf for Zone 1'; -67.5 psf for Zone 1; -90 psf for Zone 2; and -120 psf for Zone 3. Pressures are based on 139 mph wind speeds, Exposure B, Risk Category II, Enclosed Building, and Safety Factor of 2.0.
 5. Refer to applicable building codes for roofing system installation requirements and limitations. When a conflict exists, the more restrictive document will govern.
 6. Provide tested and approved system to meet or exceed the specified wind uplift pressures.
- D. Laboratory Testing and Samples:
1. At Owner's request, obtain field samples of the completed roof membrane, laps, and/or assembly.
 2. Take samples at locations designated by Owner's Representative and test for compliance with the requirements of the Contract Documents and with manufacturer's published performance criteria.
 3. Assume all costs for extraction and patching of all samples. Owner shall assume all costs for testing of field samples.
 4. Correct all deficiencies in accordance with the manufacturer's recommended procedures at no cost to Owner.
 5. If for any reason, areas that are tested by Owner fail to meet manufacturer's requirements, then all subsequent expense for retesting of those areas will be borne by Contractor.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- E. Installation:
1. Install in accordance with the manufacturer's current published application procedures, the general recommendations of the National Roofing Contractor's Association, and as supplemented by these documents.
 2. Follow Underwriters Laboratories requirements acceptable for use with specified products or systems.
 3. During installation and upon completion of installation, an inspection shall be conducted by a technical representative of the manufacturer to certify that roofing system has been installed according to manufacturer's most current published specifications and details.
 4. All roofing shall be as described in this Section and shall be provided and/or approved by roof system manufacturer.
 5. Obtain written approval from the manufacturer for any materials not manufactured or provided by manufacturer stating that materials are acceptable and are compatible with other materials and systems required.
 6. Personnel designated to utilize propane torching equipment to install roofing materials must have current CERTA safety certification issued by MRCA.
- F. Make no deviations from this Specification or the approved shop drawings without the prior written approval of the Architect, Owner's Representative, and roof membrane manufacturer.
- G. Perform entire work of this Section in accordance with the best standards of practice relating to the trades involved.

1.05 DELIVERY, STORAGE AND HANDLING:

- A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.
- B. Store materials in accordance with manufacturer's recommendations. Store rolled goods on end on clean raised platforms. Store other materials in dry area, protected from water and direct sunlight, and maintain at a temperature of 60 to 80 degrees Fahrenheit (16 to 27 degrees Celsius).
- C. Provide continuous protection of materials against deterioration.
- D. Materials Stored on Roof Levels:
1. Distribute materials stored on roof to prevent concentrated loads that would impose excessive strain on deck or structural members or impede drainage. Position materials stored on roof over structural support beams and/or columns.
 2. Positively secure materials and protective covers to prevent displacement by wind.
 3. Tarp for protection from exposure.
 4. Cut and remove manufacturer's plastic "shrink wrapping" from materials during storage.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

1.06 SUBMITTAL:

A. General:

1. Material manufacturer's roof system letter indicating the following: proposed roof system components; general installation requirements (adhesive coverage rate, fastener pattern layout, etc.); roof system uplift pressure resistance; supporting independent laboratory test report indicating respective test pressures; and warranty coverage to be provided.
2. Material manufacturer's written approval/acceptance of specified roof system and issuance of specified warranty for project.
3. Shop drawings of details.
4. Manufacturer's product data sheets with Safety Data Sheets (SDS) on each material proposed for usage.
5. Sample of warranty that is to be issued upon project completion.
6. Samples of products proposed for use.

B. Shop Drawings:

1. Shop drawings which illustrate the Work, showing fabrication, layout, setting, or installation details.
2. Prepare shop drawings for details that are proposed for the project. Indicate on a roof plan, the proposed location of detail presented on shop drawing.
3. Indicate joints, types, and locations of fasteners, shapes, sizes, expansion joints, special conditions, and installation procedures for each flashing condition. Note critical dimensions, gauge, and finish of sheet metal for each flashing condition.
4. Submit shop drawings showing layout, joining, profiles, and anchorages of fabricated work.
5. Provide drawings depicting insulation board attachment for field, perimeter, and corner zones.

C. Product Data: Submit manufacturer's catalog sheets, providing descriptive data for each material proposed for use in construction of roof assembly and related flashings and components.

D. Samples: Provide physical examples of materials/components proposed for use to comprise the specified roof system.

1.07 PROJECT CONDITIONS:

A. Existing Conditions: Examine existing building and existing roofing and decking to determine physical conditions that affect removal of existing roofing and installation of new roofing and decking.

B. Environmental Requirements:

1. Apply roofing in dry weather.
2. Do not remove existing roofing and flashing in inclement weather or when rain is predicted (30% or more possibility).
3. Do not apply materials when ambient temperature is below 40 degrees Fahrenheit (5 degrees Celsius).
4. Do not expose material to a constant temperature in excess of 180 degrees Fahrenheit (82 degrees Celsius).

→ **ROOF REPLACEMENT**
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS

- C. Protection:
 - 1. Provide special protection or avoid heavy traffic on completed work when ambient temperature is above 80 degrees Fahrenheit (27 degrees Celsius).
 - 2. Restore to original condition or replace work or materials damaged during handling or roofing materials.
- D. Emergency Equipment: Maintain on-site equipment necessary to apply emergency temporary edge seal in the event of sudden storms or inclement weather.

1.08 SEQUENCING AND SCHEDULING:

- A. Do not remove more existing roofing in one day than can be replaced with new roofing and flashing in same day.

→ **1.09 WARRANTY:**

- A. Contractor shall submit to Owner prior to final payment, two copies of the following warranties:
 - 1. Roofing Material Manufacturer's Warranty: Project shall be installed in such a manner that the roof system manufacturer will furnish a written full-system (including, but not limited to, insulation layers, fasteners, adhesives, flashing sheets, etc.), no dollar limitation, labor and material warranty agreeing to replace/repair defective materials and workmanship, including leakage of water, abnormal aging or deterioration of materials, and other failures of the materials to perform for a warranty period of twenty years after date of written final acceptance by Owner.
 - 2. Contractor's Warranty: In addition, Contractor shall furnish a written warranty agreeing to repair/replace defective installation and workmanship causing leakage of water, deterioration of materials, and other failures of the installed system, sealants, painting coatings and related work on this project, to perform for a warranty period of two-years after date of written final acceptance by Owner.

→ **PART TWO - PRODUCTS**

2.01 MANUFACTURER:

- A. Acceptable SBS Modified Bitumen Roofing Manufacturers:
 - 1. Siplast.
 - 2. Soprema.
 - 3. Johns Manville.
 - 4. GAF.
 - 5. Or approved equal.
- B. Acceptable APP Modified Bitumen Roofing Manufacturers:
 - 1. Derbigum.
 - 2. Elevate.
 - 3. Or approved equal.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

2.02 SHEET MATERIALS:

A. SBS Membrane System:

1. Membrane Base Ply: ASTM D 6164, Type I, Grade S; smooth-surfaced, polyester-reinforced, SBS modified bitumen sheet, suitable for application with cold-adhesive and/or heat-welding/torching methods such as "Paradiene 20 PR TG" or "Paradiene 20 PR" by Siplast, "Sopralene Flam 180" or "Sopralene 180 PS" by Soprema, "Ruberoid HW Smooth" by GAF, or "DynaWeld 180S" or "DynaBase PR" by Johns Manville, or approved equal.
2. Membrane Top Ply: White-colored granule-surfaced, fiberglass/polyester reinforced, SBS modified bitumen sheet suitable for application with torch-application/heat welding such as "Paradiene 30 HT FR TG BW" by Siplast, "Sopralene 180 FR GR (SG)" by Soprema, "RUBEROID EnergyCap HW Plus Granule FR" by GAF, "DynaWeld Cap 180 CR FR G" by Johns Manville.
3. Base Flashing System: One-ply of specified membrane base ply and one ply of specified top ply or other granule-surfaced (color to match cap sheet) polyester-reinforced SBS modified bitumen flashing sheet.

B. APP Membrane System:

1. Membrane Base Ply: ASTM D 6222, Type 1 or 2, Grade S; smooth-surfaced, polyester-reinforced APP modified bitumen sheet suitable for application with cold adhesive and/or heat welding/torching such as "DerbiBase HV" by DerbiGum, "APP 160" by Elevate, or approved equal.
2. Membrane Top Ply: ASTM D 6222, Type 1 or 2, Grade G; white-colored surfacing, polyester-reinforced, APP modified bitumen sheet suitable for application with cold adhesive and/or heat welding/torching methods such as "DerbiColor P CR FR" by DerbiGum, "APP 180 FR UltraWhite" by Elevate, or approved equal.
3. Base Flashing System: One ply of specified membrane base ply and one ply of specified membrane top ply.

2.03 RELATED MATERIALS:

- A. Asphalt Primer: ASTM D 41.
- B. Edge Sealant: Rubberized asphaltic plastic roof cement that is gun-grade version for sealing terminations of cap sheet such as "PerFlash" by DerbiGum, "Elastomastic 209" by Henry Co, or "#19 Ultra Rubberized Flashing Cement" by Karnak.
- C. Elastomeric Plastic Roof Cement: Rubberized plastic roof cement such as "PerFlash" by Derbigum or "SopraMastic" by Soprema to be used for temporary seals of flashings, embedding flanged sheet metal flashings, and three coursing of seams, termination bars, and cuts in modified bitumen sheets.
- D. Cold Process Adhesive: Low VOC or solvent free asphaltic or polymeric based adhesive suitable for use with modified bitumen sheets such as "Permastic" by DerbiGum, "COLPLY EF Adhesive" by Soprema, "SFT Adhesive" by Siplast, "MBR Bonding Adhesive" by Johns Manville, or approved equal.

ROOF REPLACEMENT

LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING CYPRESS, TEXAS

- E. Cant Strip: 3-5/8-inches (92mm) by 1-1/2-inches (38mm) composite cant strips of perlite such as "FesCant Plus" by Johns Manville or "Energy Guard Perlite Cant Strip" by GAF with field-cut strips of cover board with chamfered ends or triangular-shaped modified bitumen cant strip comprised of cut sections of "DerbiGum GP", 2-1/4-inch X 2-1/4-inch X 3-1/4-inch in size such as "Double DerbiCant" by DerbiGum..
- F. Walk Pads/Protection Pads: Pre-manufactured sheet or cut sections of granule surfaced polyester-reinforced modified bitumen sheet, extending minimum 2-inches (50mm) beyond edge of overlying element, with rounded corners and to have contrasting granule color from top ply such as "DerbiGum FR" by DerbiGum, "ParaTred" by Siplast, "DynaTred" by Johns Manville, or approved equal.
- G. Heavy-duty Protection Pad: Asphaltic composite board with mineral surfacing, 3/4-inch thick, (3' X 3') (3' X 5') size to suit application, such as "Whitewalk" by W.R. Meadows (2555 N.E. 33rd Street, Fort Worth, Texas 76111, 817/834-1969) or panel composed of recycled rubber particles such as "Roof-Gard Pads" by Humane Manufacturing, LLC (805 Moore Street, Baraboo, Wisconsin 53913, 800/369-6263), "Duo-Pad" by W.R. Meadows (1/2-inch by 30-inch by 4 foot) (3/4-inch by 33-inch by 4-foot), or "Walkway Roof Pads" by RB Rubber Products, Inc. (904 N.E. 10th Avenue, Portland, Oregon 97128, 503/472-4691).
- H. Liquid Flashing System: Polyester-reinforced PMMA liquid flashing system to apply around roof penetrations, low-profile flashing substrates, at roof drains, or other locations as designated on drawings, within these specifications, or where conditions dictate that would be included in the warranty coverage for the roof membrane system and match color of finish ply such as "JM PMMA Flashing" by Johns Manville, "Parapro" by Siplast, "DerbiFlash" by Derbigum, "Alsan" by Soprema, "GAF PMMA" by GAF, or approved equal.

2.04 MISCELLANEOUS MATERIALS:

- A. Best grade or quality approved by the manufacturer for the specific application.

PART THREE - EXECUTION

3.01 EXAMINATION OF SURFACES

- A. Examine substrate, roof deck, and related surfaces, and verify that there are no conditions such as inadequate anchorage, foreign materials, moisture, ridges, or other conditions that would prevent satisfactory installation of the roofing system.
- B. Correct or complete any condition requiring correction or completion prior to installation of the roofing system. Notify Owner's Representative in writing of unacceptable conditions.
- C. Verify the location of all interior ducts, electrical lines, piping, conduit, and/or similar obstructions. Perform all work in such a manner as to avoid contact with the above-mentioned items.
- D. Verify insulation is installed correctly.
- E. Start of work under this Part Three constitutes acceptance of deck substrate and site conditions.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

3.02 PREPARATION:

- A. Do not stockpile debris on roof surface.
- B. Promptly remove debris each day. Use chutes, hoists, or other equipment to transfer debris from roof surface to disposal container.
- C. Cleaning:
 - 1. Verify that debris has been completely removed.
 - 2. Clean roof insulation with stiff bristle broom and forced-air blower immediately prior to base ply application.

3.03 APPLICATION

- A. Prior to roof membrane installation, seal all openings, projections, and penetrations in the substrate to prevent material or debris entry into the building. Correct damage to the building or interior components caused by work at Contractor's sole expense.
- B. Membrane Installation - General:
 - 1. Apply roofing in accordance with roofing system manufacturer's instructions and the following requirements. Apply roofing immediately following application of insulation as a continuous operation.
 - 2. The overall appearance of the finished roof application is a standard requirement for this project. Make necessary preparations, utilize recommended application techniques, apply specified materials, and exercise care to ensure finished application is acceptable to Consultant and Owner.
 - 3. When applicable, install sheet materials using adhesives applied to substrate for adhering the field of the sheet. Side laps and end laps shall be fused together using electric-operated hot-air welding equipment suitable for use with modified bitumen materials such as provided by Cadillac Products, Leister, or other suitable equipment.
 - 4. Prime top and bottom of metal surfaces, concrete surfaces, and masonry surfaces to receive roofing with a uniform coating of asphalt primer, at a nominal rate of one-gallon (3.8 liters) per 100 square feet (9.29 square meters).
 - 5. Place cant strips on top of substrate to form continuous monolithic substrate at walls and curbs. Nail wood cants to nailer and to wall or vertical nailer, where possible. Secure fibrous cants by embedding in ribbons of low-rise foam adhesive. Miter cut cant strips to form continuous substrate at corners. Adhere cut piece of roof cover board in low-rise foam adhesive over top of fibrous cant.
 - 6. Lay all layers of roofing free of wrinkles, creases, or fishmouths. Exert sufficient pressure on the roll during application to ensure prevention of air pockets.
 - 7. Lay layers of roofing perpendicular or parallel to the slope of the deck as recommended by manufacturer.
 - 8. Install roof system configuration and components as required to meet the requirements of the testing assembly for the respective proposed roof material manufacturer.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

C. Membrane Application - Base Ply:

1. Cold Adhesive Application Option: Apply one ply of modified bitumen base ply over substrate in uniform continuous application of cold process adhesive. Apply adhesive at a nominal rate of 1-1/2 gallons to 2-1/2 gallons (5.71 liters to 9.5 liters) per 100 square feet (9.29 square meters), depending on the substrate (base sheet or insulation). Keep the adhesive applicator in close proximity to the material roll, maximum 2 feet (.7m). Exert sufficient pressure on roll during application. Roll field of sheet after initial installation of base ply with weighted lawn/linoleum roller. Heat-fuse the side and end lap seams of base ply with controlled hot-air equipment.
2. Heat-Fusing Application Option: Apply one ply of modified bitumen base ply over substrate using heat-fusing methods with hot-air gun equipment suitable for modified bitumen sheets. Apply heat evenly across the front face and full width of the roll while pulling roll forward and unrolling roll uniformly with an even downward pressure. Apply heat to roll until the bitumen back coating reaches the desired application temperature, resulting in complete melting of the burn-off film, a glossy appearance of the back coating, and an approximate 1/4-inch (6mm) to 1/2-inch (13mm) bitumen flow from edge of sheet. Exert sufficient pressure on roll during application. Do not stand on the subject sheet during the installation process.
3. Fully adhere membrane base ply to base sheet or insulation and have a minimum of 3-inch (75mm) side laps and 6-inch (150mm) end laps. Stagger end laps of adjacent sheets of membrane base ply a minimum of 3 feet. Extend field sheet of membrane base ply to top edge of cant.
4. Complete membrane base ply application over respective roof area prior to application of membrane top ply. Apply additional ply of membrane base ply in low areas or areas that may be subjected to ponding water or to promote positive drainage.
5. Apply a patch over areas of base ply with areas of physical damage or other defects. Patch to be the full width of membrane base ply and extend a minimum of 2-inches (50mm) beyond the defect in each direction.
6. Check lap seams and seal unbonded or discontinuous seams using a heated steel trowel.

D. Base Flashing Application - Base Ply:

1. Install and complete application of base ply of flashing each day base ply of membrane is installed. Install base ply flashings at curbs and parapet walls.
2. Install first ply of base flashing extending horizontally 4-inches (100mm) beyond edge of cant or sheet metal flashing flange and vertically to top edge of curb, wall, or minimum 4-inches (100mm) above the top of the cant.
3. Length of base flashings shall be maximum 6-feet (2m). Lap ends of base flashings 4-inches (100mm), minimum. Seal top edge of base flashing on a daily basis with a continuous troweling of elastomeric roof cement.
4. Check lap seams and seal unbonded or discontinuous seams using a heated steel trowel.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

5. For wood substrates, adhere base ply flashing with cold-process adhesive or mechanically attached base sheet. Secure base sheet 8-inches (200mm) on-center in all directions and along lap seams, overlapping adjacent sheets 4-inches (100mm), minimum. Adhere modified bitumen base ply flashing to base sheet or substrate.
 6. Where existing substrate is deemed unacceptable to install new materials, attach plywood or acceptable gypsum roof board to serve as new substrate for flashing membrane.
- E. Strip-in Flashing:
1. Prime top and bottom of metal flanges and other sheet metal components completely and allow to dry prior to installation.
 2. After membrane base ply has been applied, install metal flange flashings according to Section 07 62 00 - Sheet Metal Flashing and Trim. Strip-in flange/metal with strips of base flashing (base ply) concealing entire flange or horizontal surface of metal flashing and extending a minimum of 4-inches (100mm) beyond edge of flange/metal and heat-fusing strip-in to base ply.
- F. Membrane Application - Top Ply:
1. Unroll top ply and cut roll length in half approximately 15-foot lengths. Lay cut sections of top ply with underside exposed to allow the sheet to relax prior to application. Prior to application, re-roll "relaxed" sheet using insert provided with roll.
 2. Beginning at the low point on the roof, fully adhere membrane top ply to membrane base ply with minimum of 3-inch (100mm) side laps or width of selvage edge and 6-inch (150mm) end laps. Extend membrane top ply to top edge of cant. Apply each sheet directly behind applicator. Stagger side laps of top ply a minimum of 12-inches (300mm) from side laps of base ply.
 3. Cold Adhesive Application: Apply modified bitumen top ply in uniform continuous application of cold process adhesive. Apply adhesive at a nominal rate of 1-1/2 gallons to 2-1/2 gallons (5.71 liters to 9.5 liters) per 100 square feet (9.29 square meters). Keep the adhesive applicator in close proximity to the material roll, maximum 2 feet (.7m). Exert sufficient pressure on roll during application. Roll field of sheet after initial installation of top ply. Heat-fuse the side and end lap seams of the cap sheet with hot-air gun equipment.
 4. Heat-Welding/Fusing Application: Apply heat evenly across the face and full width of the roll while unrolling roll uniformly with an even downward pressure. Apply heat to roll using hot-air equipment until the bitumen back coating reaches the design application temperature, resulting in complete melting of the burn-off film, a glossy appearance of the back coating, and an approximate 1/4-inch (6mm) to 1/2-inch (13mm) bitumen flow from edge of sheet. Roll lap seams with steel roller immediately upon fusing/ mating of the sheets.
 5. While installing membrane top ply, provide proper protection or method during application to prevent contamination, soiling, charring, or marring the finish surfacing of previously installed sheet. Exert sufficient downward pressure on roll during application.

ROOF REPLACEMENT

LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING CYPRESS, TEXAS

6. During end lap application, trim the inside corner along the selvage edge of the underlying sheet at the end of the roll. The trimmed area shall be the width of the selvage edge and extend downward from the end of the roll to the outer side of the roll in a linear direction approximately 5-1/2-inches (138mm) from end of roll. Trim outside corner of membrane top ply at end laps to provide rounded finished corner. Remove surfacing or de-granulate areas of underlying top ply to receive overlapped portion of adjacent sheet. Pre-heat the subject area of the underlying sheet so that surfacing material can be removed or that granules can be "depressed" or sunk into the compound and the bitumen compound exudes up through the granules to result in a bituminous material-to-bituminous material contact.
 7. Embed white-colored granules into bituminous bleed-out along edges of cap sheet to provide monolithic surface color.
 8. Install membrane top ply so that end laps of every other sheet are aligned.
 9. Apply a patch over areas of membrane with displaced/dislodged granules/surfacing or other surface discoloration or defects. Patch shall be the full width of membrane top ply and extend a minimum of 2-inches (50mm) beyond the defect in each direction. Round corners of membrane patches.
 10. Apply additional finish material, color to match top ply, over stains, soiling, and other areas of the top ply with displaced or discolored surfacing.
 11. Check lap seams and seal unbonded or discontinuous seams using a heated steel trowel.
 12. Apply membrane top ply and terminate at the rise in the metal component. Apply a continuous bead of edge sealant along edge terminations of modified bitumen sheet (i.e. flashing flanges, exhaust vents, metal edge, etc.). Bead of edge sealant shall match height of top sheet surfacing and shall be "canted" to shed water. Embed loose granules or coat with elastomeric coating, color to match top ply, into newly installed edge sealant.
- G. Base Flashing Application - Top Ply:
1. Apply top ply of flashings only after membrane top ply is in place at curbs and parapet walls.
 2. Remove surfacing or de-granulate granulated surfaces on top ply sheet of membrane and flashings to receive flashing top ply. Pre-heat the subject area of the underlying surfaced sheet so that surfacing can be removed or so that granules can be "depressed" or sunk into the compound and the bitumen compound exudes up through the granules to result in a bituminous material-to-bituminous material contact.
 3. Cut modified bitumen flashing membrane to extend a minimum of 4-inches (100mm) above the top of the membrane top ply covering the cant. The overall minimum height of the top of the flashing membrane above the top of the roof surface is 8-inches (200mm). Extend flashings to full height of vertical substrate.
 4. Extend the flashing membrane horizontally 4-inches (100mm) onto the field of the roof surface beyond the bottom edge of the cant strip.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

5. Cut flashing from roll using selvage edge as lap seam for adjacent sheets, resulting in sheet lengths of nominal 3 feet (1m). Lap ends a minimum of 4-inches (100mm) and stagger laps from laps of underlying plies.
 6. Fully adhere and conform top ply of flashing to substrate. Extend bleed-out of applied base flashing a minimum of 1/2-inch (13mm) beyond the side or end lap. "Broom-in" foil-faced flashing ply immediately upon installation using a damp sponge mop. Embed granules or coat bleed-out with aluminum dust/elastomeric coating, to match finish surfacing.
 7. Walls: Mechanically attach top edge of modified bitumen membrane flashing with termination bar and appropriate fasteners spaced 6-inches (150mm) on-center. Apply three-coursing consisting of an initial continuous troweling of elastomeric plastic roof cement, embedded reinforcing fabric, and a secondary application of elastomeric plastic roof cement along and concealing the top edge of base flashing and termination bar. Utilize duct/masking tape, or similar tape, to provide line of demarcation for three-coursing located parallel and 2-inches below termination bar.
 8. For wall substrates greater than 12-inches (300mm) in height, install base flashing to a height of 12-inches (300mm) as specified. For remaining wall height, Adhere modified bitumen flashing to substrate and overlap wall flashing on top edge of base flashing a minimum of 4-inches (100mm). Install appropriate fasteners in vertical lap seams spaced 6-inches (150mm) on-center. Apply three-coursing over completed lap seams.
 9. Apply cut section of modified bitumen over corners of curb flashings to conceal cuts in flashing material at corner laps.
 10. Install flashing sheets on adjoining perpendicular sides (outside corners) of curbs or walls so that outside corners of flashing sheet align and are rounded.
 11. Curbs: For curbs with non-removable hoods/covers/units, extend flashing to full height of curb, secure with termination bar and appropriate fastener, and apply three-coursing of plastic cement and reinforcing fabric over top edge of sheet. Utilize duct/masking tape, or similar tape, to provide line of demarcation for three-coursing located parallel and 2-inches below termination bar. For curbs with removable hoods/covers/units, wrap flashing sheet over top of curb and secure to top or inside of curb with angle termination bar and appropriate fasteners spaced 6-inches (150mm) on-center.
- H. Metal Flanged Flashings:
1. Apply membrane top ply and terminate at the rise in the metal component.
 2. Apply a target around penetrations or utilize flashing method to conceal cuts in the membrane top ply.
 3. Apply a continuous bead of edge sealant along edge terminations of modified bitumen sheet (i.e. flashing flanges, exhaust vents, metal edge, etc.). "Cant" bead of edge sealant to shed water. Embed loose granules in newly installed edge sealant and apply coating to match finish of top ply, where applicable.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

I. Liquid-Flashings

1. Apply liquid flashing systems in accordance with the manufacturer's application guidelines at select and designated locations where conventional flashings cannot be installed to meet manufacturer's warranty requirements, at penetrations through membrane/flashings, and around roof drain sump areas.
2. Clean penetrating element or approved substrate to receive liquid flashing system.
3. Apply masking tape on substrate to create straight-edge terminations of the liquid flashing system.
4. Embed reinforcing fabric in the liquid flashing system to form monolithic flashing with the finished roofing membrane. Apply finish surfacing on the liquid flashing system to match the color of the finished top ply of the roof membrane or substrate to which the coating is applied as approved by Consultant/Engineer and Owner.
5. Apply reinforced liquid flashing system on top of cap sheet in area 3-feet X 3-feet around each primary roof drain. Embed granules, color to match cap sheet, in surface of liquid flashing.
6. Apply reinforced liquid flashing/roofing system on top of cap sheet in area 3-feet x 3-feet located around goose-neck/heat exhaust vents and/or pipes that discharge material onto roof surface. Finish surface of liquid flashing/roofing to match color of cap sheet.

J. Daily Seal:

1. Install temporary seal at completion of each day's work.
2. Ensure that water does not flow beneath any completed sections of the membrane system. This will include completion of all flashings, terminations, and daily seals. When possible, install starting at the highest point of the project area, working to the lowest point.
3. Temporarily seal membrane edge with plastic roof cement. Exercise caution to ensure that membrane is not temporarily sealed near drains in such a way to promote water migration below the membrane or impede drainage.
4. Install primary night seal beneath daily night seal in such a manner to seal both new and existing roof system to roof deck to prevent moisture migration from or into either old roof or new roof.
5. Install daily night seals by extending the new roof membrane beyond the insulation and sealing to the existing roof surface using plastic roof cement, sealant, self-adhering membrane or other material/method to achieve watertight seal.
6. When work is resumed, remove and dispose of portion of membrane where materials were applied to achieve night seal.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- K. Daily Fire Watch: Contractor personnel to perform daily "Fire Watch" a minimum of two-hours upon completion of heat-fusing installation methods. Contractor to utilize an infrared-sensing thermometer or similar equipment that can provide instant detection of elevated and/or different temperatures of roofing materials. If elevated or suspect temperatures or underlying conditions are detected, contractor to remove necessary materials and perform necessary actions to alleviate the noted condition. Maintain appropriate number of fire extinguishers on roof during installation of roofing, minimum one per application location.

3.04 PROTECTION PADS:

- A. Install layer of heavy-duty protection pad loose laid on top of cut section of modified bitumen protection pad adhered to roof surface for large-sized (greater than 4-inch diameter) or heavy roof-top piping. Install and adhere a layer of modified bitumen protection pad under each support for typical roof-top piping including condensate piping, conduit (2-inch diameter and smaller), coolant, gas, and other similar piping. Size of protection layers shall be minimum 2-inches longer in each direction through base of support with rounded corners
- B. Install protection pads, adhered to capsheet, in locations where items are to be installed on roof surface including, but not limited to, lightning protection system components

3.05 WALK PADS:

- A. Install walkpads around serviced equipment, at roof access points, in areas where water is discharged onto roof surface from adjacent/higher roof area, highly trafficked areas, and as required by Owner. Install adjacent walkpads with approximate 4-inch space between ends and/or sides. Apply walkpads on top of membrane top ply.

3.06 FIELD QUALITY CONTROL:

- A. Inspections:
1. During installation on individual roof areas, provide for one on-site inspection by a technical representative of roof membrane manufacturer.
 2. Upon completion of installation, provide a final inspection and written report by a technical representative of roof membrane manufacturer to confirm that roofing system has been installed in accordance with manufacturer's requirements.

3.07 CLEANING:

- A. Remove debris, adhesives, and sealants from surfaces.
- B. Remove debris and material waste from project site.

END OF SECTION 07 52 00

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

SECTION 07 54 00

FLUID-APPLIED ROOF COATING

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Application of elastomeric coating to existing single ply membrane roofs on designated Areas "B", "F", and "G" (Alternate Bid).

1.02 RELATED SECTIONS:

- A. 02 07 20 - Minor Demolition and Renovation Work.
- B. 07 62 00 - Sheet Metal Flashing and Trim.

1.03 DEFINITIONS:

- A. "Coating" as used in this Section means coating system materials including primers, sealers, caulks, fillers, and other applied materials whether used as prime, intermediate, or finish coats.

1.04 QUALITY ASSURANCE:

- A. Manufacturer Qualifications: Provide primary products of single manufacturer with not less than five years of successful experience in producing elastomeric coating materials of type required for Project applications equivalent to requirements for this Project. Provide secondary materials only as recommended by manufacturer of primary roofing materials.
- B. Installer Qualifications: Manufacturer licensed or approved applicator as certified in writing by primary materials manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials to jobsite in manufacturer's unopened, labeled containers and comply with manufacturer's instructions for storage and handling. Containers shall bear UL label or FM approval marking.

1.06 PROJECT CONDITIONS:

- A. Apply coatings only when temperature of surfaces and surrounding air temperatures and humidity levels are within limits specified by coating manufacturer during application and drying periods.
- B. Do not apply coating in snow, rain, fog, mist, or when relative humidity exceeds 85 percent, or to damp or wet surfaces unless otherwise permitted by coating manufacturer's printed instructions.
- C. Allow sufficient daylight hours necessary for elastomeric coating system to cure if ultraviolet light is required for curing process.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

1.07 WARRANTY:

- A. Contractor's Warranty: Provide Contractor's warranty covering defects in installed materials and workmanship for period of two years from date of final acceptance by Owner.
- B. Manufacturer's Warranty: Provide manufacturer's ten-year written warranty, signed by authorized representative of manufacturer, warranting applied roofing materials and labor from leakage, delamination, deterioration, blistering, or other coating failures resulting from installation and/or material failure.

PART TWO - PRODUCTS

2.01 MANUFACTURERS:

- A. Acceptable Manufacturers:
 - 1. Gaco.
 - 2. GAF
 - 3. Or approved equal.

2.02 MATERIALS:

- A. Silicone Coating: Single-component, moisture-cured, silicone-based elastomeric coating with fungus-resistant protection, white in color, minimum 95% solids by weight, 195% elongation, such as "GacoFlex S42" series coating by Gaco; "High Solids Silicone Coating" by GAF, or approved equal.
- B. Flashing Compound: Trowel/gun grade silicone-based elastomeric flashing compound, minimum 80% solids by weight, 200% elongation, such as "GacoPatch" or "GacoFlex SF4200 SeamSeal" by Gaco; "Silicone Mastic" by GAF; or approved equal.
- C. Reinforcing Fabric: 100% stitchbond polyester fabric; 3 oz./square yard; 60% elongation, and size suitable for application and embedment in coating, "GacoFlex 66S Reinforcing Polyester Mesh" by Gaco, "Premium Fabric" by GAF, or approved equal.
- D. Primer: Single component, solvent-based primer such as "GacoPrime" by Gaco; "Multi-Purpose Primer" by GAF, or approved equal.
- E. Cleaner: Non-hazardous concentrated cleaning solution such as "GacoWash Concentrated Cleaner" by Gaco, "Cleaning Concentrate" by GAF, or approved equal.

PART THREE - EXECUTION

3.01 PREPARATION:

- A. Comply with manufacturer's instructions for preparation of substrate to receive coating.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- B. Perform coating adhesion tests in accordance with ASTM D 903 "Standard Test Method for Peel or Stripping Strength of Adhesive Bonds" on existing single ply membrane on each area.
 - 1. Make a mock-up of the intended coating system on the existing roof surface; perform mechanical surface preparation and/or simulate cleaning process; apply primer on prepared surface; apply a layer of the specified coating to the substrate; Prepare no fewer than three (3) test patches for the first 100 squares and one (1) additional patch for each additional 100 squares at different locations on the roof to verify adhesion of the liquid-applied coating system.
 - 2. Place approximately 6-inches of precut 1-inch x 12-inches fabric strip into coating; allow remaining 6-inches of fabric to be available to pull on for test sample; apply another layer of coating to encapsulate the wetted section of fabric; allow coating to dry.
 - 3. Secure/hold loose end of fabric on a force gauge and pull the fabric slowly with the force gauge. The average value should be above 2 PLI (Pounds per linear inch) of fabric width
- C. Clean and power wash substrate free of dust, debris, and other substances detrimental to coating.
- D. After the roof is dry from initial cleaning, apply concentrated cleaner according to instructions using a Hudson-type agricultural sprayer, and allow solution to stand for 10 to 15 minutes, adding a light mist of water to prevent drying. Lightly agitate any heavily soiled areas with a broom or brush. Use a commercial power washer >3,000 psi (>21 MPa) to remove debris and continue rinsing until all suds are gone. Start at the highest point of the roof and work towards the lowest point.
- E. Treat areas of biological growth with solution of 1-part bleach and 3 parts water; followed by power washer rinse.
- F. Repair single ply flashings and membrane prior to applying coating in accordance with manufacturer's recommendations.
- G. Install new flashing sheets and accessory items as required to provide suitable substrate for coating.
- H. Fill voids, including non-moving joints and rough areas of substrate, with flashing compound in manner recommended by coating manufacturer. Fill voids larger than 1/4-inch (6mm) with materials recommended by coating manufacturer's recommendations. Form coves at penetrations and corners in substrate.
- I. Mask off, neat and square, adjoining areas and, as needed, areas not to receive coating.

3.02 APPLICATION:

- A. Comply with instructions of roofing materials manufacturer for application of fluid-applied roofing, including integral flashings, reinforcing fabric, or surfacing. Apply total thickness of roofing membrane in number of coats required by the manufacturer to obtain minimum dry-film thickness and ten-year materials and labor warranty.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- B. Lap Joints, Seams, and Flashing Detail Areas: Apply 6-inch wide strip of coating, 24-mils wet, centered over laps and seams and embed 4-inch wide strip of reinforcing fabric completely embedded in coating; then apply a second coat of coating over the encapsulated mesh and allow to cure.
- C. Curbs, Walls, and Penetrations: Apply coating, 24-mils wet, a minimum 8-inches vertically up curbs, walls, and penetrations and embed 4-inch wide strip of reinforcing fabric completely embedded in coating at vertical to horizontal transition; then apply a second coat of coating over the encapsulated mesh and allow to cure.
- D. Single ply Membrane Coating: Apply membrane coating in manner to provide uniform thickness as required by material manufacturer. Apply coating at material manufacturer's recommendations or 2 to 3 gallons per 100 square feet. Cure in accordance with material manufacturer's recommendations. Correct defect, flaws, or holidays before applying second coat. Apply additional coating in high-traffic areas/walkways and immediately broadcast granules into finish coat.
- E. Allow coating to cure in accordance with material manufacturer's recommendations. Correct defects, flaws, or holidays. Cure in accordance with material manufacturer's recommendations before allowing traffic on roof.

3.03 FIELD QUALITY CONTROL:

- A. Start installation of fluid-applied roofing membrane only in presence of manufacturer's technical representative if required by manufacturer. Installation of fluid-applied roofing membrane prior to presence of manufacturer's technical representative is subject to rejection. Submit written approval/acceptance of substrate conditions.

3.04 ADJUSTING:

- A. Remove overspray, drips, runs, and spills and restore affected areas to pre-project condition prior to final acceptance of Project by Owner.
- B. Repair or replace, as required, deteriorated or defective work found at time of final inspection. No seams should be visible on roof. Repair damages to roofing which occurred subsequent to roofing installation and prior to final inspection. Ensure that roof is in optimum condition at time of Substantial Completion and final inspection.

3.05 CLEANING:

- A. Remove trash and debris from jobsite daily. Remove remaining materials from jobsite and dispose of after completion of roofing system.

END OF SECTION 07 54 00

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Shop or field-formed sheet metal work for moisture protection.
- B. Types of work specified in this Section include:
 - 1. Roof penetration sleeves and bonnets.
 - 2. Receivers.
 - 3. Counter flashings.
 - 4. Roof edge flashing.
 - 5. Coping.
 - 6. Roof drains.
 - 7. Plumbing vent pipes.
 - 8. Curb cap flashings.
 - 9. Through-wall flashings.
 - 10. Heat exhaust vents.
 - 11. Pipe box.
 - 12. Miscellaneous sheet metal accessories.

1.02 RELATED SECTIONS:

- A. 02 07 20 - Minor Demolition and Renovation Work.
- B. 07 52 00 - Modified Bitumen Membrane Roofing.

1.03 REFERENCES:

- A. American Society for Testing and Materials (ASTM).
- B. Federal Specifications (FS).
- C. National Roofing Contractor's Association (NRCA): NRCA Roofing and Waterproofing Manual, latest edition.
- D. Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA): Architectural Sheet Metal Manual, latest edition.
- E. ANSI/SPRI/FM 4435/ES-1: "Test Standard for Edge Systems Used With Low Slope Roofing Systems."

1.04 WARRANTY:

- A. Contractor's Warranty: Provide Owner a written warranty which shall warrant sheet metal work to be free of leaks and defects in materials and workmanship for two years after date of final acceptance by Owner.
- B. For pre-finished metal, provide manufacturer's twenty-year guarantee covering deterioration or failure of the fluoropolymer finish.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

1.05 PERFORMANCE REQUIREMENTS:

- A. Roof edge sheet metal flashing shall be certified by the manufacturer or shop-fabricator to comply with ANSI/SPRI Standard ES-1; Test Methods RE-1, RE-2, and RE-3 for copings and metal edge flashings for 140 mph wind speed and horizontal design pressure and vertical design pressure applicable for the eave height of the subject building.
- B. The sheet metal coping product shall be UL Classified by Underwriters Laboratories, Inc. or other third-party verification of compliance with the ANSI/SPRI ES-1 Wind Design Standard.
- C. Provide base sheet metal that is manufactured in the United States and incorporates some percentage of recycled content. Provide documentation from manufacturer/supplier supporting this information.

1.06 MOCK-UPS:

- A. Contractor to prepare mock-ups utilizing materials proposed for the finished product and to simulate the desired appearance of the finished product. Mock-ups shall be of appropriate size to depict finishes and connections
- B. Schedule of mock-ups shall include the following: Typical wall counter flashing condition(s); Typical metal edge/fascia and coping condition(s); size of mock-ups shall be 3 feet minimum.

PART TWO - PRODUCTS

2.01 MANUFACTURERS:

- A. Acceptable Pre-finished Sheet Metal Manufacturers:
 - 1. Berridge Manufacturing Company.
 - 2. Peterson Aluminum Corporation (PAC CLAD).
 - 3. McElroy Metals, Inc.
 - 4. Metal Building Components, Inc. (MBCI).
 - 5. Or approved equal.

2.02 SHEET METAL MATERIAL:

- A. Pre-finished Metal: "Kynar 500" or "Hylar 5000" fluoropolymer pre-finished G90 galvanized/galvalume sheet metal, minimum 24 gauge. "Kynar 500" or "Hylar 5000" finish shall consist of a two coat Polyvinyladine flouride, minimum 70 percent by weight in coatings, dry film thickness 1 mil, factory applied by metal manufacturer or supplier. Color selected by Owner from manufacturer's standard color chart.
- B. Zinc-coated (Galvanized) Sheet Metal: Commercial quality with 0.20 percent copper, in accordance with ASTM A 526 except ASTM A 527 for lock forming; coating designation G90 hot-dip galvanized, 24 gauge minimum.
- C. Sheet Lead: FS QQ-L-201, Grade B; 4 pounds per square foot (140n/m²) 0.0625-inches (1.6mm) thick minimum as used for roof drains.
- D. Stainless Steel Sheet Metal: ASTM A240, Type 304, ASTM A480, No. 2B/2D Mill Finish, gauge as scheduled.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

2.03 FASTENERS:

- A. Fasteners shall be same metal as flashing and sheet metal being joined.
- B. Exposed fasteners shall be self-sealing or gasketed for watertight installation.
- C. Heads of fasteners, including but not limited to, rivets, screws, and bolts, that are exposed or visible shall have same manufactured finishes as item being secured; color to match when applicable.
- D. Mechanical Fasteners:
 - 1. Refer to Section 02 72 00 – Minor Demolition and Renovation Work.
 - 2. Washers: Steel washers with bonded rubber sealing gasket.
 - 3. Screws: Self-tapping sheet metal type compatible with material fastened.
 - 4. Rivets: Stainless steel material for the head and stem, closed end, color to match sheet metal items being adjoined.

2.04 RELATED MATERIALS:

- A. Solder:
 - 1. ASTM B 32, alloy grade 58, 50 percent tin, 50 percent lead.
 - 2. For Use with Stainless Steel: 60-40 tin/lead solder, ASTM B 32.
- B. Flux:
 - 1. Phosphoric acid type, manufacturer's standard.
 - 2. For Use with Steel or Copper: Rosin flux.
 - 3. For Use with Stainless Steel: Acid-chloride type flux, except use rosin flux over tinned surfaces.
- C. Underlayment: Self-adhering rubberized asphalt sheet membrane, 40-mil thick, suitable for high-temperature applications up to 250 degrees Fahrenheit such as "Blueskin PR 200HT" by Henry, "WIP 300 HT" by Carlisle, or approved equal.
- D. Adhesives: Type recommended by flashing sheet manufacturer for waterproof and weather resistant seaming and adhesive application of flashing sheet.
- E. Metal Accessories: Sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gauge required for performance.
- F. Sealant:
 - 1. Type A: One component polyurethane sealant; ASTM C-920, Type S, Grade NS, Class 35; such as "Sikaflex 1a" by Sika Corp. or "Dymonic" by Tremco, color to match finish of metal.
 - 2. Type B: One-part low modulus neutral-curing silicone sealant, ASTM C-920, Type S, Grade NS, Class 50; such as "Sikasil WS-290" or "Sikasil WS-295" by Sika Corp., "Dowsil 795 Silicone Building Sealant" or "Dowsil 790 Silicone Building Sealant" by Dow Corning, or "GE Silpruf 2000" by Momentive Performance Technologies; color to match finish of metal.
 - 3. Type C: Self-adhering elastomeric butyl tape, 1/8-inch (3mm) by 3/8-inch (9mm), such as "Extru-Seal" by Pecora Corp.
 - 4. Type D: One component moisture cure polyether polymer sealant available in over 175 standard colors such as "Tite Bond Weather Master Sealant" by Franklin International, color to match finish/color of adjacent sheet metal.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- G. Base Material for Flashing Pans:
 - 1. Flashing Pans 12-inch by 12-inch and Smaller: Quick-setting grout formula meeting Corps of Engineers specification CRD-C-621, Type D and ASTM C-1107, Grade C, such as "Five Star Instant Grout" by Five Star Products, Inc., "Sika Grout 212" by Sika Corp., or approved equal.
 - 2. Flashing Pans Larger than 12-inch by 12-inch: Spray-foam such as "FrothPak" by InstaFoam.
- H. Pourable Sealer: Single-component pourable polyurethane sealer such as "Pourable Sealer" by JM, "1-Part Pourable Sealer" by Chem-Link, or approved equal.
- I. Termination Bar: 1/8-inch (3mm) thick, 1-inch (25mm) wide extruded aluminum bar with flat profile, factory punched oval holes (1/4-inch by 3/8-inch [6mm by 9mm]) spaced 6-inches (150mm) on-center, such as "TB 125" by The TruFast Corp. or "Heavy Flat Bar" by OMG.
- J. Stainless Steel Clamp: Stainless steel banding with worm-drive tightening, sized for application such as "Make-A-Clamp Kit" by Dynamic Fastener, 800/821-5448.
- K. Flexible Through-Wall Flashing: Self-adhering rubberized asphalt sheet suitable for high temperature application; "WIP 300 HT" By Carlisle Coatings & Waterproofing, "Vycor Plus Self-adhering Flashing" by GCP, or approved substitute.
- L. Drain Insert: One-piece constructed drain body with aluminum flange, 18-inches (450mm) diameter, stem 12-inches (300mm) in length, diameter to suit existing conditions, aluminum clamp ring and cast aluminum strainer such as "AlumaWeld RetroDrain" by Johns Manville, "Hercules" by OMG, or approved equal.

2.05 FABRICATION - GENERAL:

- A. Fabricate work in accordance with SMACNA Architectural Sheet Metal Manual and other recognized industry practices and approved shop drawings.
- B. Comply with material manufacturer's instructions and recommendations for forming material.
- C. Shop fabricate work to greatest extent possible. Fabricate inside and outside corners for metal edge flashings and copings from single piece with equal length legs, minimum 3 feet. Notch, lap, and seam inside and outside corners of counter flashings.
- D. Fabricate for waterproof and weather resistant performance with expansion provisions for running work sufficient to permanently prevent leakage, damage, or deterioration of work. Form work to fit substrates.
- E. Make angle bends and folds for interlocking metal with full regard for expansion and contraction to avoid buckling.
- F. Form materials with straight lines, sharp angles, smooth curves, and true levels. Avoid tool marks, buckling, and oil canning.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- G. Fold back edges of exposed ends of sheet metal edge to form hem, 1/2-inch minimum.
- H. Lap joints 1-inch (25mm) minimum. Rivet and solder joints on parts that are to be permanently and rigidly assembled for copper, stainless, aluminum, and galvanized sheet metal. Install rivets, spaced 1-inch (25mm) on-center and apply solder to secure and seal exposed edge of sheet metal in a uniform continuous bead with smooth top finish. Clean residue upon completion of soldering process. Fabricate sheet metal assemblies so that adjoining sections are nested to achieve continuous metal-to-metal contact.
- I. Seams:
 - 1. Fabricate non-moving seams in sheet metal with flat-lock seams.
 - 2. Pre-finished Galvanized Sheet Metal: Seal pre-finished metal seams with rivets, spaced 1-inch (25mm) on-center, and silicone sealant, color to match metal finish.
 - 3. Metal Other than Aluminum: Tin edges to be seamed, form seams, and solder.
- J. Expansion Provisions: Where lapped type expansion provisions in work cannot be used or would not be sufficiently waterproof or weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1-inch deep, filled with sealant concealed within joints.
- K. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant in compliance with SMACNA standards.

2.06 FABRICATED ITEMS:

- A. Receivers and Counter Flashings: Minimum 24-gauge pre-finished sheet metal formed in maximum 10-foot (3m) lengths; fabricate "S"-shaped receiver to engage counter flashing a minimum of 1-inch; fabricate counter flashing with broken fascia of length to extend over top edge of base flashing a minimum of 4-inches with 1/2-inch hemmed drip edge.
- B. Wind Clips: Minimum 24-gauge pre-finished sheet metal, 1-inch (25mm) wide, length to engage counter flashing a minimum of 1/2-inch (13mm).
- C. Roof Penetration Flashing Pan and Bonnet: Minimum 24-gauge stainless steel sheet metal. Fabricate pan with 1/4-inch (6mm) hem at top edge, 4-inch (100mm) wide horizontal flanges with rounded corners; to provide installed minimum clear inside perimeter dimension of 2-inches (50mm) on each side of penetrating element and 6-inch height. Fabricate bonnet in two-piece adjustable construction with 1/2-inch caulk trough along top edge and a skirt, with hemmed edge, of length to extend over top edge of pan a minimum of 2-inches (50mm).
- D. Angle Termination Bar: 1-inch by 1-inch (25mm by 25mm) 24-gauge galvanized sheet metal.
- E. Through-Wall Flashing: 24-gauge stainless steel sheet metal, fabricate with minimum 4-inch vertical nailing flange with canted base and "S"-shaped receiver to engage counter flashing a minimum of 1-inch.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- F. Pipe Box (Base, Hood, and Face Plate): 24-gauge stainless steel sheet metal. Base shall be 8-inches in height, with 4-inch wide flanges with rounded corners and sized to provide minimum 2-inch clearance between pipes and box.
- G. Cleats/Clips:
 - 1. Concealed Cleats/Clips: Continuous strips, 22-gauge sheet metal, same metal type and fascia profile as adjacent metal item, with 3/4-inch drip edge formed at a 30 degree angle with vertical wall.
 - 2. Exposed Cleats/Clips: 24-gauge pre-finished sheet metal.
- H. Roof Drain: 4-pound/SF sheet lead, size 30-inches by 30-inches (750mm by 750mm).
- I. Heat Exhaust/Gravity Vent/Turbine Vent: 24-gauge stainless steel sheet metal. Base shall be 8-inches in height with 4-inch wide horizontal flanges with rounded corners and hoods to conceal top of base.
- J. Curb Cap Flashing: 24-gauge stainless steel sheet metal with 4-inch vertical fascias.
- K. Goose-neck Vent: 24-gauge stainless steel sheet metal. Base shall be 8-inches in height with 4-inch wide horizontal flanges with rounded corners.
- L. Coping:
 - 1. Shop-Fabricated Option: 24-gauge pre-finished sheet metal for 8-inch maximum width and 22-gauge for 8-inch to 12-inch width with 6-inch (150mm) wide back-up plates of same profile. Form 3/4-inch drips with 5/8-inch returns at 30-degree angle with vertical wall at bottom end of both interior and exterior fascias. Fabrication to meet specified ANSI/SPRI ES-1 requirements for 140 mph.
 - 2. Pre-Manufactured Option: Pre-manufactured prefinished sheet metal coping of designated dimensions and meeting ANSI/SPRI ES-1 requirements for 140 mph with continuous cleat installed over sloped substrate such as "Sloped Formed Coping" by Hickman Engineered Systems, "One Coping" by Metal Era, or approved equal.
- M. Metal Edge/Fascia:
 - 1. Shop-Fabricated Option: 24-gauge Pre-finished sheet metal with 4-inch horizontal flange, 1/2-inch high knuckle, and fascia length to extend a minimum of 1-inch below top edge of exterior wall cladding meeting ANSI/SPRI ES-1 for 140 mph wind speed. Form 3/4-inch drip with 5/8-inch return at 30° angle with vertical wall.
 - 2. Premanufactured Option: Continuous 24-gauge prefinished Kynar 500 coated galvanized sheet metal canted gravel stop with fascia extender meeting ANSI/SPRI ES-1 for 140 mph wind speed such as "MBED Style G" by Hickman, "EdgeSystem One Gravel Stop" by Metal Era or approved equal.
- N. Fascia Extender: 24 gauge pre-finished sheet metal with 1/2-inch stiffening rib at mid-span with 3/4-inch drips with 5/8-inch returns at 30-degree angle with vertical wall at bottom end formed in 10-foot lengths.

ROOF REPLACEMENT

LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING CYPRESS, TEXAS

PART THREE - EXECUTION

3.01 EXAMINATION:

- A. Verify that substrates are smooth and clean to extent needed for sheet metal work.
- B. Verify that reglets, nails, cants, and blocking to receive sheet metal are installed and free of concrete and soil.
- C. Do not start sheet metal work until conditions are satisfactory.

3.02 INSTALLATION:

- A. Install sheet metal with lines, arises, and angles sharp and true, and plane surfaces free from objectionable wave, warp, or buckle. Exposed edges of sheet metal shall be folded back to form 1/4-inch (6mm) hem on concealed side from view. Finished work shall be free from water retention and leakage under all weather conditions. Install prefabricated corners or transitions at changes in direction, elevation or plane, and at intersections. Locate field joints not less than 12-inches (300mm), nor more than 3 feet (1m) from actual corner. Laps for all metals, except for prefinished metal, shall be 1-inch (25mm) wide, fastened with rivets spaced 1-inch (25mm) on-center and soldered.
- B. Anchor units of work securely in place to prevent damage or distortion from wind or buckling. Provide for thermal expansion of metal units; conceal fasteners where possible; and set units true to line and level as indicated. Install work with laps, joints, and seams permanently watertight and weatherproof.
- C. Install fabricated sheet metal items in accordance with manufacturer's installation instructions and recommendations and with SMACNA Architectural Sheet Metal Manual.
- D. Separations: Provide for separation of metal from non-compatible metal or corrosive substrates by coating affected surfaces with zinc chromate or other permanent liquid-applied or sheet product separation at locations of contact.
- E. Continuous Cleat: At exposed edges of metal edge flashings, fascias, copings, and where required, attach continuous cleat at 6-inches (150mm) on-center with appropriate fasteners positioned on the vertical face and fastened into 2X blocking, concrete/masonry substrate, metal wall panels, or steel substrate. At a distance of 10 feet (3m) from each direction of corner, install fasteners 3-inches (75mm) on-center. Install cleat so fascia extends a minimum of 1-inch (25mm) below top of exterior wall finish.
- F. Counter Flashings:
 - 1. Install new counter flashings under equipment housing flanges and existing or new receivers along rise or parapet walls to extend a minimum of 4-inches below top edge of base flashing.
 - 2. Secure counter flashing at 6-inches (150mm) on-center with self-tapping screws.

ROOF REPLACEMENT

LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING CYPRESS, TEXAS

3. Saw-cut Reglet Mounted Assemblies: Saw cut new joint, 1/2-inch by 1-inch deep, in existing masonry/concrete where required and to install new receiver. Clean and prepare joint surfaces to receive sealant and insert receiver into joint. Secure new receiver in place with lead wedges spaced 12-inches (300mm) on-center wedged into joint. Install backer rod into saw-cut reglet and apply a continuous bead of sealant, Type B, along reglet and top edge of receiver and tool sealant to provide outward sloping finished surface. Secure counter flashing to receiver utilizing self-tapping grommetted screws spaced 6-inches (150mm) on-center.
 4. Surface-mounted Assemblies: Secure two-piece surface-mounted receiver and counter flashing assemblies along concrete substrates. Install sealant tape, Type C, between receiver and substrate. Secure receiver to substrate with termination bar and appropriate fasteners spaced 12-inches on-center. Install a continuous bead of sealant, Type B, along caulk trough/top edge of receiver and tool sealant to provide outward sloping finished surface. Secure counter flashing to receiver utilizing grommetted self-tapping screws spaced 6-inches (150mm) on-center.
 5. Install new receivers extending behind wall finish and secure vertical flange of receiver 6-inches on-center to back-up wall or metal wall panels. Extend underlayment and/or dampproofing material over vertical flange of receiver, where applicable.
 6. Lap adjacent sections of receivers and counter flashings a minimum of 4-inches (100mm). Apply a continuous bead of sealant, Type B in lap.
 7. Trim existing counter flashings at curbs and walls that are to remain to receive new flashings. Secure new counter flashing to trimmed existing flashing utilizing self-tapping screws spaced 6-inches (150mm) on-center.
 8. Install wind clips to termination bar spaced 24-inches (600mm) on-center and engage drip edge of counter flashing a minimum of 1/2-inch (13mm).
 9. Fabricate the counter flashing to form an integral closure at terminations.
- G. Penetration Pans:
1. Install compressible fill insulation between penetrating element and deck.
 2. Prime tops and bottoms of flanges of penetration pans.
 3. Pop rivet and fully solder joints in pan and flanges.
 4. Install penetration pan with flanges set in a uniform troweling of plastic roof cement on membrane base ply, secure flange with appropriate fasteners spaced 6-inches on-center, staggered, and strip-in flanges.
 5. Fill penetration pan to within 1-inch (25mm) of top of pan with non-shrink grout. Clean surfaces of pan and penetrating element and fill remainder of pan with pourable sealer.
 6. Install sheet metal bonnet or hood to conceal the top of the penetration pan.
- H. Roof Penetration Hoods and Bonnet:
1. Install sheet metal hood or bonnet on penetrating element to cover the top of the penetration pans.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

2. Round or Pipe Penetrations:
 - a. Set bonnet in sealant, Type C; utilize Type B sealant at heat sensitive areas.
 - b. Install stainless steel draw band and tighten to secure to penetration.
 - c. Seal top of bonnet with sealant, Type B.
 3. Square Penetration:
 - a. Secure bonnet to penetration with termination bar and self-drilling screws.
 - b. Set bonnet in sealant, Type C.
 - c. Seal top of bonnet with sealant, Type B.
 4. Angle or Structural Steel Penetration:
 - a. Attach bonnet to structural steel member by welding.
 - b. Paint assembly after installation.
- I. Roof Drains:
1. After membrane installation, prime bottom of lead flashing sheet and set in uniform bed of plastic roof cement on membrane base ply at roof drain locations.
 2. Extend lead flashing into drain bowl or pipe a minimum of 2-inches (50mm) and over top of piping/ bowl connection, if possible. Apply a continuous bead of sealant, Type A, at intersection of pipe and drain bowl.
 3. Mold lead flashing to conform to drain bowl assembly utilizing appropriate hand-held mallet/ hammer.
 4. Prime top surface of lead flashing sleeve to receive strip-in membrane.
- J. Pipe Box:
1. Pop rivet and fully solder joints and seams in sheet metal base and hood.
 2. Prime top and bottom of flanges of base.
 3. Install with flanges or embed in plastic roof cement on base ply, secure flanges with appropriate fasteners spaced 6-inches on-center, staggered, and strip-in.
 4. Fill base with grout or spray foam to a height of 3/4 of the total pan height.
 5. Fill remaining height of base with pourable sealer.
 6. Install hood over base, securing to each side with self-tapping screws, and sloping down toward front of box.
 7. Install face plate to cover box opening around pipe penetrations and apply sealant, Type B, around pipe configuration at face plate.
- K. Plumbing Vent Pipe: Apply liquid flashing around plumbing vent pipe penetrations as noted in Section 07 52 00, as depicted in detail drawings, and in general accordance with manufacturer's installation guidelines. Match color of liquid flashing to color of surfacing of cap sheet.
- L. Heat Exhaust/Gravity Vent/Turbine Vent/Goose-neck Vent:
1. Prime top and bottom of flanges of base.
 2. Install with flanges set in heat-softened APP base ply or embed in plastic roof cement on SBS base ply, secure flanges with appropriate fasteners spaced 6-inches on-center, staggered, and strip-in.
 3. At heat exhaust vents, install sheet metal bonnet secured to vent pipe with stainless steel draw band and apply sealant, Type B, along top edge of bonnet and tool sealant to provide outward sloping finished surface.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

M. Curb Cap Flashing:

1. Install new wood nailers on top of curb to provide substrate to receive cap flashing.
2. Install and adhere underlayment/modified bitumen flashing over top of curb extending a minimum 4-inches below top of curb and overlapping top edge of base flashing.
3. Install metal cap flashing over curb. Install appropriate fasteners through the fascia spaced 12-inches on-center.
4. Reinstall equipment on top of cap flashing on top of vibration isolator pads.

N. Pre-fabricated Metal Edge/Fascia:

1. After membrane installation, nail the continuous galvanized spring clip to the vertical face of the wood nailer. Locate the fasteners 3/4-inch below the roof edge (approximately center of nailer) and 12-inches on-center using a minimum 1-1/2-inch galvanized ring shank roofing nail. Allow 1/4-inch gap between sections of clip. Install mitered corners first then field sections. Insert one splice plate under each end of miter cover. Install miter covers by engaging miter cover onto anchor cleat and rotating miter cover up and over anchor bar miter until engaged along entire length of the anchor bar.
2. Install fascia extender in locations where indicated prior to installation of fascia/edge flashing system. Secure clip and fascia extender to wood nailers with appropriate fasteners at 6-inches on-center.
3. Install roofing membrane flashing over the spring clip allowing it to extend down the face to the drip edge. Locate and hang joint covers at all joints between corners and straight sections.
4. Install preformed curved sections to match radius of existing construction.
5. Install prefabricated inside and outside corners fabricated from one piece of sheet metal.
6. Hook each section of fascia cover over the top of the spring clip and membrane. Press down on the fascia until the drip edge is engaged. Allow 1/8-inch gap for expansion.

O. Low-profile Metal Edge:

1. Install metal edge flashing/cleat on top of single ply membrane along eaves.
2. Secure horizontal flange of metal flashing to substrate with appropriate fasteners spaced 3-inches on-center, staggered.
3. Butt adjacent sections of metal flashing and install back-up plate under butt joint with beads of sealant, Type B, in laps.
4. Strip-in flange of metal flashing with single ply membrane concealing flange and extending beyond edge of flange to achieve proper welded lap seam.

P. Coping:

1. Install new 2X wood nailers and/or 2X wood nailers and plywood to provide substrate on top of wall to have a resulting positive slope (minimum 1-inch per foot) toward roof.
2. Install and adhere underlayment or flashing membrane over the wood substrate extending a minimum of 1-inch below top of wall system. Lap ends minimum of 3-inches (75mm) and secure membrane in place on exterior vertical face.

ROOF REPLACEMENT

LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING CYPRESS, TEXAS

3. Install metal coping segments allowing 1/2-inch (13mm) spaces between segments. Lock coping onto cleat and install appropriate fasteners through the interior fascia spaced 24-inches (600mm) on-center in enlarged holes.
 4. Fabricate standing seam at joints of adjoining sections of coping. Apply sealant, Type B, in seam prior to forming.
 5. Install appropriate fastener through neoprene washer and cover plate between coping segments.
 6. Install cap bead of sealant, Type B, over sealed/riveted lap seam in coping at corners. Apply tape on coping to provide straight edges of tooled cap bead. Remove tape upon completion of tooling.
- Q. Through-wall Flashing:
1. Remove and retain brick in accordance with Section 02 07 20.
 2. Install new through-wall flashing/receiver and fasten to back-up substrate with appropriate fasteners spaced 12-inches on-center.
 3. Strip-in top of through-wall flashing with a three course application of roof cement and fabric.
 4. Overlap adjacent sections of through-wall flashing a minimum of 4-inches (100mm), sandwich sealant, Type "B", in lap, pop rivet, and solder.
 5. Provide continuous through-wall flashing in stair-step configuration when installed in sloping fashion parallel to face of brick. Provide end dams at terminations or penetrations in through-wall flashing.
 6. Adhere flexible self-adhering, non-asphaltic, butyl rubber through-wall flashing membrane, suitable for high-temperature applications, to sheet metal through-wall flashing.
 7. Install end dams, extending vertically upward a minimum of 1-inch (25mm), at terminations and penetrations in through-wall flashing.
 8. Re-install brick in accordance with general guidelines of Section 02 07 20 - Masonry Restoration.
 9. Install new counter flashings into through-wall receivers and fasten with grommetted self-tapping screws spaced at 6-inches (150mm) on-center.
- R. Roof Drain Inserts:
1. Install drain inserts after installation of membrane.
 2. Properly clean and repair existing drain piping.
 3. Trim flange of insert to ensure a proper fit, where necessary. Set flange of drain insert in bed of plastic roof cement.
 4. Secure flange of insert to substrate with appropriate fasteners and strip-in with membrane flashing.

3.03 CLEANING:

- A. Remove flux and residual acid immediately by neutralizing with baking soda and washing with clean water. Leave work clean and free of stains, scrap, and debris.
- B. Clean exposed metal surfaces, removing substances which might cause corrosion of metal or deterioration/damage of finishes. Paint (color to match) areas of prefinished metal where finish is damaged. Replace sheet metal items when damaged finish can not be repaired to an acceptable condition.
- C. Prime soldered area of phosphatized metal after cleaning to prevent rusting.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- D. Paint, with elastomeric coating, metal flashings that have been soiled with bitumen and cannot be affectively cleaned. Use medium nap roller to apply paint to surfaces to achieve monolithic finished color.

END OF SECTION 07 62 00

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

SECTION 07 72 00

TIEBACK ANCHORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Rooftop fall protection systems and accessories including:
 - 1. Anchors.
 - 2. Rail systems.
 - 3. Cable systems.

1.2 RELATED SECTIONS

- A. Section 06 10 00 - Rough Carpentry.
- B. Section 07 52 00 - Modified Bitumen Membrane Roofing.
- C. Section 07 62 00 - Sheet Metal Flashing and Trim.

1.3 REFERENCES

- A. American National Standards Institute (ANSI), International Window Cleaning Association (IWCA):
 - 1. ANSI/ASSE Z359.1 - Safety Requirements for Personal Fall Arrest Systems, Subsystems & Components.
- B. American Society of Civil Engineers (ASCE):
 - 1. ASCE/SEI 7-16 - Minimum Design Loads for Buildings and Other Structures.
- C. American Welding Society (AWS):
 - 1. AWS D1.1/D1.1M - Structural Welding Code - Steel.
 - 2. AWS D1.2/D1.2M - Structural Welding Code - Aluminum.
 - 3. AWS D1.6/D1.6M - Structural Welding Code - Stainless Steel.
- D. ASTM International (ASTM):
 - 1. ASTM A36 - Standard Specification for Carbon Structural Steel.
 - 2. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 3. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 4. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 5. ASTM A240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - 6. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - 7. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - 8. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- E. US Occupational Health and Safety Administration (OSHA):
 - 1. OSHA 29 CFR 1910 - Safety and Health Regulations for General Industry.
 - 2. OSHA 29 CFR 1910 Subpart D - Safety and Health Regulations for General Industry: Walking Working Surfaces.
 - 3. OSHA 29 CFR 1910.28 - Safety and Health Regulations for General Industry: Duty to Have Fall Protection.
 - 4. OSHA 29 CFR 1910.66 - Powered Platforms, Manlifts, and Vehicle-Mounted Work Platforms: Powered Platforms for Building Maintenance.
 - 5. OSHA 29 CFR 1926.500 to 503 - Guarding Floor and Wall Openings and Holes.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings:
 - 1. Manufacturer's Engineering Services: Manufacturer shall provide product information in appropriate file format to facilitate the design process and incorporate system solutions into project documents.
 - 2. Provide project specific, scaled, engineered stamped shop drawings and calculations including layout, dimensions, loading and structural requirements.
 - 3. Show details of each adjacent condition including materials and thicknesses, terminations and penetrations, anchors and fasteners for each system to be installed.
 - 4. Show complete layout and configuration of system components and accessories.
 - 5. Include installation and rigging instructions, restrictive and non-restrictive usage, and general safety notes.
 - 6. Locate anchorage to suit each building configuration and each type of equipment to be installed.
- D. Test Reports: Certified test reports to demonstrate compliance with specified performance criteria and physical properties.
- E. Submit Operations and Maintenance Data in accordance with Section 01700 - Closeout Submittals.

1.5 QUALITY ASSURANCE

- A. Products shall meet or exceed OSHA and ANSI/ASSE Z359.1 standards, and be tested and certified by professional engineers.
- B. Manufacturer Qualifications: Minimum 5 years experience manufacturing similar products and with the engineering experience and manufacturing capacity to meet project requirements.
- C. Installer Qualifications: Approved by the manufacturer and with minimum 5 years experience installing similar products.
- D. Welder Qualifications: Welding to be executed by certified welders with AWS qualification within the previous 12 months.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

1.6 PRE-INSTALLATION MEETINGS

- A. Convene at the Project site prior to starting work to verify project requirements, manufacturers requirements, field measurement and installation procedures.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's ordering instructions and lead time requirements to meet construction schedule.
- B. Provide packaging that will allow products to be stored outdoors or clearly mark packaging to indicate that products must be protected from the elements.
- C. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
- D. Handling: Handle materials to avoid damage.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Where rooftop fall protection and accessories are indicated to fit to adjacent construction, field verify dimensions prior to delivery.
- B. Do not install products under environmental conditions outside manufacturer's recommended limits.
- C. Coordinate with the General Contractor and related trades as required.

1.9 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.10 WARRANTY

- A. Provide manufacturers standard limited warranty against defects in material and manufacturing when products are installed in accordance with engineered shop drawings and manufacturers instructions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Rooftop Anchor, Inc.; 844 South 430 West, Suite 200, Heber City, UT 84032. (800) 411-3914. www.rooftopanchor.com.
- B. Substitutions: Or equal as approved by Engineer.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

2.2 GENERAL

- A. Fall Protection and rooftop access systems as follows:
1. Rooftop Access: Fall restraint and fall arrest systems allow workers to traverse rooftops or similar elevated areas while maintaining 100 percent tie-off to an OSHA compliant system. Rooftop access systems are typically needed by trades who perform routine maintenance of roof-based equipment for example HVAC and communication equipment, security cameras, gutters, solar panels, skylights, and lighting. Fall restraint systems allow users to approach fall hazards without falling over the edge, fall arrest are used when fall restraint is not feasible and engineered so when a user begins to fall, the system will promptly arrest or stop the fall.

2.3 ANCHORS

- A. Weldable Rooftop Anchors: 3/4 inch (19 mm) stainless steel U-Bar with standard galvanized steel pipe to meet the following loads in any direction:
1. Working Load: 1,250 pounds (5.56 kN).
 2. Ultimate Load: 5,000 pounds (22.2 kN).
 3. Maximum Fall Arrest Force: 1,800 pounds (8.00 kN) when wearing a body harness with a safety factor of 2 without permanent deformation, and 5,000 pounds (22.2 kN) against fracture or detachment.
 4. Size: 18 inch (450 mm).
- B. Beam Wrap Rooftop Anchors: 3/4 inch (19 mm) stainless steel U-Bar with standard galvanized steel pipe, 5/8 inch (16 mm) to 3/4 inch (19 mm) galvanized steel base plate, 5/8 inch (16 mm) galvanized threaded rods, and 1/2 inch (13 mm) galvanized steel bottom plate to meet the following loads in any direction:
1. Working Load: 1,250 pounds (5.56 kN).
 2. Ultimate Load: 5,000 pounds (22.2 kN).
 3. Maximum Fall Arrest Force: 1,800 pounds (8.00 kN) when wearing a body harness with a safety factor of 2 without permanent deformation, and 5,000 pounds (22.2 kN) against fracture or detachment.
 4. Size: 18 inch (450 mm) Beam Wrap Rooftop Anchors, with 5-1/4 inch (133 mm) Beam Width.
- C. Open Web Joist Rooftop Anchors: 3/4 inch (19 mm) stainless steel U-Bar with standard galvanized steel pipe, galvanized steel base plate, and 5/8 inch (16 mm) galvanized steel threaded rods with galvanized steel plate washers to meet the following loads in any direction:
1. Working Load: 1,250 pounds (5.56 kN).
 2. Ultimate Load: 5,000 pounds (22.2 kN).
 3. Maximum Fall Arrest Force: 1,800 pounds (8.00 kN) when wearing a body harness with a safety factor of 2 without permanent deformation, and 5,000 pounds (22.2 kN) against fracture or detachment.
 4. Size: 18 inch (450 mm), with 15 inch (381 mm) beam height.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

2.4 FABRICATION

- A. Fabricate items with joints tightly fitted and secured, and in manner that will not allow moisture accumulation.
- B. Remove any burrs from anchor loops following galvanizing

2.5 FINISH

- A. Manufacturer's standard galvanized steel, anodized aluminum, or stainless steel finishes as indicated above.

2.6 ACCESSORIES

- A. Fasteners: Thread locking compounded, nylock nuts, deformed threads, and double nut technique as approved by fall protection manufacturer.
- B. Flexible Flashing: As recommended by roof membrane manufacturer. For use at all roof penetrations.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify that bearing surfaces are plumb, level, and square.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Comply with manufacturer's recommendations for specific application including structural system, new or existing construction, and system size.
 - 1. The engineer or record shall review supporting structure for reinforcing requirements.
- B. Inspect components to ensure damaged parts will not be installed.
- C. Clean surfaces thoroughly prior to installation. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Installation Requirements:
 - 1. Install in accordance with manufacturer's instructions and approved shop drawings.
 - 2. Installation shall be performed by manufacturer approved installers under supervision of manufacturer approved supervisors.
 - 3. Licensed engineers shall supervise the entire process.
 - 4. Perform field welding in accordance with AWS Standards.
 - 5. Seal holes in galvanized surfaces with weatherproof UV resistant materials.
 - 6. Touch up galvanized surfaces with cold galvanizing coating.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

7. Verify that any products which may contact lanyards or lifelines are free of abrasive and sharp edges.
8. Isolate dissimilar materials as required to prevent electrolytic corrosion.
9. Torque each fastener with properly calibrated torque wrench in accordance with manufacturer's recommendations. Properly tightened fasteners to have three exposed threads
10. Isolate dissimilar materials as required to prevent electrolytic corrosion.

3.4 FIELD QUALITY CONTROL

- A. Testing and certification shall be performed under supervision of the fall protection manufacturer or a licensed professional engineer.
- B. After installation, load test each anchor product to no more than 2 times the rated working load to ensure compliance with ANSI & OSHA safety standards and local regulations.
 1. Test all epoxy anchor fasteners prior to closing surface.
 2. Test all field swaged connections prior to use.

3.5 DEMONSTRATION AND TRAINING

- A. Provide training of newly installed equipment for Owner or Owner's representative.

3.6 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

3.7 MAINTENANCE

- A. OSHA and ANSI/ASSE Z359.1 require that anchors first be certified and subsequently inspected on an annual basis. Coordinate with the manufacturer and local inspectors as required to maintain compliance.

END OF SECTION 07 72 00

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

SECTION 07 92 00

JOINT SEALANTS

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Sealant application to counter flashings, reglets, and other roofing related sheet metal fabrications and components.
- B. Sealant replacement in ACM panels along roof perimeters.

1.02 RELATED SECTIONS:

- A. 02 07 20 - Minor Demolition and Renovation Work.
- B. 07 62 00 - Sheet Metal Flashing and Trim.

1.03 REFERENCES:

- A. American Society for Testing and Materials (ASTM).
- B. Federal Specifications (FS).

1.04 SUBMITTALS:

- A. Product Data: Submit manufacturer's product data, joint preparation and installation instructions, and color charts for each product required.
- B. Submit manufacturer's certification that products meet specified requirements and are appropriate for project applications.
- C. Samples for Initial Selection Purposes: Submit manufacturer's standard bead samples consisting of strips of actual products showing full range of colors available for each product exposed to view.

1.05 QUALITY ASSURANCE:

- A. Product Labels: Include manufacturer's name, type of sealant, and color on labels of containers.
- B. Single Source Responsibility for Joint Sealer Materials:
 - 1. Obtain joint sealer materials from single manufacturer for each different product required.
 - 2. Provide primers, joint sealers, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by testing and field experience as supplied and warranted by one manufacturer.
 - 3. Provide joint sealers that have been produced and installed to establish and maintain watertight and airtight continuous seals.
- C. Installer Qualifications: Installer having not less than five years successful experience in comparable projects and employing personnel skilled in operations required for project.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- D. Field Sample: Upon directions of Owner, prepare 12-inch (300mm) samples in presence of Owner demonstrating removal and cleaning process and application of sealant.
- E. Use test methods standard with manufacturer to determine if priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealers to joint substrates under environmental conditions that will exist during actual installation.
- F. Installer to perform field adhesion in peel testing using hand pull method. Perform a minimum of one test on every type of substrate and joint condition.
 - 1. Test Method: Test joint sealers by hand pull method described below:
 - a. Install joint sealants in 4 feet joint lengths using same materials and methods for joint preparation and joint sealant installation required for complete work. Allow sealants to cure fully before testing.
 - b. Make knife cuts as follows: A horizontal cut from one side of joint to the other followed by two vertical cuts approximately 2-inches (50mm) long at side of joint and meeting horizontal cut at top of 2-inch (50mm) cuts. Place a mark 1-inch (25mm) from top of 2-inch (50mm) piece.
 - c. Use fingers to grasp 2-inch (50mm) piece of sealant just above 1-inch (25mm) mark; pull firmly down at a 90 degree angle or more while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for ten seconds.
 - 2. Report whether or not sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate.
 - 3. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of non-compliance with requirements, will be considered satisfactory. Do not use sealants which fail to adhere to joint substrate during testing.
 - 4. Repair test cut areas immediately after completion of testing work.
 - 5. Notify in advance and conduct adhesion testing in presence of Consultant.

1.06 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials in original containers with seals unbroken and labels intact.
- B. Store materials in a single lockable area of project site.
- C. Protect materials from extreme temperatures and exposure. Store in accordance with manufacturer's recommendations.

1.07 PROJECT CONDITIONS:

- A. Environment: Comply with sealant manufacturer's recommended minimum and maximum installation temperatures and other weather protection.

1.08 SEQUENCING AND SCHEDULING:

- A. Do not remove more sealant than can be replaced in same day.

ROOF REPLACEMENT

LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING CYPRESS, TEXAS

1.09 WARRANTY:

- A. Manufacturer's Warranty: Provide manufacturer's standard warranty for type of sealant specified.
- B. Contractor's Warranty: Provide written warranty against leakage and defects in workmanship for a period of two years from date of final acceptance by Owner.

PART TWO - PRODUCTS

2.01 SEALANT:

- A. Sealant:
 - 1. Type A: One component polyurethane sealant ASTM C-920, Type S, Grade NS, Class 35; such as "Sikaflex 1a" by Sika Corp. or "Dymonic" by Tremco, color to match finish of metal or adjoining materials.
 - 2. Type B: Medium/Low modulus silicone sealant; ASTM C-920, Type S, Grade NS, Class 50; such as "Sikasil WS-290" or "Sikasil WS-295" by Sika Corp., "Dowsil 795 Silicone Building Sealant" or "Dowsil 790 Silicone Building Sealant" by Dow Corning, or "GE Silpruf 2000" by Momentive Performance Technologies; color to match finish of metal or adjoining materials.
 - 3. Type C: Self-adhering elastomeric butyl tape, 1/8-inch (3mm) by 3/8-inch (9mm), such as "Extru-Seal" by Pecora Corp.
 - 4. Type D: One-part gun grade polyether sealant such as "925 BES Sealant" by Henry.
 - 5. Type E: One-part gun grade butyl rubber sealant such as "BC-158" by Pecora.

2.02 RELATED MATERIALS:

- A. Cleaner: Noncorrosive, nonstaining type, compatible with joint forming materials as recommended by sealant manufacturer.
- B. Backer Rod: Closed cell non-gassing polyethylene foam rod, over-sized 30 to 50 percent for joint size, compatible with sealant, sized and shaped to provide proper compression upon insertion such as "SofRod" by Namaco; or approved equal products.
- C. Bond Breaker Tape: Pressure sensitive adhesive polyethylene strip such as "Pecora 531 Bond Breaker Tape" by Pecora Corp or as recommended by sealant manufacturer to suit application.
- D. Primer: Nonstaining type as recommended by sealant manufacturer to suit application.
- E. Masking Tape: Nonstaining, nonabsorbent type compatible with sealant and surfaces adjacent to joints.

2.03 MIXING:

- A. Mix multi-component products as directed by manufacturer.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

PART THREE - EXECUTION

3.01 PREPARATION:

- A. Removing Existing Sealants:
1. Cut out and remove existing sealants, backer rods, bond breaker tapes, and other loose materials to depth as required by sealant manufacturer or to 1/2-inch (13mm) minimum.
 2. Remove foreign matter from joint substrates which could interfere with adhesion of joint sealant. Remove dust, oil, grease, waterproofing, water repellent, surface dirt, and paints, except for permanent protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer.
 3. Remove debris from jobsite.
- B. Cleaning:
1. Clean joints receiving sealant and adjacent surfaces in manner not to damage existing materials. Perform cleaning of joints the same day sealant is to be installed in cleaned joint.
 2. Remove dust and debris by blowing clean with high pressure air.
 3. Wipe nonporous surfaces clean with toluene or xylene and clean cloths.
- C. Priming:
1. Prime joint substrates where indicated or where recommended by sealant manufacturer based upon preconstruction sealant substrate tests or prior experience.
 2. Apply primer to comply with joint sealer manufacturer's recommendations. Apply primer to surfaces the same day sealant is to be installed onto primed surfaces.
 3. Confine primers to area of joint sealer bond. Do not allow spillage or migration onto adjoining surfaces.
- D. Masking: Mask areas adjacent to joints to prevent sealant contact with surfaces which would be permanently stained or damaged by sealant or by cleaning methods required to remove excess sealant and to provide straight edges/lines of finished sealant.

3.02 APPLICATION:

- A. Joint Backing:
1. To achieve required joint depths, restrict depth of joints by use of joint backer rod.
 - a. Provide joint width-to-depth ratio equal to approximately 2-to-1 where practical.
 - b. Provide joint depth equal to 1/4-inch minimum of 3/8-inch maximum.
 - c. Provide a minimum sealant joint width of 1/4-inch to all substrates.
 - d. Provide 1/4-inch minimum adhesion on all sealant joint and wet seal joint substrates.
 2. Size backer rod to allow for 30 percent minimum compression of the backer rod when installed.
 3. Where installation of proper size backer rod is not feasible due to insufficient clearance or depth, install bond breaker tape in joint.
 4. Three-sided adhesion of sealant is not permitted.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- B. Sealant:
 - 1. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates.
 - 2. Apply sealant in uniform continuous bead without gaps or air pockets, following manufacturer's instructions for each specific type of sealant.
 - 3. Provide uniform cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.
 - 4. Apply cap bead of sealant over fastener heads securing metal flashings, completely concealing fastener with sealant.
- C. Tooling:
 - 1. Tool joints to required configuration in accordance with manufacturer's recommendations.
 - 2. Sealant Tape:
 - a. Provide continuous uniform bed of sealant tape on horizontal bearing surfaces. Butt adjacent sections end-to-end.
 - b. Prior to mating surfaces, remove backing paper from the installed tape.
 - c. Firmly press or clamp assembly upon removal of backing paper.
 - 3. Tooling Non-sag Sealants:
 - a. Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration required.
 - b. Eliminate air pockets and ensure contact and adhesion of sealant with sides of joint.
 - c. Remove excess sealant from surfaces adjacent to joint.
 - d. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by manufacturer.
- D. Remove masking immediately after tooling without disturbing joint sealant.

3.03 ADJUSTING:

- A. If damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

3.04 CLEANING:

- A. Remove excess sealant from adjacent surfaces immediately after contact with xylene or toluene.
- B. Remove debris and containers from jobsite.

3.05 PROTECTION:

- A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion.

3.06 SCHEDULE:

- A. Sealant A:
 - 1. Sealant work in conjunction with roofing.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- B. Sealant B:
 - 1. Metal-to-metal joints (coping cover plates, counter flashing lap joints, etc.).
 - 2. Heat-sensitive applications.
 - 3. Counter flashings.
 - 4. Penetration bonnet caulk troughs.
 - 5. ACM panel joints.
- C. Sealant C:
 - 1. Between bonnet and penetrating element.
 - 2. Surface-mounted counter flashings
- D. Sealant D:
 - 1. Edges and terminations of rubberized asphalt self-adhering membranes.
- E. Sealant E:
 - 1. Concealed locations requiring a non-curing sealant.

END OF SECTION 07 92 00

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYPRESS CAMPUS – CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

SECTION 09 91 00

PAINTING

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Preparing and painting steel and sheet metal elements to remain including but not limited to, equipment hoods, piping, support frames, and roof hatch.
- B. Preparing and painting existing sheet metal accessories.

1.02 RELATED SECTIONS:

- A. 07 62 00 - Sheet Metal Flashing and Trim
- B. 07 92 00 - Joint Sealants.

1.03 DESCRIPTION OF WORK:

- A. Painting exposed steel elements related to roof work.
- B. Painting roof vents.
- C. Touch-up painting miscellaneous sheet metal items.
- D. "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers, fillers, and other applied materials whether used as prime, intermediate, or finish coats.
- E. Unless otherwise indicated, metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze, and similar finished materials will not require finish painting.

1.04 SUBMITTALS:

- A. Color Samples: Prior to beginning work, submit samples for Owners Representative review of color and texture only. Provide a listing of material and application for each coat of each finish sample. Sample to match existing paint color and texture.
 - 1. Provide two samples of each color and material with texture to simulate actual conditions. Resubmit samples as requested by Consultant until acceptable sheen, color, and texture is achieved.
 - 2. Final acceptance of colors will be from samples applied on the job.

1.05 QUALITY ASSURANCE:

- A. Product Labels: Include manufacturer's name, type of paint, stock number, color, and label analysis on label of containers.
- B. Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.
- C. Match existing color or as approved by Owner.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYPRESS CAMPUS – CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- D. Review with Owner's Representative, items shop primed by others to determine compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use to ensure compatible prime coats are used.

1.06 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials in original containers with seals unbroken and labels intact.
- B. Store rags, paint, and solvents in closed metal containers located in designated area.
- C. Comply with applicable health and fire regulations.

1.07 WARRANTY:

- A. Provide Owner a written warranty which shall warrant all paint work to be free of defects in materials and workmanship for two years after date of final acceptance.

PART TWO - PRODUCTS

2.01 MANUFACTURERS:

- A. Except as otherwise specified, materials shall be products of the following manufacturers:
 - 1. ICI Paints (Devoe).
 - 2. Sherwin-Williams Company (SW).
- B. Materials selected for coating systems for each type surface shall be product of a single manufacturer unless otherwise specified.

2.02 MATERIALS:

- A. Select products from Material List below. Select primary products of a single manufacturer for each coating or paint system, unless otherwise specified.
- B. Match existing color as approved by Owner's Representative.
- C. Omit primer coat for primed or previously painted surfaces.
- D. Paint Material List
 - 1. Ferrous Metal:
 - a. Urethane: Two finish coats over primer
 - 1) Primer:
 - a) SW - "Kem Bond HS Universal Metal Primer," B50AZ8.
 - b) ICI - "Devran 203" epoxy primer.
 - 2) Finish Coats:
 - a) SW - "Industrial Urethane Alkyd Enamel," B54-150.
 - b) ICI - "Devthane Aliphatic Urethane".

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYPRESS CAMPUS – CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

PART THREE - EXECUTION

3.01 PREPARATION OF SURFACES:

- A. Do not apply finishing materials to surfaces that are not physically tight and in first class condition. Remove all foreign matter, corrosion, rough spots, prime coat paint runs, etc., and clean surfaces of dirt, rust, grease, etc. Wire brush miscellaneous steel and iron surfaces and, if necessary, sand smooth metal surfaces to have an enameled finish.
- B. If surfaces are not in suitable condition for painting and finishing and cannot be put in such condition by customary preparatory methods, promptly notify Owner's Representative or assume responsibility for and rectify any resulting unsatisfactory finish.
- C. The proper preparation of surfaces to be finished will be strictly enforced. Remove defects and refinish wherever finished surfaces show defects due to improper preparation, workmanship, etc.

3.02 WORKMANSHIP:

- A. Perform work with skilled mechanics. Spread materials evenly, flowing on without runs, lap marks, or other defects. Color undercoats of paint to match final coat closely. Allow each coat to dry thoroughly before applying succeeding coat. Match approved samples of colors and finishes. If specified number of coats do not result in proper hiding and build up, an additional coat or coats will be required at no additional cost to Owner. There shall be no spray painting in the building unless approved in writing by Owner's Representative.
- B. Provide adequate illumination for painting and finishing. Do not perform painting or finishing in dusty areas or in spaces not heated to 60 degrees Fahrenheit (15.6 degrees Celsius). Perform work only when inclement weather conditions are conducive to product application and cure.
- C. Sand enameled and varnished surfaces lightly between coats. Carefully wipe off sanding dust before recoating. Use sandpaper of such fineness as will not leave scratches that succeeding coat of finishing material will not obliterate.
- D. Reduce paint and finishing materials, if necessary, for proper application with thinner of type and in quantities not in excess of paint and finishing materials properly stirred during application. If specified number of coats of paint or varnish do not result in proper hiding or build up due to excess thinning or improper application, an additional coat or coats will be required at no cost to Owner.

3.03 PROTECTION AND CLEANING:

- A. Protect work of other trades against injury or damage during and because of painting and finishing operations. Replace any material or surfaces damaged, or restore, if such is possible, to original condition.

ROOF REPLACEMENT

**LONE STAR COLLEGE: CYPRESS CAMPUS – CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- B. Furnish and lay drop cloths in areas where painting and finishing is being done. Protect floors and other surfaces from dripping materials. Where it becomes necessary to remove temporary coverings protecting material in place in order to proceed with work, replace or provide other satisfactory means of protection.
- C. Promptly clean off spots of paint, oil, and stains from walls, bricks, hardware, and other surfaces. Do not allow them to accumulate, dry, or harden. Upon completion of the work, check finished surfaces, clean off previously undetected spots and stains used in painting and finishing from the building, and leave entire building in clean condition insofar as painting and finishing work is concerned.
- D. Store paints, varnishes, oils, thinners, and other flammable materials outside building, if possible. When necessary to store inside, only store in covered containers in area designated by owner. Remove oily rags and waste from building at end of each day's work. Keep fire hazard to minimum.

END OF SECTION 09 91 00

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

SECTION 11 81 29

FACILITY FALL PROTECTION

PART ONE - GENERAL

1.01 SUMMARY:

- A. Section includes the following fall protection equipment:
 - 1. Roof-mounted safety and tie-back anchorage.
 - 2. Horizontal cable lifeline systems.
 - 3. Ladder safety systems.
 - 4. Roof hatch guardrails.

1.02 RELATED SECTIONS:

- A. Section 020720 Minor Demolition and Renovation.
- B. Section 076200 Sheet Metal Flashing and Trim.

1.03 REFERENCES:

- A. Abbreviations and Acronyms:
 - 1. HLL: Horizontal lifeline.
 - 2. PFPE: Personal fall protection equipment.
 - 3. SRL: Self retracting lifeline.
- B. Definitions: Definitions in OSHA 29 CFR 1910 and 1926 including their subparts apply to this Section.
 - 1. Travel Restraint System: A system, consisting of a combination of an anchorage, anchorage connector, lanyard (or other means of connection), and body support that an employer uses to eliminate the possibility of an employee going over the edge of a walking-working surface. A Travel Restraint System is arranged so that a worker is allowed to approach fall hazards yet is prevented from falling over a drop-off.
 - 2. Fall Arrest System: A system used to arrest an employee in a fall from a working level. A fall arrest system exposes a worker to a fall, but arrests or stops the fall within specified parameters.
 - 3. Anchorage, as used in this Section, means a secure point of attachment for lifelines, lanyards, or deceleration devices, which is independent of the means of supporting or suspending an employee or worker.
 - 4. Anchor, as used in this Section, means a fastener or fastening device used to secure an anchorage or other component of the fall protection system to the structure.
 - 5. Competent Person: As defined in 29 CFR 1910.140(b) as "a person who is capable of identifying existing and predictable hazards in any personal fall protection system or any component of it, as well as in their application and uses with related equipment, and who has authorization to take prompt, corrective action to eliminate the identified hazards."

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

6. Qualified Person: As defined in 29 CFR 1910.140(b) as "a person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project."

1.04 ADMINISTRATIVE REQUIREMENTS:

A. Coordination:

1. Coordinate layout and installation of work of this Section with interfacing and adjoining work and other Sections affecting or affected by work of this Section for proper sequencing of each installation.
2. Furnish setting drawings, diagrams, templates and installation instructions to other Sections.
3. Furnish inserts and anchoring devices which need to be preset and built into structure to appropriate trade. Supply on timely basis to avoid delay in Work.
4. Instruct other trades of proper location and position.

1.05 ACTION SUBMITTALS:

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include rated capacities; operating weights; furnished specialties; and accessories.

B. Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication and assembly of fall protection equipment, as well as procedures and diagrams.

1. Show complete layout and configuration of fall protection equipment including all components and accessories.
2. Clearly indicate design and fabrication details and installation details.
3. Include plans, elevations, sections, details, and attachments to other Work
4. Include installation and rigging instructions and all necessary Restrictive and Non-Restrictive Working Usage Notes and General Safety Notes.
5. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- C. Delegated-Design Submittal: Include design for fall protection equipment for which design is assigned to Contractor.
 - 1. Indicate working and ultimate loads for each item of fall protection equipment.
 - 2. Indicate design loads imposed on building structure at points of support.

1.06 INFORMATIONAL SUBMITTALS:

- A. Manufacturers' instructions for each product.
- B. Qualification Statements for manufacturer.
 - 1. Include manufacturer's approval for installer.
 - 2. Include list of past Projects and contacts evidencing compliance with specified qualifications.

1.07 CLOSEOUT SUBMITTALS:

- A. Operation and Maintenance Data: For fall protection systems, subsystems, and equipment to include in operation and maintenance manuals.
 - 1. Requirements for personal fall protection including complete instructions for users and building maintenance personnel for the safe and proper use, operation, and maintenance of the equipment specified.
 - 2. Provisions for pre-operational, operation, and maintenance inspections. Include a Log Book outlining mandatory annual inspection requirements that are in accordance with ANSI and OSHA Regulations and Industry Standards.
 - 3. Plan view drawing of the building's roof, including the building name and address.
 - a. Show facility fall protection equipment layout and details of the fall protection systems.
 - b. Identify anchorage points for personal fall arrest systems.
 - c. Identify load ratings of each item of fall protection equipment including special use conditions.

1.08 QUALITY ASSURANCE:

- A. Qualifications:
 - 1. Manufacturer Qualifications: Minimum 10 years experience.
 - a. Company: One specializing in the design, fabrication and installation of fall protection equipment specified in this Section and whose products have a record of successful in-service performance.
 - 2. Installer Qualifications: Minimum 5 years experience.
 - a. Company: A firm or individual certified, licensed, or otherwise qualified or employed by fall protection equipment manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements. A manufacturer's willingness to sell its materials to Contractor or to an installer engaged by Contractor does not in itself confer qualification on the buyer.
 - b. Project Experience: Minimum 5 years experience on at least 5 projects of similar nature in past 5 years.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- c. Staff: Employ a competent foreman who is a Competent Person as defined in 29 CFR § 1926.32(m) and who is a certified installer to supervise Work of this Section. Foreman shall be present whenever Work is in progress.
 - 3. Welder Qualifications: Welders must be qualified to applicable AWS Standards for each type of weld required.
 - B. Certifications:
 - 1. Inspection certificates for fall protection equipment.
- 1.09 DELIVERY, STORAGE, AND HANDLING:**
- A. Delivery Requirements: Deliver materials in manufacturer's undamaged packaging, complete with installation instructions.
- 1.10 WARRANTY:**
- A. Manufacturer's Standard Warranty: Manufacturer will warrant the products specified below, to operate properly, if the fall protection system is inspected annually by the manufacturer or a certified representative.
 - 1. Warranty Periods from date of Substantial Completion:
 - a. Rooftop Horizontal Lifelines: 10 years.

PART TWO - PRODUCTS

2.01 MANUFACTURERS:

- A. Manufacturers:
 - 1. Rooftop Anchor, Inc., A Division of Diversified Fall Protection
 - 2. Or approved equal.
- B. Project Source Limitations: Obtain each variety of fall protection equipment, whether specified in this Section or in other Sections, through one source from a single manufacturer who is capable of showing prior successful production of units similar to those required for entire Project

2.02 DESCRIPTION:

- A. Fall protection systems consist of the following permanently installed equipment with required attachment devices and accessories:
 - 1. Horizontal lifelines for attachment of personal fall arrest systems.
- B. Product Options: Drawings indicate suggested locations, profiles, and dimensional requirements of fall protection equipment and are based on the specific system indicated. Final locations shall be determined according to fall protection equipment manufacturer's design requirements.
 - 1. If modifications are proposed, submit, with Shop Drawings, comprehensive explanatory data to Architect/Engineer for review.
- C. Regulatory Requirements: Provide fall protection equipment, supports, and anchorage designed and constructed to suit building configuration and in accordance with the Contract Documents and applicable regulations and codes.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

1. Comply with the following ANSI/ASSP regulations:
 - a. ANSI/ASSP Z359.16 "Safety Requirements for Climbing Ladder Fall Arrest Systems."
 - b. ANSI/ASSP Z359.18 "Safety Requirements for Anchorage Connectors for Active Fall Protection Systems "Part of The Fall Protection Code."
2. Comply with the following OSHA regulations:
 - a. OSHA 29 CFR 1910, Subpart D "Walking and Working Surfaces."
 - b. OSHA 29 CFR 1926, Subpart M "Fall Protection."

2.03 PERFORMANCE / DESIGN CRITERIA:

- A. Delegated Design: Professional design services are specifically required of Contractor. Engage a qualified design professional to design facility fall protection equipment, using performance requirements and design criteria specified herein.
1. Design Criteria:
 - a. Fall protection systems and equipment shall comply with current applicable federal, OSHA, ANSI, and state regulations and standards.
 - b. Design anchorage components, using proper engineering principles, to provide adequate attachment to building; ensure compatibility with industry standard equipment.
 - c. For suspended access work, locate anchorages to suit suspension equipment that will be used on the structure with respect to items such as reach, rigging, spacing, roof edge conditions, and similar items. Locate anchorages so lines don't exceed 15 degrees from perpendicular to the building edge that is serviced.
 - d. Design fall protection system to accommodate structural movement, movement within system, movement between system and support components, dynamic loading and release of loads, and deflection of structural support, without detriment to durability or performance, without damage to support structure.
 - e. Design fall protection system and provide clearances that will allow for installation tolerances, and expansion and contraction of adjacent building materials.
 2. Structural Performance Criteria: Provide facility fall protection equipment and systems, including anchorages, complying with specific performance and design criteria indicated, capable of withstanding, without failure, the effects of gravity loads and in-use loads and stresses under conditions indicated or reasonably anticipated. Include necessary modifications to meet required criteria.
 - a. Contract Documents may indicate certain performance requirements, features, and primary components required, but do not cover details of design and construction, and do not purport to identify nor solve problems of thermal or structural movement, anchorage, or moisture disposal. Requirements shown by details are intended to establish basic locations and dimension of fall protection systems.
 - b. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect/Engineer.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- c. Compliance with requirements of authorities having jurisdiction is the responsibility of Contractor.

2.04 RIGID ANCHORAGE:

- A. Design Criteria: Design anchorages used for attachment of personal fall arrest equipment to resist the following maximum static load in any direction without detachment or fracture occurring.
1. Safety Factor: 2:1
 2. Type A and Type T Anchorages: [5,000 pounds (2268 kg)].

2.05 HORIZONTAL LIFELINES:

- A. Design Criteria: Design as part of a complete [travel restraint] [fall arrest] system as follows:
1. Safety Factor: 2:1
 2. The horizontal lifeline shall be designed for a minimum of two (enter 1-3 as required) users, each using an energy absorbing lanyard which limits the force applied to the horizontal lifeline to 1,350 lbs (or as designated by the Qualified Fall Protection Engineer, not to exceed 1,800 lbs). Design trolleys to ensure no occurrence of structural or mechanical deterioration during designed life of system that could affect security and operation considering permanent exposure to elements.
- B. Horizontal Cable Lifeline System: Hands-free fixed cable type for rooftop installation. Design system for fall arrest purposes and install to allow users to walk uninterrupted the entire length of the system and provide secure anchorage to arrest a fall. System shall allow attachment at any point along the cable and enable freedom of movement along the cable as it passes by components.
1. Basis of Design System: Horizontal Lifeline System by Rooftop Anchor, Inc.
 2. Cable: ASTM A492 316 stainless steel wire rope, 7 x 7 type; 5/16 inch (7.94 mm) diameter
 - a. Fixed End Anchorage: Permanently swaged 316 stainless steel terminations.
 - b. Tension Absorber End Anchorage: 316 stainless steel tensioner with 180 pounds (82 kg) visual tension indicator.
 3. Intermediate Brackets: 5/16 inch (8 mm) 316 stainless steel, electropolished.
 4. Corner and Curve Transitions: 316 stainless steel, electropolished.
 5. Horizontal Lifeline Energy Absorber: Installed inline at cable terminations as designated by Qualified Fall Protection Engineer. 316 stainless steel.
 6. Attachment Traveler Device: 316 stainless steel casting, electropolished and serial numbered; with carabiner designed for attachment to cable at any point and to slide along cable.
 7. Roof-Mounted Rigid Anchorage: Stanchion anchorage as specified above designed to withstand the maximum calculated fall arrest forces.
 8. Custom Fabricated Roof-Mounted Anchorage: Galvanized steel members as indicated on Drawings.

ROOF REPLACEMENT

LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING CYPRESS, TEXAS

2.06 LADDER SAFETY SYSTEMS:

- A. Design Criteria: Design to withstand, without failure, a drop test consisting of an 18-inch (41 cm) drop of a 500 pound (227 kg) weight.
- B. Climbing Ladder Fall Arrest System (CLAFS): Comply with 29 CFR 1910.29, 29 CFR 1926.1053, Section 7 of ALI A14.3, ANSI/ASSP Z359.15, and ANSI/ASSP Z359.16; climbing ladder fall arrest system allowing workers to climb and descend ladder using both hands and which does not require workers to continuously, hold, push, or pull any part of system while climbing.
 - 1. Products:
 - a. 3MTM DBI-SALA® Lad-Saf™ Flexible Cable Ladder Safety System as distributed by Rooftop Anchor, Inc.
 - 2. Anchorage: Design for anchorage to fixed ladders up to height indicated with rungs 1-1/8 inch (28.5 mm) diameter or less meeting requirements of 29 CFR 1910.23.
 - 3. Top Bracket Assembly: Designed to fasten to three rungs with U-bolts[with extension post above ladder top meeting requirements of ANSI/ASSP Z359.16; built-in energy absorber; stainless steel.
 - 4. Bottom Bracket Assembly: Designed to fasten to two rungs with U-bolts; include built-in tensioning device; stainless steel.
 - 5. Cable Guides: Non-metallic, automatic pass-through guides for mounting to ladder rungs at 25 foot maximum intervals; stainless steel.
 - 6. Cable Lifeline: Stainless steel wire strand,; 3/8 inch (9.52 mm) diameter or as required to sustain applied loads.
 - 7. Carrier Sleeve: Manufacturer's standard automatic pass-through, detachable fall arrestor unit with attached carabiner designed to connect the worker to the system, automatically follow the user during the climb and lock onto the cable in the event of a fall, allowing the user to regain their footing. Design unit to prevent user from installing the carrier upside down and to require at least two deliberate manual actions by the user to remove from cable. Sleeves shall lock automatically in a fall and must include a second independent locking mechanism that can't be disengaged or interfered with during a fall. During climbing and descent, sleeve movement shall be automatic, not requiring manual intervention.

2.07 SAFETY SIGNAGE AND DATA PLATES:

- A. Safety Signage: Removable, non-fading, non-corrosive, multi-language, legible, preprinted metal or plastic label. Include the following information:
 - 1. The words "DANGER. Fall Protection Must be Used Beyond this Point."
- B. Allowable Load Data Plates: Permanent, non-fading, non-corrosive, legible, preprinted metal or plastic labels complying with ANSI Z359.18. Omit for rigid anchorages. Include the following information on data plates:
 - 1. Maximum rated service or working load capacity and maximum number of users per device or system.
 - 2. Manufacturer's name, address, phone number, web address, , and system serial number(s), and date of installation.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

3. Other pertinent information.
4. Permanently attach to each fall protection device or system so labels will be visible to anyone seeking to use anchorage
- C. Service Labels: Removable, non-fading, non-corrosive, multi-language, legible, preprinted metal or plastic label at each overhead horizontal track system and horizontal lifeline system. Include the following information on service labels:
 1. Installer's name, phone number, and date of original installation.
 2. Date of latest inspection and certification.
 3. System capacity.
 4. Manufacturer's name, address, phone number, web address, and date of installation.
 5. Attach labels in manner to prevent unintentional removal

2.08 STEEL MATERIALS:

- A. Steel Plates, Shapes, and Bars: ASTM A36/A 36M.
- B. Steel Pipe: ASTM A53/A 53M, Standard Weight unless otherwise indicated.

2.09 STAINLESS STEEL MATERIALS:

- A. Stainless Steel Sheet, Strip, and Plate: ASTM A240/A 240M or ASTM A666, Type 304.
- B. Stainless Steel Bars and Shapes: ASTM A276, Type 304 with minimum yield strength of 35 ksi.
- C. Stainless Steel Anchor Rods: Type 304 with minimum tensile strength of 100 ksi and minimum yield strength of 65 ksi.
- D. Stainless Steel Tubing: ASTM A554, Grade MT 304.
- E. Stainless Steel Pipe: ASTM A312/A312M, Grade TP 304.
- F. Stainless Steel Wire Rope: Wire rope manufactured from stainless steel wire complying with ASTM A368, Type 316.
 1. Fittings: Stainless steel connectors, Type 316, with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.
- G. Cast Stainless Steel: ASTM A747/A747M precipitation hardened casting.

2.10 FASTENERS:

- A. General: Select fasteners and anchors for type, grade, and class required. Unless otherwise indicated, provide fasteners as follows:
 1. Material for exterior locations in contact with stainless steel: Type 304 stainless-steel fasteners.
 2. Material for exterior locations exposed to weather: Type 304 stainless steel fasteners.
- B. Stainless Steel Bolts and Nuts: ASTM F593 hexagon-head annealed stainless steel bolts; with ASTM F594 hex nuts; and, where indicated, flat washers; Alloy Group 1.
- C. Stainless Steel Washers: ASTM A240/A 240M, Type 304 and ANSI B18.22.1, Type A Plain.
- D. High-Strength Steel Bolts and Nuts: ASTM A325, Type 3 regular hexagon-head bolts; with ASTM A563, Grade C3 hex nuts; and, where indicated, flat washers.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- E. Steel Bolts and Nuts: ASTM A307, Grade A regular hexagon-head bolts; with ASTM A563 hex nuts; and, where indicated, flat washers.
- F. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors designed for and recommended by anchorage manufacturer for conditions encountered.

2.11 MISCELLANEOUS MATERIALS:

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

2.12 STEEL AND IRON FINISHES:

- A. Thermal Diffusion Galvanizing: Proprietary, factory-applied, thermal diffusion coating applied per AWS C2.2, 1967 Edition "Recommended Practices for Metallizing with Aluminium and Zinc for Protection of Iron and Steel" and providing the same warranty and corrosion protection as hot-dip galvanizing.
 - 1. Basis of Design Product: ThermaGalv™ by Rooftop Anchor, Inc.
 - 2. Substitutions will [not] be considered.
- B. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- C. Pigmented Organic Finish: Manufacturer's standard powder coat comparable in performance to AAMA 621 coatings.
 - 1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 2. Color: High visibility yellow or as selected from manufacturer's full range.

PART THREE - EXECUTION

3.01 INSTALLERS:

- A. Installer List: Installation contractor shall be trained or qualified by the manufacturer.

3.02 EXAMINATION:

- A. Verification of Conditions:
 - 1. Examine roofs, and other mounting surfaces for suitable conditions where fall protection equipment will be installed for compliance with requirements for, installation tolerances, operational clearances, and other conditions affecting performance of work.
 - 2. Verify that structural members to which anchorage is to be attached have adequate bearing surface required to ensure proper attachment per manufacturer's requirements.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.03 PREPARATION:

- A. Coordinate location of fall protection equipment indicated to be attached to permanent structure elements or surface of roofing system and provide appropriate anchoring devices with installation templates, diagrams, and manufacturer's instructions.

3.04 INSTALLATION, GENERAL:

- A. Comply with manufacturer's written installation instructions and recommendations, referenced standards, requirements of authorities having jurisdiction, and approved submittals.
- B. Securely and rigidly install products in place to obtain the required working loads without exceeding allowable loads for each item of fall protection equipment.
- C. Field Welding: Welding methods shall comply with AWS D1.1
- D. After installation, clean and paint as necessary any field welds with cold galvanizing compound to prevent corrosion. Fastening to In-Place Construction: Provide anchorage devices and fasteners where fall protection devices are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
 1. Install fasteners in accordance with fastener manufacturer's recommendations to obtain the allowable working loads published in their product literature.
 2. Apply thread-locking fluid or deform threads of tail end of anchor studs after nuts have been tightened to prevent accidental removal or vandalism at pedestrian accessible equipment
- E. Coordinate installation of flashed roof anchorage with roofing trades to ensure a roofing manufacturer-approved, water-tight flashing method is used.

3.05 REPAIR:

- A. Repairing Damaged Finishes: Immediately after installation, clean field welds and/or abraded and other areas where coatings are damaged.
 1. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.
 2. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish per manufacturer's written instructions.

3.06 FIELD QUALITY CONTROL:

- A. Manufacturer's Field Services:
 1. Require product manufacturers to provide field surveillance of the installation of their products and to observe installation of equipment and assist in Owner's demonstration and training.
 2. Monitor and report installation procedures, and unacceptable conditions.
 3. Engage manufacturer's Qualified Person to perform field tests and inspections and to prepare test reports.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

- B. Testing Services: Testing and inspecting of completed applications of fall protection equipment work shall take place in successive stages as facility fall protection equipment is installed. Do not proceed with work for the next area until test results for previously completed applications of work show compliance with requirements.
 - 1. Prepare a written report to Contractor with copy to Architect and Owner including the date and results of the inspection, the signature of the person who performed the inspection, and the number, or other identifier, of the building support structure and equipment which was inspected.
- C. Do not load or stress system until materials and fasteners are properly installed and ready for service.
- D. Field Tests: Test using load cell test apparatus in accordance with applicable OSHA and ANSI requirements, supervising engineer, and manufacturer's recommendations.
 - 1. Test 100 percent of anchorage that rely on chemical adhesive fastening.
 - 2. Test anchorage by applying the greater of twice the working load or 2,500 pounds (1134 kg), applied at up to 900 pounds (408 kg) per minute and maintained for at least 3 minutes.
 - 3. Test tension of cable lifelines using a calibrated tension meter.
- E. Field Inspections:
 - 1. Inspect each anchorage attachment to building structure for proper installation.
- F. Remove and replace work where test results indicate that it does not comply with specified requirements.
- G. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- H. Do not allow use of fall protection equipment until users have been trained in the use of the systems.

3.07 ADJUSTING:

- A. Verify that products have been installed in accordance with manufacturer's instructions.
- B. Adjust facility fall protection components to function smoothly and safely and as necessary to ensure compliance with reference standards.
- C. Correct component deficiencies to assure compliance prior to Substantial Completion

3.08 CLOSEOUT ACTIVITIES:

- A. Demonstration: Demonstrate function, operation, maintenance, and safety procedures for each fall protection component.
- B. Training: Train Owner's personnel in proper use and maintenance of facility fall protection equipment.
- C. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.

3.09 PROTECTION:

- A. Protect roof surfaces from damage during installation.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

3.10 RECERTIFICATION AGREEMENT:

- A. Agreement: Furnish a proposal to Owner for an annual recertification program per the manufacturer's recommendations.
1. Furnish proposal in the form of a standard yearly agreement.
 2. State services, obligations, conditions, and terms for agreement period and for future renewal options.

END OF SECTION 11 81 29

SECTION 23 01 25

TEMPORARY MECHANICAL DISCONNECTS

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Pre-testing of mechanical units, temporary raising, disconnects of mechanical units, and reinstallation of units as shown on the drawings, and re-testing and correction of deficiencies caused by the Work.

1.02 QUALITY ASSURANCE:

- A. The Contractor shall employ mechanics proficient in the trades involved.
- B. The Contractor shall disconnect mechanical equipment only as scheduled in the approved construction schedule and when performing roofing work in the immediate area of the equipment.
- C. Each unit shall be fully operational immediately after reinstallation. Shut-down time for each unit shall be limited to a four hour period unless otherwise agreed in writing by Owner's Representative.
- D. Prior to commencing any disconnections, the Owner shall be given forty-eight hours notice.

1.03 TESTING:

- A. Prior to commencing work, the Contractor shall test mechanical units in the presence of the Owner's Representative.
- B. Deficiencies in operation including unusual noises will be noted in writing and shall become a matter of record.
- C. Upon completion of the reinstallation of each unit, it shall be retested by the Contractor in the presence of the Owner's Representative.
- D. Any deficiencies which were not noted in the initial testing shall be corrected by the Contractor at his expense.

PART TWO - PRODUCTS

2.01 MATERIALS:

- A. Any replacement parts or additional materials needed due to changes in curb or pre-manufactured support heights shall be as recommended by the manufacturers of the mechanical unit or as required by governing codes, and shall match the existing materials as to type, size, thickness, and quality.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

PART THREE - EXECUTION

3.01 INSTALLATION:

- A. After disconnection, move units sufficient distance to permit the installation of the new supports and new ducts and new roofing and flashing materials.
- B. Units shall be moved onto existing roofing to the maximum extent possible.
- C. Provide plywood traffic ways for moving units, including under equipment used for moving units for its full route of movement.
- D. Under no circumstances shall any mechanical units be stored on completed sections of the new roof.
- E. After installation of equipment support (if required), the unit shall be reset on the support. Reconnecting of pipe, conduit, wiring, and reactivation of the unit to its original condition shall be provided by Contractor. All conduit modifications, extension of ductwork, etc., shall be provided by Contractor at no additional cost to Owner.
- F. Units shall be installed level, plumb, and free of vibration and in accordance with unit manufacturer's original installation practices.

END OF SECTION 23 01 25

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

SECTION 26 01 25

TEMPORARY ELECTRICAL DISCONNECTS

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Temporarily disconnect rooftop electrical equipment or circuits including fans, conduit, and HVAC units as needed. Contractor shall coordinate work to ensure a minimum disruption to equipment. No piece of equipment shall be moved or disconnected without prior approval from Owner's Representative.
- B. Temporarily shut off power to building when working around main power supply conduits on roof.

1.02 QUALITY ASSURANCE:

- A. The Contractor shall employ electricians licensed in the electrical trade.
- B. The Contractor shall disconnect electrical equipment or feeds only as scheduled in the approved construction schedule and when performing roofing work in the immediate area of the equipment or feed.
- C. Each feed or unit shall be fully operational immediately after reinstallation. Shut-down time for each unit shall be limited to a four hour period unless otherwise agreed by Owner's Representative.
- D. Prior to commencing any disconnections, the Owner's Representative shall be given forty-eight hours notice.

1.03 TESTING:

- A. Prior to commencing roofing work, the Contractor shall test circuits and units in the presence of Owner's Representative. Testing of circuits and units includes the ground system/field.
- B. Deficiencies in operation will be noted in writing and shall become a matter of record.
- C. Upon completion of the reinstallation of each unit, it shall be retested by the Contractor in the presence of the Owner's Representative.
- D. Any deficiencies which were not noted in the initial testing shall be corrected by the Contractor at his expense.

PART TWO - PRODUCTS

2.01 MATERIALS:

- A. Any replacement parts or additional materials needed due to changes in curb or pre-manufactured support heights shall be as required by the National Electrical Code (USA).

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

PART THREE - EXECUTION

3.01 GENERAL:

- A. Perform all work to meet the requirements of the National Electrical Code (USA) and local Municipal Electrical Codes.

3.02 DISCONNECTION:

- A. Circuits shall be placed under a controlled tagging and log procedure. Prior to disconnection, all sources of power to the panel or equipment shall be verified. De-energized power circuits shall be tagged out.
- B. Prior to removing equipment or panels, conductors, cables, conductors and terminals terminating in the equipment shall be uniquely identified. This information shall be recorded on a terminal connection schedule prepared for each piece of equipment. Marking shall consist of industry approved methods such as fiber cable tags and wire and terminal marking materials such as Thomas and Betts or equal. Markings shall be impervious to moisture and chemicals in the working environment.
- C. Disconnected cable ends and conductors shall be protected from moisture and rain.
- D. After disconnection, move electrical equipment and materials a sufficient distance to permit the installation of roofing and flashing materials.

3.03 RE-INSTALLATION:

- A. Resetting: As soon as practicable after the flashing operations on a unit are completed.
- B. Install any required duct or electrical connections.
- C. Reinstall the units and reconnect for operation.
- D. Prior to reconnection, cables and conductors shall be physically inspected to verify they are physically in serviceable condition. Cables and conductors shall be re-terminated in accordance with the termination schedules developed above. Electrical connections shall be properly torqued.
- E. Prior to re-energization, electrical units shall be tested to verify continuity and proper connection. Multiphase circuits shall be verified to be connected in the correct phase sequence so that motors turn in the correct direction when energized.
- F. Prior to declaring equipment "in service", the equipment and controls shall be checked for proper operation. This shall require the equipment to be exercised through three complete cycles. Any deficiencies occurring during this test shall be corrected and the equipment re-tested until it operates successfully through three complete cycles. Following this test, the equipment shall be declared operational and "in service".

END OF SECTION 26 01 25

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

SECTION 26 41 00

LIGHTNING PROTECTION SYSTEM

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Renovation and recertification of existing lightning protection system.
- B. Furnish all labor, materials, and items of service required for completion of a functional and unobtrusive lightning protection system.
- C. System furnished shall be the standard product of manufacturer's regularly engaged in the production of lightning protection equipment.
- D. Lightning protection system shall be as approved by Owner and Consultant.
- E. Cooperate with the roofing contractor and roofing material manufacturer to maintain roofing warranties.

1.02 RELATED SECTIONS:

- A. 02 07 20 - Minor Demolition and Renovation Work.
- B. 07 52 00 - Modified Bitumen Membrane Roofing.
- C. 07 54 00 - Fluid-applied Roof Coating.
- D. 07 62 00 - Sheet Metal Flashing and Trim.
- E. 07 92 00 - Joint Sealants.

1.03 STANDARDS:

- A. Lightning Protection Institute Installation Standard, LPI 175.
- B. Underwriters Laboratories, Inc. Installation Requirement, UL96A.
- C. National Fire Protection Association Lightning Protection Code, NFPA78.
- D. National Electrical Code (NEC).

1.04 SUBMITTALS:

- A. Product Data: Submit manufacturer's data sheets for each product to be used.
- B. Shop Drawings:
 - 1. Submit shop drawings.
 - 2. Prepare scaled roof plan locating and identifying all required details.
 - 3. Show type, size, and location of all grounding, down conductors, through roof/through wall assemblies, and roof conductors.
- C. Certificates:
 - 1. Underwriters Laboratories Inc. Master Label.
 - 2. Lightning Protection Institute Certification.
 - 3. Field-applied certification plates.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

1.05 QUALITY ASSURANCE:

- A. Applicator:
 - 1. Employees Certified Master Installers.
 - 2. Company is UL listed.
 - 3. Member of Lightning Protection Institute.
- B. Regulatory Requirements: The lightning protection system shall conform to the requirements of the LPI, UL, NFPA, and NEC.
- C. Inspection: Contractor shall apply to Underwriters Laboratories Inc. for inspection and certification.

PART TWO - PRODUCTS

2.01 MATERIALS:

- A. Aluminum sized, weighted, and constructed to suit pre-application.
- B. Bolt type connectors and splicers shall be utilized.
- C. All mounting hardware shall be stainless steel.
- D. Ground rods shall be stainless steel of appropriate diameter.
- E. Air Terminals: Blunt end aluminum units.
- F. Braided Cable: Aluminum braided cable.
- G. Sealant Adhesive: Non-slump moisture curing structural sealant, gray in color, such as "M-1 Structural Sealant" by ChemLink, Inc.

PART THREE - EXECUTION

3.01 GENERAL INSTALLATION:

- A. The installation shall be accomplished by an experienced installation company that is UL listed, a member of the Lightning Protection Institute, United Lightning Protection Association qualified, and an employer of Certified Master Installers of lightning protection systems.
- B. A Certified Master Installer shall directly supervise the work.
- C. All equipment shall be installed in a neat, workmanlike manner.
- D. The system shall consist of a complete conductor network at the roof and include air terminals, connectors, splicers, bonds, copper downloads, and proper ground terminals.
- E. Lightning Protection System:
 - 1. Temporarily disconnect, remove, and salvage the lightning protection system including, but not limited to, cables, holders, clamps, and clips.
 - 2. Reinstall the lightning protection system so that, upon completion, system can be re-certified by UL.
 - 3. Install equipment in a neat, workmanlike manner.
 - 4. System shall consist of a complete conductor network at the roof and include air terminals, connectors, splicers, bonds, and other associated hardware.

**ROOF REPLACEMENT
LONE STAR COLLEGE: CYFAIR CAMPUS - CENTER FOR ARTS BUILDING
CYPRESS, TEXAS**

5. Secure bases of air terminals and cable holders to inside vertical face of coping with appropriate fasteners.
6. Set air terminal bases, metal cable holders, and cable connectors in bed of sealant adhesive on top of cut section of protection pad installed on top of roof, where applicable.

3.02 COORDINATION:

- A. The lightning protection installer will work with other trades to ensure a correct, neat, and unobtrusive installation.
- B. It shall be the responsibility of the lightning protection installer to assure a sound bond to the main water service and to assure interconnection with other ground systems.

3.03 CLEANING:

- A. Remove trash, debris, equipment, and parts from the jobsite.
- B. Clean exposed metal surfaces, removing substances that might cause corrosion of metal components.

END OF SECTION 26 41 00