

Construction Documents  
**ROOF RECOVER & REPLACEMENT SPECIFICATIONS**

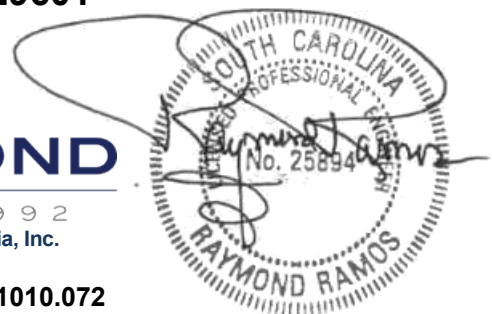
**GREER HIGH SCHOOL**  
3000 EAST GAP CREEK RD,  
GREER, SC 29651



PREPARED FOR:

**GREENVILLE COUNTY SCHOOLS**  
301 EAST CAMPERDOWN WAY,  
GREENVILLE, SC 29601

BY



Raymond Project No.: GSP1010.072  
March 20, 2023

Connor Salas, PE, FAPC  
Dylan Johnson, RRO  
Raymond Ramos, RRC, PE

**SECTION 00 01 02  
PROJECT DIRECTORY**

Owner: GREENVILLE COUNTY SCHOOLS  
Attn: W. Burke Royster, Superintendent  
301 E Camperdown Way,  
Greenville, SC 29601  
Attn: Teresa Champion, Project Manager, Facilities  
2 Space Drive,  
Taylors, SC 29687  
(864) 355-7779  
E-mail: [tchampion@greenville.k12.sc.us](mailto:tchampion@greenville.k12.sc.us)

Designer: RAYMOND ENGINEERING-GEORGIA INC.  
Attn: Dylan Johnson, Project Building Envelope Consultant  
1035 Green Street, Suite A,  
Conyers, GA 30012  
(404) 345-8201  
Email: [dylan.johnson@raymondllc.com](mailto:dylan.johnson@raymondllc.com)  
Attn: Connor Salas, Project Building Envelope Consultant  
9100 Conroy Windermere Rd, Ste 200  
Windermere, FL 34786  
(941) 539-6087  
Email: [connor.salas@raymondllc.com](mailto:connor.salas@raymondllc.com)  
Attn: Christopher Moody, Project Manager  
1035 Green Street, Suite A,  
Conyers, Georgia 30012  
(770) 483-9592  
E-mail: [Christopher.Moody@Raymondllc.com](mailto:Christopher.Moody@Raymondllc.com)

**END OF SECTION**

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**DIVISION 01**  
**GENERAL REQUIREMENTS**

**SECTION 01 11 00  
SUMMARY OF WORK**

**PART 1 – GENERAL**

1.1 Work Covered by Contract Documents

1.1.1 Work under this Contract consists of furnishing all labor, materials, and equipment necessary to perform the quality remedial roof replacement at Greer High School, 3000 East Gap Creek Road, Greer, SC 29651, as shown on Drawing Nos. G-001 through A-504. The work will include, but is not necessarily limited to, the following:

1.1.1.1 Phase I:

- a) At Roof Areas A3, A9, A10, A11, & A12, remove and properly dispose the existing aggregate, cant strips, and base flashings, as required to provide a smooth substrate for the application of the new recover roof system.
- b) At all Roof Areas, remove and properly dispose the existing metal flashings, including lead flashings, scupper liners, expansion joint covers, coping, and counter flashings.
- c) Remove existing store front window system at the location shown on drawings, north of Area A1.
- d) At all Roof Areas, remove and properly dispose of existing gutters and downspouts.
- e) At all Roof Areas, remove and properly dispose of existing pipe flashings including lead flashing and pitch pans.
- f) At all Roof Areas, remove and properly dispose of abandoned penetrations in the deck as marked on drawings or on the roof.
  - (i) Close associated openings in the deck as specified.
  - (ii) Fill void in insulation with isocyanurate insulation, 2-layers minimum, to match the thickness of the existing roof, as specified.
- g) At all Roof Areas, raise existing curbs to a minimum finished flashing height of 8-inches above the new roof surface.
- h) At all Roof Areas, extend soil vent pipes to a minimum finished flashing height of 8-inches above the new roof surface.
- i) At all Roof Areas, remove and replace any deteriorated wood blocking, as specified.
- j) At all Roof Areas, furnish and install new wood blocking at roof eaves and rake edges to match the level of the new roof.
- k) At Roof Areas A3, A9, A10, A11, & A12, furnish and install a new 80-mil adhered TPO roof system, adhered coverboard, and mechanical fastening enhancements, as specified.
  - (i) Provide manufacturer's 20-year No Dollar Limit Warranty.
- l) (Deductive Alternate No. 1) Furnish and install a new 60-mil adhered TPO roof

system in lieu of the 80-mil membrane in all Roof Areas.

- (i) Provide manufacturer's 20-year No Dollar Limit Warranty
- m) At all Roof Areas, furnish and install new 60-mil TPO membrane flashings and liquid flashings, as necessary and as specified.
- n) At all Roof Areas, furnish and install new metal flashings, including expansion joint covers, coping, gravel stops, and counterflashing as specified.
- o) At all Roof Areas furnish and install new gutters and downspouts as specified.
- p) Furnish and install new concrete splash blocks at all downspouts that empty onto the roof surface or onto the ground as specified.
- q) Raise, scrape, prime, and paint gas lines. Furnish and install new non-penetrating premanufactured supports as specified.
- r) Remove all PVC condensation lines and replace with new copper condensation lines as specified. Existing copper condensation lines shall remain.
- s) Scrape, prime, and paint ladders. Secure any loose ladder fasteners.
- t) Furnish and install miscellaneous items as required to ensure a watertight roofing system.
- u) Furnish and install new store front window system at the location shown on drawings, north of Area A1, as shown on drawings A-104 and A-504.
- v) Furnish and install any miscellaneous items, as specified herein.

1.1.2 Phase II:

- a) At Roof Areas A1, A2, A4, A5, A6, A7, & A8, remove and properly dispose the existing aggregate, cant strips, and base flashings, as required to provide a smooth substrate for the application of the new recover roof system.
- b) At Roof Areas B1, B2, B3 & B4, remove and discard the existing built-up roofing system to include membrane, roofing felts, asphalt, insulation, and bituminous flashings down the existing cementitious wood fiber deck.
- c) At all Roof Areas, remove and properly dispose the existing metal flashings, including lead flashings, scupper liners, expansion joint covers, coping, and counter flashings.
- d) At all Roof Areas, remove and properly dispose of existing gutters and downspouts.
- e) At all Roof Areas, remove and properly dispose of existing pipe flashings including lead flashing and pitch pans.
- f) At Roof Area A4, remove and properly dispose of existing drain bowl assemblies.
- g) At all Roof Areas, remove and properly dispose of abandoned penetrations in the deck as marked on drawings or on the roof.

- (i) Close associated openings in the deck as specified.
- (ii) Fill void in insulation with isocyanurate insulation, 2-layers minimum, to match the thickness of the existing roof, as specified.
  
- h) At all Roof Areas, raise existing curbs to a minimum finished flashing height of 8-inches above the new roof surface.
  
- i) At all Roof Areas, extend soil vent pipes to a minimum finished flashing height of 8-inches above the new roof surface.
  
- j) At all Roof Areas, remove and replace any deteriorated wood blocking, as specified.
  
- k) At all Roof Areas, furnish and install new wood blocking at roof eaves and rake edges to match the level of the new roof.
  
- l) At Roof Area A4, furnish and install new drain bowl assemblies to match the existing size as specified.
  
- m) At Roof Areas A1, A2, A4, A5, A6, A7, & A8, furnish and install a new 80-mil adhered TPO roof system, adhered coverboard, and mechanical fastening enhancements, as specified.
  - (i) Provide manufacturers 20-year No Dollar Limit Warranty.
  
- n) At Roof Areas B1, B2, B3, & B4, furnish and install a new 80-mil adhered TPO roof system, adhered coverboard, and two layers of adhered isocyanurate insulation, as specified.
  - (i) Provide manufacturer's 30-year No Dollar Limit Warranty
  
- o) (Deductive Alternate No. 1) Furnish and install a new 60-mil adhered TPO roof system in lieu of the 80-mil membrane in all Roof Areas.
  - (i) Provide manufacturer's 20-year No Dollar Limit Warranty
  
- p) At all Roof Areas, furnish and install new 60-mil TPO membrane flashings and liquid flashings, as necessary and as specified.
  
- q) At all Roof Areas, furnish and install new metal flashings, including expansion joint covers, coping, gravel stops, and counterflashing as specified.
  
- r) At all Roof Areas furnish and install new gutters and downspouts as specified.
  
- s) Furnish and install new concrete splash blocks at all downspouts that empty onto the roof surface or onto the ground as specified.
  
- t) Raise, scrape, prime, and paint gas lines. Furnish and install new non-penetrating premanufactured supports as specified.
  
- u) Remove all PVC condensation lines and replace with new copper condensation lines as specified. Existing copper condensation lines shall remain.
  
- v) Scrape, prime, and paint ladders. Secure any loose ladder fasteners.
  
- w) Furnish and install miscellaneous items as required to ensure a watertight roofing system.

- x) Furnish and install any miscellaneous items, as specified herein.

1.2 Description of the Existing Roof System

1.2.1 Information in this Section is provided only to establish general description and the Contractor is responsible for visiting the site to satisfy himself to the existing conditions, size of Roof Areas, etc. before submitting his Bid.

1.2.2 The roof assemblies are composed of the following:

1.2.2.1 Roof Areas A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12

- a) The roof surfacing is aggregate adhered by asphalt.
- b) The roofing is approximately 1/2" of asphalt impregnated felts.
- c) The cover board is (2) layers of 3/4-inch-thick mineral perlite.
- d) The roof insulation is 1-1/2-inch-thick isocyanurate insulation.
- e) The roof deck is a metal deck.

1.2.2.2 Roof Areas B1, B2, B3, B4

- a) The roof surfacing is built-up wood fiber with aggregate.
- b) The cover board is (2) layers of 3/4-inch-thick mineral perlite.
- c) The roof insulation is 1-1/2-inch-thick isocyanurate insulation.
- d) The roof deck is a cementitious wood fiber deck.

1.2.3 The approximate size of each area is as follows:

1.2.3.1	Roof Area A1	14,250	square feet
1.2.3.2	Roof Area A2	13,960	square feet
1.2.3.3	Roof Area A3	7,650	square feet
1.2.3.4	Roof Area A4	8,610	square feet
1.2.3.5	Roof Area A5	4,735	square feet
1.2.3.6	Roof Area A6	11,475	square feet
1.2.3.7	Roof Area A7	2,900	square feet
1.2.3.8	Roof Area A8	6,100	square feet
1.2.3.9	Roof Area A9	1,225	square feet
1.2.3.10	Roof Area A10	13,260	square feet
1.2.3.11	Roof Area A11	32,610	square feet
1.2.3.12	Roof Area A12	50,030	square feet
1.2.3.13	Roof Area B1	17,685	square feet
1.2.3.14	Roof Area B2	540	square feet
1.2.3.15	Roof Area B3	540	square feet
1.2.3.16	Roof Area B4	4,350	square feet
	<b>Total:</b>	<b>189,920</b>	<b>square feet</b>

1.2.4 An asbestos analysis detected no asbestos-containing materials in the roofing at Greer High School. See attached report.

**PART 2 – PRODUCTS:** Not used.

**PART 3 – EXECUTION:** Not used.

**END OF SECTION**

ATLANTA

Corporate Headquarters  
3945 Lakefield Court  
Suwanee, GA 30024  
(770) 866-3200 FAX (770) 866-3259



10/28/2021

Erich Iverson  
Raymond Engineering  
1224 Royal Drive  
Conyers, GA 30094

RE: Sample Analysis  
GSP1010.072  
Greer HS  
T2100852

Enclosed is a summary and the analysis of samples delivered to MAS on 10/27/2021.

It was requested that we analyze the samples using Asbestos in Building Materials PLM.

The samples were analyzed in accordance with EPA/600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials.

These analysis results relate only to the specific items analyzed. Any partial reproduction of the attached report may not be made without the consent of MAS. The attached report may not be used to imply product endorsement or certification by MAS the EPA, or the U.S. Government.

Materials Analytical Services appreciates this opportunity to have been of service to you. We look forward to working with you on future projects.

Sincerely,  
MAS Microscopy Department





**EPA/600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials**

Erich Iverson  
Raymond Engineering  
1224 Royal Drive  
Conyers, GA 30094

Order #: T2100852  
Date Received: 10/27/2021  
Date Analyzed: 10/28/2021  
Date Reported: 10/28/2021

Customer Project: GSP1010.072, Greer HS

Sample ID # Site	Sample Description	Asbestos Constituents	Non-Asbestos Constituents
T2100852-001 1	Roof material, Black/Tan	None Detected	Fibrous Glass 30% Cellulose 25% Other 40% Perlite 5%
T2100852-002 2	Roof material, Black	None Detected	Fibrous Glass 5% Cellulose 30% Other 65%
T2100852-003 3	Roof material, Black	None Detected	Fibrous Glass 40% Other 60%
T2100852-004 4	Roof material, Black	None Detected	Fibrous Glass 20% Other 80%
T2100852-005 5	Roof material, Black	None Detected	Fibrous Glass 5% Other 95%

Approved By:  
Cory Tawes  
Microbiological Analyst

**Analyst:**  
cdubour



The samples were analyzed in accordance with EPA document 600/R-93/116, "Method for the Determination of Asbestos in Bulk Building Materials" and/or EPA document 40 CFR Appendix E to Subpart E of Part 763, "Interim Method for the Determination of Asbestos in Bulk Insulation Samples". The method detection limit is 1% unless otherwise stated. This report relates only to items tested as received, and may not be used to claim endorsement or certification by Materials Analytical Services, LLC (MAS), EPA, or the U.S. Government. This report may not be reproduced except in full without the approval of MAS (A2LA Chemical Cert. #2925.01).

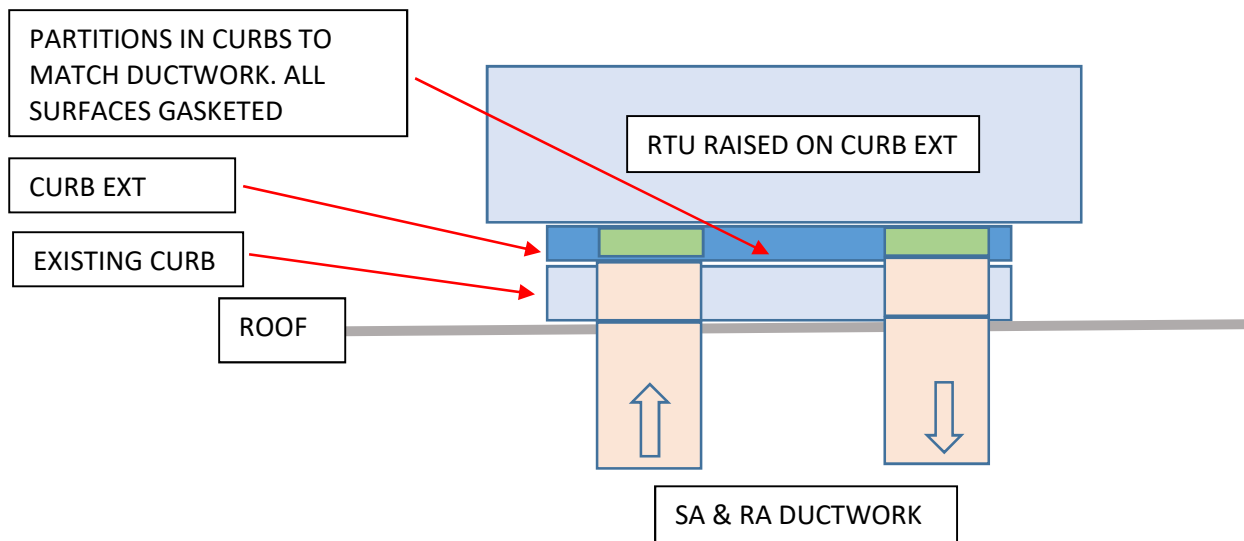


General Requirements

1. Mechanical work includes any modifications to rooftop equipment during a re-roof project. Included are Packaged RTU's, Air Handlers, Fans, Condenser Units, Dust and Fume Collectors, piping, wiring, ductwork, curbs, stands, mounting rails, roof and/or wall brackets. This includes equipment raising (curb extensions) relocations, re-positioning, refrigerant piping, CHW & HHW piping, condensate piping, natural gas piping, electrical disconnects, convenience outlets, rooftop lighting, and HVAC controls.
2. All work shall be in accordance with recognized State and Federal Codes and Standards AND GCSD Design Standards.
3. Specific details for each condition shall be developed and submitted for review by GCSD prior to execution. Allow 7 business days for review.
4. ALL Work shall be performed by a Lic. Mech Contractor approved by GCSD. Attached is a list of GCSD IDC Mechanical Contractors as of March 2020. Likewise, Electrical Work shall be performed by Lic. Electrical Contractor.
5. **ALL Mechanical/Electrical Work shall carry a 24 month 'bumper-bumper' parts and labor warranty.**

Curb Mounted Units

1. Raising and/or repositioning curb mounted units usually involves a curb extension, adapter, or new curb. This work usually breaks the unit duct connections. Ductwork is normally fastened to the existing curb and mates to the RTU via a gravity gasket connection. Roofer along with selected Mech Contr shall thoroughly inspect existing conditions and provide specific details for matching new work to old work. This work shall include as-built inspections for ductwork leaks (both outside and inside the building) and any remedial repair or warranty work to correct leaks. Worst case scenario is re-lifting and re-gasket of curb/curb extension. Typical schematic pasted below.



## **IDC – PACKAGED EQUIPMENT CONTRACTOR SERVICES**

### **BID 116-28-4-20**

#### **McCarter Mechanical Inc.**

685 John Dodd Rd,  
Spartanburg, SC 29303  
Scott McCarter  
(864) 599-7883

#### **Gregory Electric Company, Inc.**

P.O. BOX 170519  
SPARTANBURG, SOUTH CAROLINA 29301  
Tom Cook  
864-283-2785

#### **Jennings-Dill Inc**

33 Grand Ave  
Greenville, SC 29607  
(864) 434-0618  
Andy Lockliar

#### **W B Guimarin & Co Inc**

1327 Miller Rd # B,  
Greenville, SC 29607  
Chris Bigalke  
864.675-1000

#### **Cullum Services**

121 Webb Street  
Simpsonville, SC 29681  
Esteban Uzarraga  
843.747-2900

#### **RUTHERFORD HEATING & AIR**

737 E. MAIN ST.  
SPINDALE, NC 28160  
Alan Murray  
828-287-2240

#### **Service Mechanical, Inc.**

1851 Suber Mill Road  
Greer, SC 29650  
Brent Smith  
864.608-2151

#### **Johnson Controls**

430 J Roper Mountain Road,  
Greenville, SC 29615  
Wayne Vafiadis  
864.423-9155

#### **Trane Carolinas**

Ingersoll Rand  
288 Fairforest Way  
Greenville, SC 29607  
Jim Cree  
864.672-6000

#### **MCG Mechanical**

2000 Pearman Dairy Road  
Anderson, SC 29625  
David Cox  
864.231-9157

**SECTION 01 14 00  
WORK RESTRICTIONS**

**PART 1 – GENERAL**

1. Related Documents

1.1. Drawings and general provisions of the contract, including General Conditions, Supplementary Conditions and other Division 01 specification sections, apply to this section.

1.2. Use of Premises

1.2.1. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of site beyond areas in which the work is indicated. Contractor shall weekly update the designer and owner of planned upcoming future work activities and Phasing Work Plans and notify Owner/Designer of any required or desired deviations as soon as these are identified.

1.2.1.1. Limits: Confine construction operations to the area inside the construction limits, as indicated on the site Plans.

1.2.1.2. Owner occupancy: The owner will occupy the site during construction, until and after substantial completion.

1.2.1.3. Installation of construction materials which are not noisy are not restricted and may be performed at any time.

1.2.1.4. All efforts shall be made to minimize disruption of functioning of the Greer High School. This includes minimizing noise and water intrusion affected by construction.

1.2.1.5. For any operation or activity that will disrupt, impact, or inconvenience the Greer High School, a written notification shall be submitted to the owner at least 7 days prior to the required start of that operation or activity.

1.2.1.6. The contractor shall at all times protect the interior portions of the facility from damage due to weather, water intrusion or construction debris. Interior portions shall be watertight and secure at all times.

1.2.1.7. Facility is responsible for performing sensitive environmental tests which shall not be interrupted due to construction.

1.2.1.8. The contractor shall coordinate, with the Owner, the location of membrane installation prior to membrane installation. Contractor will receive confirmation from the Owner. Contractor shall provide to the Owner an installation plan drawing showing locations of roofing and dates/schedule on which installation is proposed to take place.

1.2.2. Owner occupancy: Owner reserves the right to occupy and to place and install equipment in completed areas of building, before substantial completion, provided such occupancy does not interfere with completion of work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total work and will be coordinated with the Contractor.

1.2.2.1. Designer will prepare a certificate of substantial completion for each specific portion of the work completed and to be occupied before owner occupancy.

- 1.2.2.2. Obtain a certificate of occupancy from authorities having jurisdiction before owner occupancy.
- 1.2.2.3. Before partial owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, owner will provide, operate, and maintain mechanical and electrical systems serving occupied portions of building.
- 1.2.2.4. On occupancy, owner will assume responsibility for maintenance and custodial service for occupied portions of building.
- 1.2.3. School hours: During school operation hours the contractor shall not perform work without prior approval from the Owner. Standard school hours begin in August and are listed as follows:
  - 1.2.3.1. High School: (8:30am – 4:30pm)
  - 1.2.3.2. Middle School: (8:00am – 4:00pm)
  - 1.2.3.3. Elementary School: (7:30am – 3:00pm)

**PART 2 – PRODUCTS:** Not Used.

**PART 3 – EXECUTION:** Not Used.

**END OF SECTION**

**SECTION 01 22 13  
UNIT PRICES AND ALLOWANCES**

**PART 1 – GENERAL**

- 1.1 Work Included: All unit prices and allowances as listed in Bid Form.
- 1.2 Procedures
  - 1.2.1 Unit prices will be exercised at the option of the Owner.
  - 1.2.2 Modify and coordinate related activities as required to complete the work if, and when, acceptance is designated by the Owner in AIA Document A101.
  - 1.2.3 In the event unit prices are exercised, applicable sections of this Specification shall govern. Other sections may be modified as required to address the unit price.
  - 1.2.4 Cost associated with any necessary removals at scuppers to install scuppers and/or conductors and/or downspouts shall be included in the Base Bid.
  - 1.2.5 Cost associated with the repair of decking at removed abandoned penetrations identified on plans and/or marked on the roof shall be included in the Base Bid.
  - 1.2.6 Bidders shall provide a unit price for the items listed on the “Unit Price Schedule” included in this section. Bidder shall include a cash allowance in the Base Bid for each unit price in the quantity listed below on the bid form. Payment will be made for unit price work in excess of the cash allowance, which includes all overhead and profit. In the event it is necessary to replace fewer than the quantity associated with the cash allowance, the Owner will take a credit at the unit price rate. The Design Professional shall be responsible for verifying the actual quantity and extent of the unit price work.

**PART 2 – PRODUCTS:**

- 2.1 See applicable specification sections.

**PART 3 – EXECUTION**

- 3.1 Refer to Section 02 41 13 Selective Demolition and Preparations of the Specification for unit prices.
- 3.2 Attach the following completed table, “Unit Price Schedule,” to the bid form. See Exhibit A on following page.

**END OF SECTION**

**“EXHIBIT A”**

<u>UNIT PRICE SCHEDULE PHASE I</u>							
<u>NO.</u>	<u>ITEM</u>	<u>UNIT</u>	<u>UNIT PRICE</u>		<u>ALLOWANCE</u>		<u>INCLUDED IN BASE     <u>BID</u></u>
1	Wet Insulation Replacement	SF	\$ _____	x	22,000 SF	=	\$ _____
2	Wood Blocking Replacement	BF	\$ _____	x	1,000 BF	=	\$ _____
3	Metal Deck Priming	SF	\$ _____	x	7,500 SF	=	\$ _____
4	Metal Deck Priming & Plate Installation	SF	\$ _____	x	4,500 SF	=	\$ _____
5	Metal Deck Replacement	SF	\$ _____	x	360 SF	=	\$ _____
6	Installation of Side Lap Screws	EA	\$ _____	x	400 EA	=	\$ _____
7	Installation of Deck-to-Joist Screws	EA	\$ _____	x	200 EA	=	\$ _____
8	Structural Wood Fiber Deck Plate Installation	SF	\$ _____	x	600 SF	=	\$ _____
9	Structural Wood Fiber Deck Replacement	SF	\$ _____	x	200 SF	=	\$ _____

**END OF “EXHIBIT A”**

**SECTION 01 26 00  
MODIFICATION PROCEDURES**

**PART 1 – PROCEDURES**

1.1 Unit Price Work

- 1.1.1 Changes to the contract price due to work accomplished based upon unit prices will be initiated by the Contractor. The Designer will complete AIA Document G701 or equivalent document provided by the owner in three copies and submit to the Contractor and Owner for signatures.
- 1.1.2 The Contractor is to immediately notify Designer of any work to be accomplished based upon unit prices and describe the scope of unit price work to be done prior to proceeding.
- 1.1.3 In submitting AIA Document G701 or equivalent document provided by the owner, Contractor is to fully describe the amount accomplished and the total change to the Contract as a result of this Change Order. Shop drawings and/or roof plans to assist in describing the work scope shall be attached.

1.2 Changes in Scope of Work

- 1.2.1 Changes to the Contract Price due to work accomplished due to a change in scope of work will be initiated by the Contractor. The contractor-provided information will be used by the Designer in the development of AIA Document G701 or equivalent document provided by the owner. The Designer shall prepare the Change Order in three copies and shall submit to the Contractor and Owner for signatures.
- 1.2.2 The Contractor must notify the Designer of any work that is not part of the Contract but must be accomplished to continue with the project.
- 1.2.3 Prior to proceeding with such work, the Contractor is to provide the Owner with a description of the work being accomplished and a total cost for such work. Shop drawings and/or roof plans shall be attached, as required.
- 1.2.4 The Contractor is not authorized to proceed with such work until approved by the Owner. Notification to proceed may be verbal or in writing. If verbal, AIA Document G701 or equivalent document provided by the owner is to be submitted at the earliest opportunity.

**PART 2 – PRODUCTS**

- 2.1 Not used.

**PART 3 – EXECUTION**

- 3.1 Not used.

**END OF SECTION**

**SECTION 01 29 73  
SCHEDULE OF VALUES**

**PART 1 – GENERAL**

1.1 Summary

1.1.1 Provide a detailed breakdown of the agreed Contract Sum showing values allocated to each of the various parts of the Work, as specified herein and in other provisions of the Contract Documents.

1.1.2 Related work:

1.1.2.1 Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.1.2.2 Preparation and submittal of a schedule of values is required by the General Conditions.

1.1.2.3 Schedule of values is required to be compatible with the "continuation sheet" accompanying applications for payment, as described in Section 01 29 76. Contractor shall use the current AIA Form G703.

1.2 Submittals

1.2.1 Prior to the first application for payment, submit a proposed schedule of values to the Designer.

1.2.2 Meet with the Designer, if necessary, and determine additional data required to be submitted.

1.2.3 Secure the Designer's approval of the schedule of values prior to submitting first application for payment.

1.3 Quality Assurance

1.3.1 Use required means to assure arithmetical accuracy of the sums described.

1.3.2 When so required by the Designer, provide copies of the subcontracts or other data acceptable to the Designer substantiating the sums described.

**PART 2 – PRODUCTS: Not Used.**

**PART 3 – EXECUTION**

3.1 The following schedule of values shall be shown on AIA Form G703, unless otherwise specified or directed:

3.1.1 General and Supplementary Conditions

3.1.2 Payment and Performance Bonds

3.1.3 Division 01

3.1.4 Division 02 – Labor and Materials

3.1.5 Division 06 – Labor and Materials

3.1.6 Division 07 – Labor and Materials

- 3.1.6.1 Section 07 22 16 – Roof Board Insulation
- 3.1.6.2 Section 07 54 23 – Thermoplastic Polyolefin (TPO) Roofing
- 3.1.6.3 Section 07 60 00 – Flashing and Sheet Metal
- 3.1.6.4 Section 07 92 00 – Joint Sealants
- 3.1.7 Division 8 – Labor and Materials
  - 3.1.7.1 Section 08 43 13 – Aluminum-Framed Windows
  - 3.1.7.2 Section 08 71 00 – Door Hardware
  - 3.1.7.3 Section 08 80 00 – Glazing
- 3.1.8 Division 22 – Labor and Materials
  - 3.1.8.1 Section 22 05 59 – Hangers and Supports for Plumbing Piping and Equipment
  - 3.1.8.2 Section 22 14 00 – Roof Drains

**END OF SECTION**

**SECTION 01 29 76  
APPLICATION FOR PAYMENT**

**PART 1 – GENERAL**

1.1 Procedures

- 1.1.1 Monthly pay estimates shall be submitted to Designer in quadruplicate on the current AIA Form G702. Form shall include the contract's Schedule of Values form, which shall be completed using AIA Form G703 unless otherwise specified.
- 1.1.2 Ninety percent of the value of materials stored at the site and ninety percent of work accomplished, less previous payments, shall be paid by Owner to Contractor in monthly installments upon Designer's certification. Final payment shall be made 30 days after Designer has certified completion to the Owner.
- 1.1.3 A payment or payments made to the Contractor for work performed shall not constitute acceptance or approval of the work and shall in no way relieve Contractor from the requirements of the Contract.
- 1.1.4 All sums received by the Contractor for any part or parts of the work furnished or performed by a Subcontractor or material supplier shall be paid promptly to the latter by Contractor and while in the hands of the Contractor shall constitute trust funds held for the use and benefit of Owner. Contractor shall submit with payment requests lien releases from subcontractors and material suppliers which state that subcontractors and suppliers have been paid for services and materials supplied to the project. All dates on the lien releases provided with payment applications from the Contractor shall be common. Payment requests may be delayed if not received in a timely manner.
- 1.1.5 At final payment, the Contractor shall submit a final conditional release of liens contingent upon the receipt of the remainder of the contract amount, including any approved change order, unit price work, and retainage. At final payment, the Contractor shall submit a zero-dollar final release of liens from all subcontractors and materials suppliers through the date of material completion.
- 1.1.6 If payments are to be made on account of materials or equipment not incorporated in the work, but delivered and suitably stored at the Site, or at such other location agreed upon in writing, such payments shall be conditioned upon submission by Contractor of bills of sale or other documents satisfactory to the Owner establishing Owner's title to such materials or equipment or otherwise protecting Owner's interest therein, including the prepayment of applicable insurance and transportation to the Site.
- 1.1.7 The Contractor shall submit with each application for payment a calendar showing work-days and weather days for the monthly application for payment. Weather days shall be considered days that work cannot be performed due to inclement weather, as reported from the National Weather Service, or approved equal.

1.2 Quality Assurance

- 1.2.1 Prior to start of construction, secure the Designer's approval of the schedule of values required to be submitted in accordance with the General Conditions, and further described in Section 01 29 73 of these Specifications.
- 1.2.2 During progress of the Work, modify the schedule of values as approved by the Designer to reflect changes in the Contract Sum due to Change Orders or other modifications of the Contract. Base requests for payment on the approved schedule of values.

**PART 2 – PRODUCTS:** Not used.

**PART 3 – EXECUTION:** Not used

**END OF SECTION**

**SECTION 01 31 19  
PROJECT MEETINGS**

**PART 1 – GENERAL**

- 1.1 Description: To provide for an orderly review during progress of the work and to provide for the systematic discussion of problems that may arise throughout the construction period.
- 1.2 Presentation: Each Contractor and major Subcontractor shall be represented at every meeting by a representative member of his organization. The Owner and/or his authorized representative shall also attend.
- 1.3 Submittals
  - 1.3.1 The proceedings of these meetings shall be recorded by the Designer, if required. One copy of the proceedings shall be furnished to Owner and each representative.
  - 1.3.2 Conducting the meeting, recording, and distributing meeting minutes shall not be construed that the Designer is scheduling or coordinating Contractor's work.
- 1.4 Decision Interpretations: All decisions and interpretations given by the Designer at project meetings shall be made on behalf of the Owner and shall be conclusive on each contractor affected.

**PART 2 – PRODUCTS**

- 2.1 Not Used.

**PART 3 – EXECUTION**

- 3.1 A pre-bid meeting shall be held with Owner, Owner's Representative and Bidders at the Project Site at the time and date stated in the advertisement.
- 3.2 A pre-construction conference shall be scheduled with the Owner and/or his representative, Contractor's project manager/superintendent, Contractor's project foreman, and manufacturer's representative prior to start of work.
- 3.3 Agenda
  - 3.3.1 Contract Documents
  - 3.3.2 Communication channels and procedures
  - 3.3.3 Field change orders and decisions
  - 3.3.4 Project meeting schedules
  - 3.3.5 Construction schedule
  - 3.3.6 Rules and regulations affecting the work
  - 3.3.7 Safety requirements
  - 3.3.8 Organization of Contractor, Subcontractors, and Suppliers
  - 3.3.9 Shop drawings and submittals

- 3.3.10 Project record documents
- 3.4 Progress Meetings
  - 3.4.1 The Designer will schedule project meetings at his discretion, based upon the progress and quality of the work performed by the Contractor.
  - 3.4.2 Agenda for progress meetings will include, but is not limited to:
    - 3.4.2.1 Construction schedule
    - 3.4.2.2 Change orders
    - 3.4.2.3 Quality control
    - 3.4.2.4 Problems encountered, and actions taken
- 3.5 Location: Meetings shall be held at the job site to the maximum extent possible.

**END OF SECTION**

**SECTION 01 32 13  
CONSTRUCTION SCHEDULES**

**PART 1 – GENERAL**

1.1 Description

1.1.1 To assure adequate planning and execution of the work to complete the project within the time period allowed in the Contract and to assist the Designer in evaluating work progress.

1.1.2 "Day" used throughout the Contract shall mean "Consecutive Calendar Days" unless otherwise stated.

1.2 Schedule Adherence

1.2.1 Liquidated Damages: The Contractor represents and agrees that he has taken into account in his bid the requirements of the bid documents, the location, the time allowed for the work, local conditions, availability of materials, equipment, and labor, and any other factors which may affect performance of the work. The contractor agrees and warrants that he will achieve completion of the work no later than the specified time. If the Contractor fails to complete the work in the specified time, the Contractor shall pay the Owner the sum of one thousand dollars (\$1,000.00) per day for each calendar day beyond the contract time as Liquidated Damages until the work has reached substantial completion.

1.2.2 Should any activity not be completed within 7 days after the scheduled completion date, Owner shall have the right to order the Contractor to expedite completion of work by whatever means the Owner deems appropriate and necessary without additional expense.

1.2.3 Should any activity be 15 or more days behind schedule, the Owner shall have the right to complete the activity or to have the activity completed by whatever means the Owner deems appropriate and necessary.

1.2.4 Any costs incurred by the Owner in connection with expedition of the construction activity under this article shall be reimbursed to the Owner by the Contractor. This may take the form of deductions from payments due Contractor.

1.2.5 Failure by the Owner to exercise the option to either order the Contractor to expedite any activity or to expedite an activity by other means shall not be considered precedent setting for any other activity.

1.2.6 Inclement Weather

1.2.6.1 Where the contract includes schedule requirements including, but not limited to, available working hours, available working days, construction durations, substantial completion date(s), and/or final completion date(s), these requirements shall be graphically shown in the construction schedule. The schedule shall be based on assuming normal inclement weather for each calendar month, and no contract time extensions shall be considered until the calendar month has experienced inclement weather beyond this normal consideration. Furthermore, the Contractor bears the burden of proof to show inclement weather beyond normal considerations, which shall include documentation from the National Weather Service (NWS), or approved equal prior to bid, that the reported inclement weather was outside of the specified parameters to perform the work of this specification. All inclement weather documentation shall be submitted in writing within the payment period for each occurrence.

1.2.6.2 Normal Inclement Weather for each calendar month shall be considered:

	<u>Month</u>	<u>Days</u>
a)	January	6
b)	February	5

c)	March	6
d)	April	5
e)	May	5
f)	June	6
g)	July	6
h)	August	6
i)	September	4
j)	October	3
k)	November	3
l)	December	6

- 1.2.6.3 No consideration or extension shall be allowed for inclement weather days that fall outside any working restrictions.
- 1.2.6.4 Work under this specification shall be adequately staffed to complete the work of this specification given the specified work restrictions with considerations for normal inclement weather.
- 1.2.6.5 No financial compensation shall be made due to inclement weather, and any changes to the contract shall be no-dollar time extensions.
- 1.2.6.6 The contractor is expected to maintain construction in accordance with the approved schedule less any approved inclement weather days outside of normal considerations. Should the contractor fall behind schedule less any approved inclement weather days outside normal consideration, this shall be considered non-compliance with the contract and the Designer may act in accordance with the Contract Documents.

1.3 Schedule: Within 7 days after receipt of notice to proceed, the Contractor shall submit one reproducible and two prints of the construction schedule to the Designer.

#### 1.4 Diagrams

1.4.1 Graphically show the sequence and interdependence of all activities necessary to complete the work and the order in which such activities are to be accomplished as planned by the Contractor and his project field supervisor in coordination with all subcontractors whose work is shown on the diagram. Activities shown on the diagram shall include, but are not limited to:

1.4.1.1 Submittals and approvals of shop drawings and samples.

1.4.1.2 Project mobilization

1.4.1.3 Demolition/Roof preparation

1.4.1.4 Construction

1.4.1.5 Sheet Metal

1.4.1.6 Miscellaneous work

1.4.1.7 Final Cleanup

1.4.1.8 Final Inspection

1.4.1.9 All activities by the Designer which affects progress, required completion dates, or both, for all and each part of the Work.

- 1.4.2 The detail of information shall be such that duration times of activities shall normally range from 1 to 30 days. The selection and number of activities shall be subject to approval by the Designer.

**PART 2 – PRODUCTS**

Not Used.

**PART 3 – EXECUTION**

3.1 Construction Schedule

3.1.1 Within 10 days after the effective date of Agreement, the Contractor shall complete the analysis described in Article 1.4 of this Section in preliminary form. Meet with the Designer to review the contents of the proposed schedule and make all revisions agreed upon. Submit in accordance with Paragraph 1.4.1 of this section.

3.1.2 Revisions

3.1.2.1 Contractor shall make only those revisions to the construction schedule as are approved in advance by Designer.

**END OF SECTION**

**SECTION 01 32 26  
PROGRESS REPORTS**

**PART 1 – GENERAL**

- 1.1 Summary: Contractor shall keep a daily progress report to provide a continuous record of the progress of this Work. The format of the report shall be as directed by the Designer.
- 1.2 Quality Assurance:
  - 1.2.1 Reports shall be filled out daily by the Contractor's job site representative who shall be in a supervisory capacity.
  - 1.2.2 Reports shall be completed by the same individual throughout the duration of the Project wherever possible.

**PART 2 – PRODUCTS:** Not Used.

**PART 3 – EXECUTION**

- 3.1 Report: Contractor shall complete one form for each workday.
  - 3.1.1 Forms shall be completed for workdays shortened or cancelled due to weather, material shortages, labor conditions or holidays.
  - 3.1.2 Forms shall be legible with all pertinent items.
  - 3.1.3 Submit copies to the Designer upon request.
- 3.2 Information Required In The Contractor's Daily Report Shall Include The Following:
  - 3.2.1 Date
  - 3.2.2 Company Name
  - 3.2.3 Name of Superintendent/Foreman
  - 3.2.4 Number of Workers
  - 3.2.5 Weather Conditions
  - 3.2.6 Location of Work Performed
  - 3.2.7 Materials Installed
  - 3.2.8 Description of Work Performed
  - 3.2.9 Photographs of Unit Price Work (minimum of 4): Contractor required to maintain a function digital camera with a minimum resolution of 12 megapixels. Photographs taken on cell phones shall not be allowed.
  - 3.2.10 Photographs of the day's sequence of work (minimum of 8): Contractor required to maintain a functioning digital camera with a minimum resolution of 12 megapixels. Photographs taken on cell phones shall not be allowed.

3.2.11 Project Issues/Request for Information

3.2.12 Name of Visitors

**END OF SECTION**

**SECTION 01 33 00  
SUBMITTALS**

**PART 1 – GENERAL**

- 1.1 Procedures
  - 1.1.1 Submit certain items with Bid and within 7 calendar days after receipt of signed Contract. The successful Contractor shall submit the required information to the Designer in 3 copies or in digital format as allowed by the Owner.
  - 1.1.2 Each transmitted document shall identify the project name and Contractor. Material submittals shall also identify the type and trade name of materials, material manufacturer, intended use and specification number. The successful bidder shall request an electronic copy of the attached “Submittal Checklist” to complete and include with the submittals.
  - 1.1.3 Submittals shall bear the Contractor's stamp and indicate approval and date.
  - 1.1.4 After Designer's review of materials, revise and resubmit, as required, identifying changes made since previous submittal.
  - 1.1.5 Upon approval by Designer, submittals will be forwarded to the Owner for review and approval.
- 1.2 Bid Submittals
  - 1.2.1 Proposed scope of work.
  - 1.2.2 Unit Price Schedule – Section 01 22 13, Unit Prices and Allowances, Exhibit A
  - 1.2.3 Material Price Schedule – Section 01 29 73, Schedule of Values, Exhibit B
  - 1.2.4 Schedule of Values
  - 1.2.5 Safety Plan (Generic)
- 1.3 Site Specific Safety Plan – Refer to Section 01 66 00.
- 1.4 Construction Schedules – Refer to Section 01 32 13 of this Specification.
- 1.5 Shop Drawings, Samples and Product Data: Refer to Section 01 33 23 of this Specification.
- 1.6 Foreman's Statement: Submit on or before pre-construction conference.
- 1.7 Emergency phone number of principals, superintendent, foreman, project manager: Submit to Owner and Designer at Pre-Construction Conference.
- 1.8 Pre-Construction Submittals
  - 1.8.1 Prior to the start of the project, the following items need to be submitted within 7 calendar days after the receipt of signed Contract. The contractor shall fill out the attached Submittal checklist form, ensuring that all items listed in this section, referenced for submittal in the specification, and/or items to be used on this project are properly submitted. Items submitted must conform to the standards and expectations of that material, detail, and/or procedure expressed in this specification. If not, that item may be rejected for use by the Designer.
  - 1.8.2 The following literature shall be submitted.
    - 1.8.2.1 Contractor’s Letter of Good Standing with Manufacturer
    - 1.8.2.2 Manufacturer’s Sample 20-year NDL warranty

- 1.8.2.3 Contractor's 5-year roofing warranty
- 1.8.2.4 Contractor's 1-year window/door warranty
- 1.8.2.5 Manufacturer's Application Instructions
- 1.8.2.6 Contractor's Foreman's Statement
- 1.8.2.7 Contractor's Construction Schedule
- 1.8.2.8 Contractor's Schedule of Values
- 1.8.2.9 Manufacturer's Certificates
  - a) Submit separate letters from the membrane manufacturer and the insulation manufacturer stating he has examined the plans, specifications and details for this project and approves the use of his products and systems on this project.
  - b) Submit a letter from the membrane manufacturer acknowledging the brand name and type of insulation proposed for use and his approval of the use of this insulation with his products.
  - c) Submit a letter from the insulation manufacturer acknowledging the brand name and type of roof membrane being proposed and his approval of the use of the roof membrane and system with his product.
  - d) Submit a copy of the licensed membrane applicator agreement.
  - e) If any membrane components are not packaged by the membrane manufacturer, submit a letter from the membrane manufacturer clearly identifying the component and acknowledging approval to use this component on this project.
  - f) Submit for each bulk shipment of asphalt a manufacturer's certificate clearly stating type of asphalt and compliance with reference standard.
- 1.8.3 Submit all materials as outlined in Part 2 of the Specification sections. Group and label material submittals by Specification Section.
- 1.8.4 Submit metal flashing color charts.
- 1.8.5 Submit shop drawings in accordance with Section 01 33 23.
- 1.9 Close-out Submittals
  - 1.9.1 At the end of the project and prior to final payment, the following documents shall be submitted to the Designer:
    - 1.9.1.1 Copies of all punch lists prepared by the Designer and documentation of completion.
    - 1.9.1.2 Contractor's Warranty to Owner
    - 1.9.1.3 Manufacturer Guarantees
    - 1.9.1.4 Contractor's Final Payment Application

- 1.9.1.5 Consent of Surety for Final Payment
- 1.9.1.6 Final Lien Waiver
- 1.9.1.7 Contractor's Affidavit of Payment of Debts and Claims
- 1.9.1.8 Contractor's Affidavit of Release of Liens

## **PART 2 – PRODUCTS**

- 2.1 Membrane and associated membrane flashings are to be manufactured and labeled by the membrane materials manufacturer or, if supplied by a different manufacturer, approved for use by membrane manufacturer in compliance with warranty requirements.

## **PART 3 – EXECUTION**

- 3.1 Timing
  - 3.1.1 Make all submittals in accordance with schedules specified herein.
  - 3.1.2 Designer will be allowed a minimum of 10 calendar days following receipt of submittals for review.
  - 3.1.3 Delays caused by tardiness in receipt of submittals shall not be an acceptable basis for extension of the Contract completion date.
- 3.2 Review
  - 3.2.1 The notations "No Exceptions Taken" or "Exceptions as Noted" shall authorize the Contractor to proceed with fabrication, purchase, or both subject to the revisions, if any, required by the Designer's review comments.
  - 3.2.2 The Contractor shall make all revisions, as required. If the Contractor considers any revisions to constitute a change, he shall notify the Designer under the provisions of the General Conditions.
  - 3.2.3 Only those revisions directed or approved by the Designer shall be shown on the re-submittal.
  - 3.2.4 After a submittal has been approved by the Designer, substitution of materials, equipment and/or procedures shall not be considered unless accompanied by an acceptable explanation for the substitution.
- 3.3 Foreman's Statement

STATEMENT

Greer High School  
Roof Replacement

I, (Name), an employee of (Contractor) hereby state that I have my own personal copy of the project specifications and drawings, have thoroughly read them, and have visited the work site.

By \_\_\_\_\_

Date \_\_\_\_\_

**END OF SECTION**

## Submittal Review

Project Information	
<b>Project Name:</b>	Greer High School Roof Replacement/Recover
<b>Location:</b>	3000 East Gap Creek Road Greer, South Carolina 29651
<b>REI-GA Project No:</b>	GSP1010.072
<b>Contractor:</b>	
<b>Submitted By:</b>	
<b>Reviewed By:</b>	
<b>Date:</b>	
<b>Submittal Review:</b>	

Contractor shall provide material and installation submittals for the items required. If the status is either "No Exceptions Taken" or "Exceptions as Noted", fabrication and/or ordering MAY be undertaken. This does not authorize changes to Contract Sum unless stated in separate letter or Change Order. "No Exception Taken" and "Exceptions as Noted" does not authorized the Contractor to deviate from the contract documents unless that deviation is explicitly identified and discussed with the Designer and Owner. If the status is either "Revise and Resubmit" or "Not Approved", fabrication MAY NOT be undertaken. Resubmit corrected copies for final approval. Correction shall be limited to items marked. Reviewing is only for conformance with the design concept of the Project and compliance with the information given in the Contract Documents. Contractor is responsible for dimensions to be confirmed and correlated at the site for information that pertains solely to the fabrication processes or to the means, methods, techniques, sequences and procedures of construction; and for coordination of the Work of all trades.

No.	Specification Section	Paragraph Number	Submittal Item	Submitted Item	Date Submitted	Date Reviewed	Status	Delivered	Comments
			(Approved, no required additional submittal)				No Exceptions Taken		
			(Approved as noted, no required additional submittal)				Exceptions as Noted		
			(Revisions to original submittal required)				Revise and Resubmit		
			(Original submittal not approved)				Not Approved		
			(Submittal is not applicable to project)				Not Applicable		
			(Not Submitted, submittal required)				Choose an item.		
No.	Specification Section	Paragraph Number	Submittal Item	Submitted Item	Date Submitted	Date Reviewed	Status	Delivered	Comments
1.	01 33 00	1.2.5	Safety Plan				Choose an item.		
2.	01 33 00	1.7	Emergency Phone Numbers				Choose an item.		
3.	01 33 00	1.8.2.1	Contractor's Letter of Good Standing with Manufacturer				Choose an item.		
4.	01 33 00	1.8.2.2	Manufacturer's Sample 20-Year NDL Warranty				Choose an item.		
5.	01 33 00	1.8.2.3	Contractor's 2-Year Warranty				Choose an item.		
6.	01 33 00	1.8.2.4	Manufacturer's Application Instructions				Choose an item.		
7.	01 33 00	1.8.2.5	Contractor's Foremen's Statement				Choose an item.		
8.	01 33 00	1.8.2.6	Contractor's Construction Schedule				Choose an item.		
9.	01 33 00	1.8.2.7	Contractor's Schedule of Values				Choose an item.		
10.	01 33 00	1.8.2.8	Manufacturer's Certificates				Choose an item.		
11.	01 33 00	1.8.4	Metal Flashing Color Chart				Choose an item.		
12.	01 33 23	1.1.8.1	Shop Drawings (Roof to Roof Transition Detail)				Choose an item.		
13.	01 33 23	1.1.8.2	Shop Drawings (Counterflashing Details)				Choose an item.		
14.	01 33 23	1.1.8.3	Shop Drawings (Insulation Fastening Pattern Details)				Choose an item.		
15.	01 33 23	1.1.8.4	Shop Drawings (Curb Flashing Details)				Choose an item.		
16.	01 33 23	1.1.8.5	Shop Drawings (Curb Extender Flashing Details)				Choose an item.		
17.	01 33 23	1.1.8.6	Shop Drawings (Liquid Flashing Details)				Choose an item.		
18.	01 33 23	1.1.8.7	Shop Drawings (Drip Edge Details)				Choose an item.		
19.	01 33 23	1.1.8.8	Shop Drawings (Overflow Scupper Details)				Choose an item.		
20.	01 33 23	1.1.8.9	Shop Drawings (Gutter and Downspout Details)				Choose an item.		
21.	01 33 23	1.1.8.10	Shop Drawings (Expansion Joint Cover and Closure Detail)				Choose an item.		
22.	01 33 23	1.1.8.11	Shop Drawings (Coping and Closure Details)				Choose an item.		
23.	01 33 23	1.1.8.12	Shop Drawings (Primary Drain Details)				Choose an item.		
24.	01 33 23	1.1.8.13	Shop Drawing (Window head detail)				Choose an item.		
25.	01 33 23	1.1.8.14	Shop Drawing (Window sill detail)				Choose an item.		
26.	01 33 23	1.1.8.15	Shop Drawing (Window jamb detail)				Choose an item.		

No.	Specification Section	Paragraph Number	Submittal Item	Submitted Item	Date Submitted	Date Reviewed	Status	Delivered	Comments
27.	01 33 23	1.1.8.16	Shop Drawings (Other Details, As Specified)				Choose an item.		
28.	02 41 13	2.1	Sheet Metal				Choose an item.		
29.	02 41 13	2.2	Sodium Hypochlorite 5% Solution				Choose an item.		
30.	02 41 13	2.3	Structural Wood Fiber				Choose an item.		
31.	02 41 13	2.4	Metal Deck Primer				Choose an item.		
32.	02 41 13	2.5	Metal Deck				Choose an item.		
33.	02 41 13	2.6	Deck-To-Joist Fastener				Choose an item.		
34.	02 41 13	2.7	Deck Side Lap Screws				Choose an item.		
35.	02 41 13	2.8.1	Masonry Anchor				Choose an item.		
36.	02 41 13	2.8.2	Tapcon				Choose an item.		
37.	02 41 13	2.8.3	Roofing Spike				Choose an item.		
38.	02 41 13	2.9	Wood Screws				Choose an item.		
39.	02 41 13	2.10	Wood Nails				Choose an item.		
40.	02 41 13	2.11	Polyisocyanurate Roof Insulation				Choose an item.		
41.	06 10 53	2.1	Non-Structural Wood Blocking				Choose an item.		
42.	06 10 53	2.2	CD-X Exterior Grade Plywood				Choose an item.		
43.	06 10 53	2.3	Screws				Choose an item.		
44.	06 10 53	2.4	Nails				Choose an item.		
45.	06 10 53	2.5.1	Masonry Anchor				Choose an item.		
46.	06 10 53	2.5.2	Tapcon				Choose an item.		
47.	06 10 53	2.5.3	Roofing Spike				Choose an item.		
48.	07 22 16	2.1	Polyisocyanurate Roof Insulation				Choose an item.		
49.	07 22 16	2.2	Wood Fiber Tapered Edge Strips				Choose an item.		
50.	07 22 16	2.3	Cover Board				Choose an item.		
51.	07 22 16	2.4	Separator Board				Choose an item.		
52.	07 22 16	2.5.1	Insulation Fastener				Choose an item.		
53.	07 22 16	2.5.2	Insulation Fastener Plate				Choose an item.		
54.	07 54 23	2.2	TPO Membrane 80 Mil				Choose an item.		
55.	07 54 23	2.2.2	Membrane Adhesive				Choose an item.		
56.	07 54 23	2.2.3	General Purpose Sealant (White)				Choose an item.		
57.	07 54 23	2.2.4	T-Joint Covers				Choose an item.		
58.	07 54 23	2.2.5	Inside/Outside Molded Corners				Choose an item.		
59.	07 54 23	2.2.6	Large and Small Pipe Flashing				Choose an item.		
60.	07 54 23	2.2.7	Universal Pipe Boot				Choose an item.		
61.	07 54 23	2.2.8	Unsupported Membrane				Choose an item.		
62.	07 54 23	2.2.9	Cut Edge Sealant				Choose an item.		
63.	07 54 23	2.2.10	Membrane Cleaner				Choose an item.		
64.	07 54 23	2.2.11	Membrane-Clad Metal				Choose an item.		
65.	07 54 23	2.2.12	Termination Bar				Choose an item.		
66.	07 54 23	2.2.13	Polyurethane Caulk				Choose an item.		
67.	07 54 23	2.2.14	Water Cut-Off Mastic				Choose an item.		
68.	07 54 23	2.3	Membrane Welding Machines				Choose an item.		
69.	07 54 23	2.4	Walkway				Choose an item.		
70.	07 54 23	2.5	Foam Core				Choose an item.		
71.	07 54 23	2.6	Roofing Nails				Choose an item.		
72.	07 54 23	2.7.1	Membrane Fastener				Choose an item.		
73.	07 54 23	2.7.2	Seam Plate				Choose an item.		
74.	07 54 23	2.8.1	Masonry Anchor				Choose an item.		

No.	Specification Section	Paragraph Number	Submittal Item	Submitted Item	Date Submitted	Date Reviewed	Status	Delivered	Comments
75.	07 54 23	2.8.2	Tapcon				Choose an item.		
76.	07 54 23	2.8.3	Roofing Spike				Choose an item.		
77.	07 60 00	2.2	Galvanized Steel				Choose an item.		
78.	07 60 00	2.3	Stainless Steel				Choose an item.		
79.	07 60 00	2.4	Flat Bar				Choose an item.		
80.	07 60 00	2.5	Termination Bar				Choose an item.		
81.	07 60 00	2.6	Kynar 500-Based Finish				Choose an item.		
82.	07 60 00	2.7	Solder				Choose an item.		
83.	07 60 00	2.8	Non-Shrinking Sealant				Choose an item.		
84.	07 60 00	2.9	Manufacturer's Approved Liquid Applied Flashing at Drains				Choose an item.		
85.	07 60 00	2.10	Pop rivets				Choose an item.		
86.	07 60 00	2.11.1	Fasteners				Choose an item.		
87.	07 60 00	2.11.2	Sealant Tape				Choose an item.		
88.	07 60 00	2.11.3	Elastomeric Sealant				Choose an item.		
89.	07 60 00	2.11.4	Butyl Sealant				Choose an item.		
90.	07 60 00	2.11.5	Epoxy Seam Sealer				Choose an item.		
91.	07 92 00	1.6	Adhesion Test Report				Choose an item.		
92.	07 92 00	2.2	Joint Sealant				Choose an item.		
93.	07 92 00	2.3.1	Cylindrical Joint Sealant Backing				Choose an item.		
94.	07 92 00	2.3.2	Bond-Breaker Taper				Choose an item.		
95.	07 92 00	2.4.1	Primer				Choose an item.		
96.	07 92 00	2.4.2	Cleaners				Choose an item.		
97.	07 92 00	2.4.3	Masking Tape				Choose an item.		
98.	08 43 13	2.1.1	Window Frame Manufacturer				Choose an item.		
99.	08 43 13	2.1.2	Swinging Door Manufacturer				Choose an item.		
100.	08 43 13	2.2	Aluminum framed Storefront				Choose an item.		
101.	08 43 13	2.2.2	Performance Requirements				Choose an item.		
102.	08 43 13	2.3.1	Aluminum Framing Members				Choose an item.		
103.	08 43 13	2.3.1.1	Glazing Stops				Choose an item.		
104.	08 43 13	2.4.2	Fasteners				Choose an item.		
105.	08 43 13	2.4.3	Glazing Gaskets				Choose an item.		
106.	08 43 13	2.6.2	Weather Stripping				Choose an item.		
107.	08 43 13	2.6.3	Sill Sweep Strip				Choose an item.		
108.	08 43 13	2.6.4	Threshold				Choose an item.		
109.	08 43 13	2.6.5	Hinges				Choose an item.		
110.	08 43 13	2.6	Push/Pull Set				Choose an item.		
111.	08 43 13	2.6.7	Exit Device				Choose an item.		
112.	08 43 13	2.6.8	Door Closers				Choose an item.		
113.	08 43 13	2.6.9	Locks				Choose an item.		
114.	08 71 00	2.2.1	Fasteners				Choose an item.		
115.	08 71 00	2.2.2	Fire Rating				Choose an item.		
116.	08 71 00	2.3	Hinges				Choose an item.		
117.	08 71 00	2.4	Exit Devices				Choose an item.		
118.	08 71 00	2.5	Mortise Locks				Choose an item.		
119.	08 71 00	2.6	Door Pulls/ Push Bars				Choose an item.		
120.	08 71 00	2.7	Closers				Choose an item.		
121.	08 71 00	2.8	Thresholds				Choose an item.		
122.	08 71 00	2.9	Weather Stripping and Gasketing				Choose an item.		

# Submittal Review

No.	Specification Section	Paragraph Number	Submittal Item	Submitted Item	Date Submitted	Date Reviewed	Status	Delivered	Comments
123.	08 71 00	2.10	Bumper Guard				Choose an item.		
124.	08 71 00	2.11	Finishes				Choose an item.		
125.	08 80 00	2.1	Manufacturer				Choose an item.		
126.	08 80 00	2.2	Performance Requirements				Choose an item.		
127.	08 80 00	2.3	Glass Materials				Choose an item.		
128.	08 80 00	2.4	Insulating Glass Units				Choose an item.		
129.	22 05 59	2.1	Pipe Support				Choose an item.		
130.	22 05 59	2.2.2	Copper				Choose an item.		
131.	22 05 59	2.2.3	Solder				Choose an item.		
132.	22 05 59	2.2.4	3-RAH-12				Choose an item.		
133.	22 05 59	2.2.5	6-RAH-12				Choose an item.		
134.	22 05 59	2.2.6	Model 2.5				Choose an item.		
135.	22 05 59	2.2.7	Model 1.5				Choose an item.		
136.	22 05 59	2.2.8	Outdoor, Appliance Flexible Connectors				Choose an item.		
137.	22 14 00	2.2	Roof Drains				Choose an item.		
138.	22 14 00	2.3	Drainage Pipe and Fitting				Choose an item.		
139.	22 14 00	2.4	Insulation				Choose an item.		
140.	22 14 00	2.5	Stainless Steel				Choose an item.		
141.	22 14 00	2.6	Fasteners				Choose an item.		
142.	22 14 00	2.7	Fire Wrap				Choose an item.		
143.	22 14 00	2.8	No-Hub Coupling				Choose an item.		

**SECTION 01 33 23**  
**SHOP DRAWINGS, PRODUCT DATA AND SAMPLES**

**PART 1 – GENERAL**

- 1.1 Shop Drawings
  - 1.1.1 Shop drawings, diagrams, illustrations, schedules, performance charts, brochures and other data prepared by the Contractor, Subcontractor, manufacturer, supplier, or distributor which illustrate some portion of the Work.
  - 1.1.2 Submit shop drawings by transmittal letter with the following information:
    - 1.1.2.1 Designer's Project Number
    - 1.1.2.2 Submittal Date
    - 1.1.2.3 Submittal Number
    - 1.1.2.4 Project Title
    - 1.1.2.5 Name of Contractor, Approval Date and Contractor's approval stamp/signature.
    - 1.1.2.6 Reference to Specification Section, Paragraph and/or Drawing.
    - 1.1.2.7 The location of the work covered by the shop drawing.
    - 1.1.2.8 Any qualification, deviation, or departure from Contract.
    - 1.1.2.9 Any additional information required by the Specifications for the material being furnished.
  - 1.1.3 Each shop drawing shall be numbered. The same numbering system shall be retained through all revisions. Each drawing shall have a clear space for the approval stamps of contractor and Designer.
  - 1.1.4 In submitting shop drawings for approval, all associated shop drawings related to a complete assembly shall, where possible, be submitted at the same time so that each may be checked in relation to the entire proposed assembly.
  - 1.1.5 Contractor shall prepare composite shop drawings and installation layouts, when required, to depict proposed solutions for tight field conditions. The composite shop drawings and field installation layouts shall be coordinated in the field by the Contractor for proper relationship to the work of other trades involved in the work.
  - 1.1.6 With respect to standard manufactured items, Contractor shall submit to Designer manufacturer's illustrated cuts of the items to be furnished showing details, sizes and dimensions and all other pertinent information. Sufficient copies of cuts shall be furnished so that Designer may maintain a minimum of two copies and return to Contractor the number required for Contractor's use.
  - 1.1.7 Contractor shall submit one reproducible print and three copies of each drawing.
  - 1.1.8 Submit shop drawings for the following details:
    - 1.1.8.1 Roof to roof transition detail

- 1.1.8.2 Counterflashing details
- 1.1.8.3 Insulation fastening pattern details
- 1.1.8.4 Curb flashing details
- 1.1.8.5 Curb extender flashing details
- 1.1.8.6 Liquid flashing details
- 1.1.8.7 Drip edge details
- 1.1.8.8 Overflow scupper details
- 1.1.8.9 Gutter and downspout details
- 1.1.8.10 Expansion joint cover and closure details
- 1.1.8.11 Coping and closure details
- 1.1.8.12 Primary drain details
- 1.1.8.13 Window head flashing detail
- 1.1.8.14 Window sill flashing detail
- 1.1.8.15 Window jamb detail
- 1.1.8.16 Other details, as specified

1.2 Product Data

- 1.2.1 Submit a complete description of the roofing systems listing all components and their respective manufacturer.
- 1.2.2 Submit each manufacturer's technical specifications and installation procedures for each major roofing component required.
- 1.2.3 Minimum required components include, fasteners, insulation, cover board, roof membrane, membrane flashing and metal flashing material.

- 1.3 Samples: Submit a 6-inch-long sample of each metal shape to be used on this project to Designer for approval. Metal shapes are to be constructed in accordance with approved shop drawings and will be used for establishment of quality standards during installation.

**PART 2 – PRODUCTS**

- 2.1 Not Used.

**PART 3 – EXECUTION**

3.1 Timing

- 3.1.1 A minimum of 10 days shall be allowed for review by the Designer following his receipt of the submittal.
- 3.1.2 If a submittal contains more than 10 shop drawings, Contractor shall indicate which drawings must be returned within 10 days. Designer shall have an additional 10 days to return the balance of

submittals.

3.1.3 Delays caused by tardiness in receipt of submittals shall not be an acceptable basis for extension of the contract completion date.

### 3.2 Review

3.2.1 Review by the Designer shall be directed to the general method of construction and shall not be construed as a complete check, nor shall the review relieve the contractor from responsibility for errors and/or omissions which may exist.

3.2.2 The notations "Reviewed" or "Make Corrections as Noted" shall authorize Contractor to proceed with fabrication, purchase, or both, subject to the revisions, if any, required by the Designer's review comments.

3.2.3 The Contractor shall make all revisions, as required. If the Contractor considers any required revisions to constitute a change, he shall notify the Designer under the provisions specified in the General Conditions.

3.2.4 Only those revisions directed or approved by the Designer shall be shown on the re-submittal.

3.2.5 After a submittal has been approved by the Designer, substitution of materials or equipment shall not be considered unless accompanied by an acceptable explanation as to the necessity for the substitution.

**END OF SECTION**

**SECTION 01 42 19**  
**REFERENCE STANDARDS**

**PART 1 – GENERAL**

- 1.1 Products specified by association or trade standards, must comply to those standards, except when more rigid requirements are specified herein or are required by applicable codes.
- 1.2 Brand or manufacturer names are used as standards of quality where no other appropriate reference is available. The Designer will consider substitution of materials of equal quality and properties provided a written request accompanied by substantiating data is received at least 10 days prior to Bid Date.
- 1.3 The date of the standard is that which is in effect as of the bid date, except when a specific date is stated.
- 1.4 Should there be a discrepancy between the referenced standards and these Contract documents, the latter shall govern unless written interpretation is obtained from the Designer.
- 1.5 Should there be discrepancies among the referenced standards, the more stringent requirements govern.
- 1.6 Definitions:
  - 1.6.1 ASTM – American Society of Testing and Materials. A society formed for the development of standards on characteristics and performance of materials, products, systems and services, and the promotion of related knowledge.
  - 1.6.2 U L – Underwriters' Laboratories. A non-profit, independent organization which tests devices, systems, and materials to determine their performance to life, fire, casualty hazards and crime prevention.
  - 1.6.3 ANSI – American National Standards Institute. A private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States.
  - 1.6.4 F M – Factory Mutual or Factory Mutual Research Corporation. Has a charter similar to Underwriters' Laboratories.
  - 1.6.5 SMACNA – Sheet Metal and Air Conditioning Contractors National Association.
  - 1.6.6 AIA – American Institute of Architects
  - 1.6.7 NRCA – National Roofing Contractors Association.
  - 1.6.8 SCBC – South Carolina Building Code, 2021 Edition
  - 1.6.9 SCPC – South Carolina Plumbing Code, 2021 Edition
  - 1.6.10 IEBC – International Existing Building Code, 2021 Edition
  - 1.6.11 IECC – International Energy Conservation Code, 2009 Edition
  - 1.6.12 OSHA – Occupational Safety and Health Administration
  - 1.6.13 SCFC – South Carolina Fire Code, 2021 Edition
  - 1.6.14 SCMC – South Carolina mechanical Code, 2021 Edition

- 1.6.15 NEC – National Electrical Code (NFPA 70) with SC modifications, 2020 Edition
- 1.6.16 ASCE 7 – Minimum Design Loads and associated criteria for buildings and other structures; most recent edition cited by referring code or reference standard.
- 1.6.17 SDI (QA/QC) – Standard for Quality Control and Quality Assurance for installation of steel deck; 2017.
- 1.6.18 SJI 100 – Catalogue of standard specifications, load tables, and weight tables for steel joists and joist girders; 2011.

**END OF SECTION**

**SECTION 01 45 00**  
**QUALITY CONTROL**

**PART 1 – GENERAL**

- 1.1 Quality Control – General
  - 1.1.1 Work found in violation of the Specifications, or not in conformance with acceptable roofing practices/standards, shall be subject to rejection including removal and replacement with new materials at Contractor's expense.
  - 1.1.2 Failure of Owner or Engineer to discover or reject defective work, or work not in accordance with the Contract, shall not be deemed an acceptance thereof, nor a waiver of Owner's rights to Contractor's compliance with the Contract or performance of the work, or any part thereof. No partial or final payment, or partial or entire occupancy, by Owner shall be deemed to be an acceptance with the Contract, nor shall it be deemed a waiver by Owner or any of Owner's rights pursuant to this Contract or otherwise.
  - 1.1.3 Membrane (of any kind) and base flashings shall be smooth to the substrate, and wrinkles in membrane or base flashings shall be grounds for rejection.
  - 1.1.4 The accumulation of debris and foam adhesive beneath new membrane is not acceptable and shall be grounds for rejection.
  - 1.1.5 Oil canning in metal shall be grounds for rejection.
- 1.2 Quality Control – Contractor: Maintain quality control over products, services, site conditions, and workmanship, to produce work of specified quality.
  - 1.2.1 Maintain quality control over products, services, site conditions, and workmanship, to produce work of specified quality.
  - 1.2.2 Promptly after the award of the contract, a preconstruction conference will be held at the job site. The contractor shall be represented, as a minimum, by the superintendent or project manager and foreman who will perform/supervise the work. Meetings with the designer and owner shall also be attended by the superintendent or project manager and foreman who perform/supervise the work. Failure of representation as stated may result in the rescheduling of these meetings. Meetings during the project may be held as often as the designer and owner deem necessary.
  - 1.2.3 The contractor's project foreman or superintendent who attended the pre-construction meeting shall be on site at all times that work is being performed.
  - 1.2.4 Subcontractor foremen shall be on site at all times that the subcontractor's work is being performed. The foremen shall be at the actual work site to observe workmanship and to be able to direct the work.
  - 1.2.5 Conduct:
    - 1.2.5.1 Contractor's employees and assigns will conduct themselves professionally.
    - 1.2.5.2 Indecent language, harassing "cat" calls or whistles, etc., will not be tolerated. Violators will be removed from Owner's property immediately; questions will be asked later.
    - 1.2.5.3 Proper dress is required. Shirts, long pants, and shoes will be worn at all times. Music is not permitted.

- 1.2.5.4 Contractor's personnel are not permitted to use Owner's Buildings / Facilities for eating or leisure activity. Contractor's personnel are not permitted to use Owner's restrooms.
- 1.2.5.5 Contractor's personnel are prohibited from having firearms, alcoholic beverages, or drugs (except those prescribed by a physician) on the Owner's property.
- 1.2.5.6 Smoking - Contractor shall comply with area designations as established by the Greenville County School District and the Owner's project manager.

### 1.3 Quality Control – Owner

- 1.3.1 A minimum of 3 seam samples shall be taken across seams per day per welder or field peel tests shall be performed in accordance with the roofing system manufacturer's requirements by the roofing contractor. At a minimum, a peel test shall be performed each time machines are activated, and this test shall be dated, stored on-site, and readily available for Designer inspection. Samples shall be tack welded to the roof at each test location, but shall be removed before substantial completion, unless otherwise directed by the Owner. Work found in violation of the Specifications, or not in conformance with acceptable roofing practices/standards, shall be subject to rejection including removal and replacement with new materials at Contractor's expense.
- 1.3.2 Work found in violation of the Specifications, or not in conformance with acceptable roofing practices/standards, shall be subject to rejection including removal and replacement with new materials at Contractor's expense.
- 1.3.3 Failure of Owner or Designer to discover or reject defective work, or work not in accordance with the Contract, shall not be deemed an acceptance thereof, nor a waiver of Owner's rights to Contractor's compliance with the Contract or performance of the work, or any part thereof. No partial or final payment, or partial or entire occupancy, by Owner shall be deemed to be an acceptance with the Contract, nor shall it be deemed a waiver by Owner or any of Owner's rights pursuant to this Contract or otherwise.
- 1.3.4 Owner intends to conduct inspections of the work by in-house personnel and/or the Owner's representative on a full/part-time basis. Such work is in addition to the Designer's inspections which may be conducted to verify that work completed is comparable to contractor's monthly application for payment.

**PART 2 – PRODUCTS:** Not Used.

**PART 3 – EXECUTION:** Not Used.

**END OF SECTION**

**SECTION 01 50 00**  
**TEMPORARY FACILITIES AND CONTROLS**

**PART 1 – GENERAL**

1.1 Description

- 1.1.1 Contractor shall provide for temporary facilities and controls required for the performance of the project except as otherwise noted. Such items include, but are not necessarily limited to, utilities such as heat, water, electricity, and telephone; sanitary facilities; contractor's facilities; and enclosures such as tarpaulins, barricades, and canopies.
- 1.1.2 Contractor shall provide protective netting and/or other means of protection to minimize airborne debris being scattered on the grounds during the removal of the existing roof system.
- 1.1.3 All equipment furnished by Contractor shall comply with all pertinent safety requirements.
- 1.1.4 Ladders, planks, hoists, and all similar items furnished by individual trades in the execution of their own portions of the work are not part of this Section.
- 1.1.5 All temporary facilities will be subject to the Owner's approval.

1.2 Product Handling

- 1.2.1 The Contractor shall exercise all means necessary to maintain temporary facilities and controls in proper and safe condition throughout the progress of the project.
- 1.2.2 All required connections to existing utility systems shall be made with minimum disruption. If disruption of existing service is required, notice shall be given to the Owner and connections shall not be made without Owner's approval. If necessary, Contractor shall provide for alternate temporary service.
- 1.2.3 If the required utility is not available from the Owner, the Contractor shall provide for alternate temporary service for the duration of the project.

**PART 2 – PRODUCTS: Not Used.**

**PART 3 – EXECUTION**

3.1 Electricity

- 3.1.1 Owner will furnish electricity to the Contractor during this project only at available electrical outlets located on the exterior of the building. Any additional electrical requirements required by the Contractor shall be provided by the Contractor at no additional cost to the Owner.
- 3.1.2 All wiring needed to facilitate construction of the project shall be temporary in nature and shall be furnished and installed by the Contractor at no additional cost to the Owner. Upon completion of the work, the Contractor shall remove all such temporary wiring and restore service to its original condition at no additional cost to the Owner.

3.2 Water: The Owner will furnish water required for construction through available hose bibs. Any additional water requirements by the Contractor shall be provided by the Contractor at no additional cost to the Owner.

3.3 Telephone: The project Superintendent will be required to have a working mobile phone during the work. Such costs shall be included in the Base Bid.

- 3.4 Sanitary Facilities: Contractor shall provide toilet and washroom facilities at the project site at no additional cost to the Owner. The use of the facility's toilet and/or washroom facilities is not approved.
- 3.5 Enclosures
- 3.5.1 Contractor shall furnish, install, and maintain for the duration of the project, all scaffolds, ladders, tarpaulins, barricades, warning signs, platforms, bridges, canopies, steps, and other temporary construction required to properly facilitate completion of the project in compliance with all safety and other regulations.
- 3.5.2 Contractor shall provide all necessary safeguards to warn and prevent pedestrians and Owner's personnel from being exposed to dangers or hazards created by this project.
- 3.6 Signs: No signs or advertising of any kind shall be allowed on the project site unless approved in advance by Owner.
- 3.7 Construction Aids
- 3.7.1 A disposal chute may be constructed by Contractor to prevent damage to buildings and grounds. Disposal chute shall be enclosed-type and shall be located such that demolition debris will be discharged from the roof at the designated staging area directly into disposal vehicles or containers.
- 3.7.2 Contractor shall provide for debris removal services and containers. Placement and servicing of containers shall be coordinated with the Owner.
- 3.7.3 Residue and debris from all operations shall not be allowed to accumulate on the project site. Debris shall be removed and properly disposed of daily in accordance with all Federal, State, and local regulations.
- 3.7.4 Dust, dirt, and debris created by project construction shall be properly contained or controlled by the Contractor. Method(s) of control shall be approved by the Designer.
- 3.8 Parking: Contractor's construction vehicles shall enter the project site and park in areas as directed by the Owner. The Contractor shall be responsible for coordination of traffic by his subcontractors, suppliers, etc., so as not to disrupt ongoing operations of the Owner.
- 3.9 Field Office: The Contractor may provide his own Field Office. The location is subject to the approval of the Owner.
- 3.10 Ventilation
- 3.10.1 Provide, as required, facilities to maintain specific storage conditions as described within this Specification and as recommended by the material's manufacturer for use in construction.
- 3.10.2 Provide adequate ventilation of enclosed areas to prevent the accumulation of fumes, vapors, and gases.
- 3.11 Connects and Disconnects
- 3.11.1 In the event it is necessary to disconnect any electrical wiring or connections, plumbing lines or other building services, notify the Owner. Contractor shall not disconnect or connect services unless authorized in writing by Owner.
- 3.11.1.1 Disconnection of any electrical wiring or connections, plumbing lines or other building

services shall be performed by an approved South Carolina Licensed Contractor specialized in this field of work.

3.11.2 Modification of existing service piping, wiring and duct work required in connection with the lifting, removal or relocation of roof-mounted equipment shall be accomplished by the Contractor as part of his Contract.

3.11.2.1 Contractor shall not disconnect existing copper P-traps from HVAC units. Existing P-traps and copper condensate lines to be reused. Any P-Traps and condensate lines damaged during re-roofing operations will be replaced in kind by the contractor at no additional cost to the Owner. Contractor shall protect the existing roof deck, new insulation system, new roof system from water entry and/or damage at existing P-trap locations during roof replacement.

3.11.2.2 Existing PVC P-traps and condensate lines shall be replaced with copper.

3.11.2.3 Modification of existing service piping, wiring and duct work in connection with the lifting, removal or relocation will need to be performed by an approved South Carolina Licensed Contractor specialized in this field of work.

3.12 Contractor Staging Area

3.12.1 Shall be fenced in and locked at the end of each day, or when the contractor cannot visually monitor the staging area.

3.12.2 Shall be locked with dual locks – one from the Owner and one from the Contractor.

3.12.3 All staging area locations shall be confirmed during the pre-construction meeting and shall be approved by the Owner prior to construction.

**END OF SECTION**

**SECTION 01 60 00**  
**PRODUCT REQUIREMENTS**

**PART 1 – GENERAL**

1.1 Summary

- 1.1.1 This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- 1.1.2 See Section 01 77 00 for submitting warranties for Contract closeout.
- 1.1.3 See Divisions 02 through 22 for specific requirements for warranties on products and installations specified to be warranted.

1.2 Definitions

- 1.2.1 Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1.2.1.1 Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
  - 1.2.1.2 Comparable Product: A product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- 1.2.2 Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor. It may be in certain instances but is not necessarily the intent of product Specifications to limit the use of product manufacturers and model numbers to those listed by name. As a minimum, all requirements of the Specifications must be met, including but not limited to appearance, function, quality, durability, and source reliability. Actions and approvals regarding products and product substitutions will occur in a manner that suits and is in the best interest of the Owner.
- 1.2.3 Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.
- 1.2.4 All material must comply with specifications and referenced standards as minimum requirements. The latest edition of referenced standards applies unless specifically stated otherwise.
- 1.2.5 Do not use materials and equipment removed from the existing structure, except as specifically required or allowed by the Contract documents.

1.3 Submittals

- 1.3.1 Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles. Substitutions under this paragraph shall only be considered when

the specified product has become unavailable at no fault of the Contractor.

1.3.1.1 Substitution Request Form: Use CSI Form 13.1A.

1.3.1.2 Documentation: Show compliance with requirements for substitutions and the following, as applicable:

- a) Statement indicating why specified material or product cannot be provided, or an explanation why Contractor wishes to provide an alternate material or product.
- b) Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
- c) Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
- d) Product Data, including drawings and descriptions of products and fabrication and installation procedures.
- e) Samples, where applicable or requested.
- f) List of similar installations for completed projects with project names and addresses and names and addresses of Designer and owners.
- g) Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
- h) Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
- i) Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
- j) Cost information, including a proposal of change, if any, in the Contract Sum.
- k) Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
- l) Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results, or because of adverse unforeseen conditions or expenses resulting from the substitution.

1.3.1.3 Designer's Action: If necessary, Designer will request additional information or documentation for evaluation of a request for substitution. Designer will notify Contractor of acceptance or rejection of proposed substitution within 1 day of receipt of request, or 1 day of receipt of additional information or documentation, whichever is later.

- 1.3.1.4 Form of Acceptance: Change Order.
- 1.3.1.5 Use product specified if Designer cannot decide on use of a proposed substitution within time allocated.
- 1.3.2 Comparable Product Requests: Must be submitted a minimum of 10 days prior to bid. Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number, product data sheets, and title and Drawing numbers and titles.
  - 1.3.2.1 Designer's Action: If necessary, Designer will request additional information or documentation for evaluation within 48 hours of receipt of a request for substitution. Designer will notify all Contractors of acceptance or rejection of proposed substitution within 3 days of receipt of request, or 3 days of receipt of additional information or documentation, whichever is later.
  - 1.3.2.2 Form of Approval: Addendum.
  - 1.3.2.3 Use product specified if Designer cannot decide on use of a comparable product request within time allocated.
- 1.4 Quality Assurance
  - 1.4.1 Contractor shall be responsible for all aspects of material and equipment transportation, delivery, unloading, handling, storage, etc., necessary to get materials and equipment to the roof.
  - 1.4.2 Deliver all materials with manufacturer's labels intact and legible.
- 1.5 Product Options
  - 1.5.1 Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project; product selected shall be compatible with products previously selected, even if previously selected products were also options.
- 1.6 Product Delivery, Storage, and Handling
  - 1.6.1 Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
  - 1.6.2 Delivery and Handling:
    - 1.6.2.1 Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
    - 1.6.2.2 Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
    - 1.6.2.3 Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
    - 1.6.2.4 Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

1.6.3 Storage:

1.6.3.1 Store products to allow for inspection and measurement of quantity or counting of units.

1.6.3.2 Store materials in a manner that will not endanger Project structure.

1.6.3.3 Store products that are subject to damage by the elements, under cover in a weather tight enclosure above ground, with ventilation adequate to prevent condensation.

1.6.3.4 Store cementations products and materials on elevated platforms.

1.6.3.5 Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.

1.6.3.6 Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

1.6.3.7 Protect stored products from damage and liquids from freezing.

1.7 Product Warranties

1.7.1 Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1.7.1.1 Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

1.7.1.2 Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

1.7.2 Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

1.7.2.1 Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.

1.7.2.2 Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.

1.7.2.3 Refer to Divisions 02 through 22 for specific content requirements and particular requirements for submitting special warranties.

1.7.3 The material manufacturer(s) providing warranties or guarantees as a part of this contract shall provide a letter with the pre-construction submittals stating that they have examined the plans, details, and specifications and have the intent to provide the warranty or guarantee required under this contract. The letter shall also state that the installing contractor is of adequate level and is in good standing to obtain the warranty or guarantee requested.

1.7.4 If the material manufacturer shall have any exceptions to the work as shown or described in the plans, details, or specification, that manufacturer shall provide written documentation to the Designer by way of a bidder a minimum of 10 days prior to bid with a list of any work described or shown on the plans, details, or specification that do not meet the manufacturer(s) minimum

requirements to obtain the specified warranty or guarantee, or that do not meet minimum industry standards. No exceptions or modifications to the terms of warranties or guarantees shall be made after the bid.

- 1.7.5 All warranties that are normally available from manufacturers, vendors, Subcontractors, etc. shall be provided to the Owner, even if these warranties are not specifically called for in the Contract Documents.
- 1.7.6 Submittal Time: Comply with requirements in Section 01 77 00.

## **PART 2 – PRODUCTS**

### 2.1 Product Selection Procedures

- 2.1.1 General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
  - 2.1.1.1 Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  - 2.1.1.2 Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  - 2.1.1.3 Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  - 2.1.1.4 Where products are accompanied by the term "as selected," Designer or Owner will make selection.
  - 2.1.1.5 Where products are accompanied by the term "match sample," sample to be matched is Designer's.
  - 2.1.1.6 Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
- 2.1.2 Product Selection Procedures:
  - 2.1.2.1 Product: Where Specification names a single product and manufacturer, provide the named product that complies with requirements.
  - 2.1.2.2 Manufacturer/Source: Where Specification names a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
  - 2.1.2.3 Available Products: Where Specification includes a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements, as determined by the Designer. Comply with provisions in Part 1 "Comparable Products" Article for consideration of an unnamed product.
  - 2.1.2.4 Available Manufacturers: Where Specification includes a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements, as determined by the Designer. Comply with provisions in Part 1 "Comparable Products" Article for consideration of an unnamed product.
  - 2.1.2.5 Product Options: Where Specification indicates that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the

specified product or system. Comply with provisions in Part 1 "Product Substitutions" Article for consideration of an unnamed product or system.

- 2.1.2.6 Basis-of-Design Product: Where Specification names a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specification indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 1 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
- 2.1.2.7 Visual Matching Specification: Where Specification requires matching an established Sample, select a product that complies with requirements and matches Designer's sample. Designer's decision will be final on whether a proposed product is a match.
- 2.1.2.8 If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
- 2.1.2.9 Product: Where Specification names a single product and manufacturer, provide the named product that complies with requirements.
- 2.1.2.10 Standard Range: Where Specification includes the phrase "standard range of colors, patterns, textures" or similar phrase, Designer will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
- 2.1.2.11 Full Range: Where Specification includes the phrase "full range of colors, patterns, textures" or similar phrase, Designer will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## 2.2 Product Substitutions

- 2.2.1 Timing: Designer will consider requests for substitution if received within 5 days after the Proceed Order. Requests received after that time may be considered or rejected at the discretion of the Designer.
- 2.2.2 Conditions: Designer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Designer will return requests without action, except to record noncompliance with these requirements:
  - 2.2.2.1 Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Designer for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
  - 2.2.2.2 Requested substitution does not require extensive revisions to the Contract Documents.
  - 2.2.2.3 Requested substitution is consistent with the Contract Documents and will produce indicated results.
  - 2.2.2.4 Substitution request is fully documented and properly submitted.
  - 2.2.2.5 Requested substitution will not adversely affect Contractor's Construction Schedule.
  - 2.2.2.6 Requested substitution has received necessary approvals of authorities having jurisdiction.

- 2.2.2.7 Requested substitution is compatible with other portions of the Work.
- 2.2.2.8 Requested substitution has been coordinated with other portions of the Work.
- 2.2.2.9 Requested substitution provides specified warranty.
- 2.2.3 Should, after the approval or implementation of a substitution, there occur a discovery of an unforeseen circumstance or condition that is attributable to the substitution, the Contractor shall be responsible to bear any additional costs or to return to the Owner any cost savings resulting from the discovery.
- 2.3 Comparable Products
  - 2.3.1 Conditions: Designer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Designer will return requests without action, except to record noncompliance with these requirements:
    - 2.3.1.1 Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents, and will produce the indicated results, and that it is compatible with other portions of the Work.
    - 2.3.1.2 Product data sheets of proposed materials.
    - 2.3.1.3 Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
    - 2.3.1.4 Evidence that proposed product provides specified warranty.
    - 2.3.1.5 List of similar installations for completed projects with project names and addresses and names and addresses of Designers and owners, if requested.
    - 2.3.1.6 Samples, if requested.

**PART 3 – EXECUTION:** Not Used.

**END OF SECTION**

**SECTION 01 66 00**  
**STORAGE AND PROTECTION**

**PART 1 – GENERAL**

1.1 General Protections

- 1.1.1 Limit size of work sections to safeguard adjacent materials, structures, etc., and to minimize dust and noise.
- 1.1.2 Protect existing facilities from damage during work. Do not overload existing paving, curbs, sidewalks, etc. with vehicle traffic. Do not overload new or existing construction with demolition debris, equipment, etc.
- 1.1.3 Plywood, minimum 3/4" thick, or other suitable materials shall be used to protect roof areas from damage that may be caused by concentrated equipment loads and foot traffic.
- 1.1.4 Roof traffic shall be confined to work areas. Contractor shall be responsible for leaks that develop in traffic areas during and after project completion.
- 1.1.5 Self-supporting ramps shall be used where expansion joints, area dividers, etc. are to be crossed.
- 1.1.6 Contractor shall protect interior operations from adverse weather during roofing operations.
- 1.1.7 At the end of each workday, the contractor shall apply nightly temporary tie-ins to ensure that the building is weather tight, and that newly installed materials are free from moisture and debris. Newly install materials coming in contact with moisture and debris is grounds for rejection of materials and shall constitute the replacement of the materials with like materials at no additional cost to the Owner.
- 1.1.8 The Contractor will be held liable for any damages to the building, building contents, its occupancy, grounds, or landscaping resulting from work under the Contract. In the event of damage, Contractor will restore property to a condition equivalent to that at the time the project started.
- 1.1.9 The Contractor shall keep existing drainage facilities and associated leaders/downspouts clear of debris and bitumastic materials during construction. The Contractor will be required to use elastomeric plugs to protect leaders/downspouts during demolition and re-roofing operations.
- 1.1.10 Prior to the start of re-roofing operations, the Contractor has the option to water test all drain leaders and lines for clogs prior the start of work. All findings shall be immediately reported to the Owner/Designer in writing for direction prior to proceedings.
  - 1.1.10.1 Failure to perform this option and proceeding with work shall serve as the acceptance of the existing drain leaders and lines to be functioning at one hundred percent (100%) capacity prior to the start of re-roofing operations.
  - 1.1.10.2 Furthermore, with this acceptance, the Contractor shall be responsible to ensure that drain leaders and lines are functioning at one hundred percent (100%) capacity prior to the Final Payment at no additional cost to the Owner.
- 1.1.11 Prior to the start of re-roofing operations, the Contractor shall provide Owner personnel with plastic bags/tarps which will be used by personnel to protect televisions, computers, and other associated equipment during the period of time that re-roofing operations are occurring. Bags/tarps shall be provided a minimum of one week prior to the start of re-roofing operations. Costs for providing such materials shall be included in the Base Bid.

1.1.11.1 Contractor will still be required to provide any other additional protection to interior items as may be deemed necessary to comply with the requirements of the Contract Documents.

1.1.12 Schedule of Interior Protections

1.1.12.1 The contractor bears the responsibility to locate any conduits that are in the decking flutes prior to the start of the work. The contractor shall to the full extent possible, not engage these conduits with screws, fasteners, etc. Should power be lost due to penetrate a conduit, the Contractor bears the responsibility to locate and repair the conduit and/or enclosed wiring to the original condition to restore power to the Owner. Cost associated with these repairs shall be borne by the Contractor at no additional cost to the Owner.

- a) Repairs to wiring, electrical equipment, and accessories under this paragraph shall be performed by an electrical contractor licensed to perform such work in the state of South Carolina with a minimum of 5 years experience in this type of work.

1.1.13 Exterior Protections

1.1.13.1 Provide construction trailer, if desired, and material staging at location provided by the Owner at the pre-bid meeting.

1.1.13.2 Maintain a clean construction area in fencing. Maintain a clean material staging area in fencing. No spills, splatter, or residue shall remain on tarmac, roads, or grounds.

1.2 Safety Site Plans

1.2.1 The Contractor shall install and maintain temporary fall protection systems for this type of work in accordance with the following standards:

1.2.1.1 29 CFR 1910 – OSHA

1.2.1.2 29 CFR 1926 – OSHA

1.2.1.3 ANSI/IWCA I-14.1

1.2.1.4 ANSI/ASSE Z359.0-2007

1.2.1.5 ASME A120.01-2008

1.2.2 The Contractor shall submit a site-specific safety plan that shall outline safety precautions that shall be in place to protect workers, buildings, persons, vehicles, structures, and any other items that may be affected or otherwise endangered during the work. This shall list techniques, materials, safety personnel, and precautions that shall be used to achieve a safe working environment. Include sketches, plans, and diagrams, as necessary, for assessment with the safety plan. This safety plan shall be submitted to the Owner for approval with the bid. Failure to submit a safety plan shall result in disqualification of the bid and the bid shall be labeled “non-responsive”. At a minimum, this safety plan shall include:

1.2.2.1 General Safety requirements.

1.2.2.2 Protocol for providing a safe working environment for Contractor Employees, in accordance with Paragraph 1.1.3 above.

- a) Temporary fall restraint systems and anchorages,
- b) Warning lines and barricades,
- c) Safety meetings and minutes.

1.2.2.3 Wind speed working conditions, and protections for temporary roofing in high-speed events.

1.2.2.4 Protocol for fire safety,

- a) Equipment checklist for proper operation,
- b) Fire extinguisher locations for every open flame,
- c) Wind requirements for open flames,
- d) Monitoring any open flame work for subsequent combustion.

1.2.2.5 Protocol for night/pre-dawn work, including foot-candle lighting, safety monitor per number of workers, barricades encapsulating work areas, 100% tie-in outside of barricaded work area, etc.

1.2.2.6 Protocol for deviations from submitted safety plan on a temporary, as needed basis.

Note: This safety plan schedule outlines minimum requirements, and this plan is subject to expansion and approval by the Owner.

1.2.3 Protect existing facilities from fire as a result of construction operations. Contractor shall provide suitable and adequate fire extinguishers conveniently located at staging areas, storage areas and at areas or equipment where an open flame is being used. Competent operators shall be in attendance at all times and shall be properly trained or instructed in fire protection.

1.2.3.1 At each location where an open flame is used, Contractor shall provide a watchman with a suitable fire extinguisher.

### 1.3 Material Protection

1.3.1 Products shall be transported by methods which avoid damage. Damaged material shall be subject to rejection by the Designer.

1.3.2 Store materials off the ground covered with tarps. Factory-applied wrappings are not acceptable.

1.3.3 Wet materials shall be removed from the project site.

1.3.4 Asphalt products may be stored on the ground but covered. Materials that are temperature sensitive are to be stored in strict accord with manufacturer's written instructions.

### 1.4 Storage

1.4.1 Contractor shall be responsible for proper storage of equipment, materials and devices furnished by himself and/or his subcontractors and suppliers.

1.4.2 To the maximum extent possible, the Contractor shall not store combustible or flammable materials inside the facility.

1.4.3 All storage areas are subject to approval by the Owner or his authorized representative.

**PART 2 – PRODUCTS:** Not Used.

**PART 3 – EXECUTION:** Not Used.

**END OF SECTION**

**SECTION 01 74 00  
CLEANING**

**PART 1 – GENERAL**

- 1.1 Description: To maintain the buildings and site in a clean condition throughout the duration of the project. The Contractor shall comply with all requirements for cleanliness described in other sections of these Specifications.

**PART 2 – PRODUCTS**

- 2.1 The Contractor shall provide all required manpower, material, and equipment to maintain the specified standard of cleanliness.
- 2.2 Contractor shall use only those materials and equipment which are compatible with the surface being cleaned as recommended by the manufacturer or approved by the Designer.

**PART 3 – EXECUTION**

- 3.1 Progress Cleaning
- 3.1.1 Stored items shall be kept in an orderly arrangement allowing maximum access and shall not impede drainage or traffic.
- 3.1.2 Scrap, debris, waste material and other items shall not be allowed to accumulate and shall be removed from the roof daily.
- 3.1.3 Contractor shall protect new roofing membrane from dirt and debris during the demolition of the remainder of the roofing. Areas with new roofing membrane shall be kept clean and free of debris during the duration of the re-roofing.
- 3.1.4 Streets, parking lots, walks and grounds connecting to the project area shall be protected from deposits of mud, sand, stone, litter, or debris in any form, and this protection shall be the responsibility of the Contractors. All mud collected on vehicle wheels must be cleaned off before leaving the construction area. Should any mud or debris collect on the streets from the construction project, this shall be removed immediately before becoming a traffic hazard.
- 3.1.5 Contractor shall provide storage containers for all items awaiting removal from the site. Storage containers shall be approved by the Designer.
- 3.1.6 Dust, dirt, and debris created by project construction shall be properly contained or controlled by the Contractor.
- 3.1.7 The Contractor shall conduct daily inspections to ensure that the requirements for cleanliness are met.
- 3.1.8 At locations where the Contractor accesses the site or designated changing areas, the Contractor shall maintain a clean site. The Contractor shall protect the Owners' building from damage, staining, soiling, roofing materials, and roofing debris. This shall also include, at a minimum, the weekly cleaning of these areas. "Clean" shall be interpreted as meaning the level of cleanliness generally attainable by skilled cleaners using commercially available building maintenance equipment and materials.
- 3.1.9 Work may be stopped or delayed by the Owner should the Contractor fail to take appropriate measures to clean the site daily. Extensions to the project completion date for such delays will not be approved.

- 3.1.10 Contractor shall visually inspect all exterior surfaces and remove all traces of dirt, waste materials, smudges, splashed materials, and other foreign matter. The Designer may require that light sandblasting or other cleaning be performed at no cost to the Owner. If such cleaning is required, the Contractor shall take all necessary precautions to prevent damage to adjacent materials, property, and vegetation.
- 3.1.11 The contractor shall make every effort to protect the vehicles on site from becoming unclean, from construction debris and from damage. The contractor is responsible to pay for vehicle cleaning and repairs necessary due to construction related activity.
- 3.2 The Contractor shall inspect all arrangements of materials stored on the project site on a weekly minimum basis and shall service all arrangements in accordance with the requirements of Paragraph 3.1 of this section.
- 3.3 Final Cleaning
  - 3.3.1 Except as specifically provided otherwise, "clean" shall be interpreted as meaning the level of cleanliness generally attainable by skilled cleaners using commercially available building maintenance equipment and materials.
  - 3.3.2 All tools, equipment, materials, scrap, debris, and waste shall be removed from the project site and a final progress cleaning conducted in accordance with this Section.
  - 3.3.3 Unless otherwise directed by the Designer, the Contractor shall clean all adjacent areas on the site and completely remove all resultant debris.
  - 3.3.4 The Contractor shall clean out all gutters and associated downspouts of any debris prior to final acceptance by the Owner. Such work shall be performed at no additional cost to the Owner.
  - 3.3.5 Restore grass or planted areas by filling ruts, raking, seeding, planting, sodding, and fertilizing. Sweep paved areas.
  - 3.3.6 Contractor shall visibly inspect all exterior surfaces and remove all traces of dirt, waste materials, smudges, splashed materials and other foreign matter. The Designer may require that light sandblasting or other cleaning be performed at no cost to the Owner. If such cleaning is required, the Contractor shall take all necessary precautions to prevent damage to adjacent materials, property, and vegetation.
  - 3.3.7 Prior to final inspection, the surface of the membrane shall be cleaned of all debris, dust, and foreign material. This may require the use of water, detergents, and other cleaning agents approved by the roofing system manufacturer. Contractor will be responsible for providing the necessary items to perform this task. Do not use any abrasive pads that can score the polymer.
    - 3.3.7.1 During the work, the Contractor or subcontractor shall not be allowed to stage materials on newly installed roofing. The Contractor shall phase work and stage necessary materials at existing roofing areas. Any damage to new membrane during construction shall result in repairs to the membrane at no additional cost to the Owner, and large areas shall result in the removal and replacement of new membrane at no additional cost to the Owner.

**END OF SECTION**

**SECTION 01 77 00**  
**PROJECT CLOSEOUT PROCEDURES**

**PART 1 – GENERAL**

- 1.1 Description: To provide a specific format for substantial completion and final inspection.
- 1.2 Related Requirements Specified Elsewhere
  - 1.2.1 Completion: Waiver of Claims, General Conditions
  - 1.2.2 Section 01 74 00 – Cleaning
  - 1.2.3 Section 01 78 39 – Project Record Documents
  - 1.2.4 Section 01 78 36 – Guaranties
  - 1.2.5 Closeout Submittals Required for Trades: Respective Section of Specification
  - 1.2.6 Substantial Completion: Conditions of the Contract.
  - 1.2.7 Final Payment: General Conditions
- 1.3 Quality Assurance: All documents submitted to the Owner shall be signed by a person authorized to endorse Contracts on behalf of the Contractor.

**PART 2 – PRODUCTS:** Not Used.

**PART 3 – EXECUTION**

- 3.1 Substantial Completion
  - 3.1.1 The Contractor shall submit written certification to the Owner when the project or designated portion of the project is substantially complete. A list of major items to be completed or corrected shall be stated.
  - 3.1.2 The Owner will inspect within ten (10) days after receipt of certification and issue a Certificate of Substantial Completion containing:
    - 3.1.2.1 The Date of Substantial Completion.
    - 3.1.2.2 The Contractor's list of items to be completed or corrected and any amendments by the Owner or Designer.
    - 3.1.2.3 The time to be allowed for the Contractor to complete or correct listed items.
    - 3.1.2.4 The time and the date Owner will assume possession of the work or designated portion thereof.
    - 3.1.2.5 The signatures of the Owner, Designer and Contractor.
  - 3.1.3 The Contractor shall then complete or correct those items so listed within the designated time and inform the Owner upon completion.
  - 3.1.4 Should the Owner determine that the work is not substantially complete, the Owner shall immediately notify the Contractor in writing stating reasons. The Contractor shall then complete

the work and send a second written notice to the Owner certifying that the project, or designated portion thereof, is substantially complete. The Owner will re-inspect the work within ten (10) days after receipt of certification.

### 3.2 Final Inspection

3.2.1 The Contractor shall submit written certification to the Owner that:

3.2.1.1 The Contract Documents have been reviewed.

3.2.1.2 Work has been completed in accordance with the Contract Documents.

3.2.1.3 The project has been inspected for compliance with the Contract Documents.

3.2.1.4 The project is ready for final inspection.

3.2.2 The Owner will make a final inspection within ten (10) days after receipt of certification.

3.2.3 Should the Owner determine that the work is finally complete in accordance with the requirements of the Contract Documents, the Owner will request that the Contractor submit the appropriate project closeout documentation.

3.2.4 Should the Owner determine that the work is not finally complete, the Owner will immediately notify the Contractor in writing stating reasons. The Contractor shall then take immediate measures to remedy the stated deficiencies and send an additional written notice to the Owner certifying that the work is complete. The Owner will re-inspect the work within ten (10) days after receipt of certification.

3.3 Re-Inspection Costs: Should the Owner be required to perform additional inspections due to noncompliance of work with the certifications of the Contractor, the Contractor shall compensate the Owner for such additional services. Such costs will be deducted from final payment to the Contractor.

### 3.4 Closeout Submittals

3.4.1 Project Record Documents: As required by Section 01 78 39

3.4.2 Warranties: As required by Section 01 78 36

3.4.3 Evidence of payment and release of liens: Waiver and Release Upon Payment – Final.

3.4.4 Consent of Surety

3.4.5 Contractor's Affidavit of Payment of Debts and Claims: AIA G706.

3.4.6 Contractor's Affidavit of Release of Liens: AIA G706A.

3.4.7 The Contractor shall be responsible for proper execution of all submittals required by this Section prior to delivery to the Owner through the Designer.

3.4.8 The Contractor shall submit a final statement of accounting to the Owner. The statement shall reflect all adjustments including, but not limited to:

3.4.8.1 Original Contract sum.

3.4.8.2 Change Orders noting such items as:

- a) Unit Prices
- b) Cash Allowances
- c) Deductions for Uncorrected Work
- d) Deductions for Re-Inspection Payments
- e) Other Adjustments

3.4.8.3 Total adjusted Contract sum

3.4.8.4 Previous payments

3.4.8.5 Remaining amount due

3.4.9 The Owner will prepare a final Change Order reflecting approved adjustments not previously noted.

### 3.5 Final Application for Payment

3.5.1 The Contractor shall submit final application for payment in accordance with the specifications.

3.5.2 The Owner will issue a final certificate in accordance with the specification.

**END OF SECTION**

**SECTION 01 78 36  
WARRANTY AND GUARANTEES**

**PART 1 – GENERAL**

- 1.1 Upon completion of the work and prior to the final payment, the Contractor shall submit the required contractor's guarantee and/or manufacturer Guarantees, as required by this Section.
- 1.2 Submit all items required by this Section as part of project record documents, Section 01 78 39.
- 1.3 Guarantees and Bonds
  - 1.3.1 Contractor:
    - 1.3.1.1 Use the attached guarantee form.
    - 1.3.1.2 Roofing Warranty: The Contractor shall warrant the materials and workmanship of all systems of the project against leakage and against defects due to faulty materials, workmanship, and contract negligence for a period of five (5) years following Final Acceptance of the project.
    - 1.3.1.3 Window Warranty: Comply with the General Conditions of the Contract concerning warranties and bonds. The Contractor shall agree that the work covered under this Contract shall remain free from any water penetration and physical defects caused by defective workmanship or materials for a period of one (1) years from the date of final acceptance by Owner. Warranty shall be executed on Contractor's company letterhead and signed by an authorized officer of the company.
    - 1.3.1.4 The Contractor and the Owner's representative shall conduct an inspection approximately 30 days prior to the end of the Contractor's guarantee to determine the present physical condition of the roofing system and window system. The Owner's representative shall then submit a written report as to the findings of this inspection, and the Contractor, at his own expense, shall repair any defects covered under the scope of this contract.
  - 1.3.2 Window Manufacturer Guarantees:
    - 1.3.2.1 General – Guarantees shall not contain conditions limiting the manufacturer's obligations due to:
      - a) Receipt of payments from the roofing contractor.
      - b) The system having been installed in accordance with the manufacturer's specifications and procedures.
    - 1.3.2.2 Prior to final payment, Contractor shall submit one original and three copies of the window manufacturer's warranties to the Owner:
      - a) Provide two (2) year warranty for window defects due to materials and/or fabrication workmanship.
      - b) Provide twenty (20) year warranty for seal. Warranty shall cover visual obstruction from film formation or moisture collection between internal glass surfaces.

1.3.3 Roofing Manufacturer Guarantees:

1.3.3.1 General – Guarantees shall not contain conditions limiting the manufacturer’s obligations due to:

- a) Receipt of payments from the roofing contractor.
- b) The system having been installed in accordance with the manufacturer’s specifications and procedures.

1.3.3.2 TPO (80-mil) Membrane Manufacturer’s Guarantee: Recover Roof Areas

- a) The Contractor shall include in the base bid the cost of the manufacturer’s 20-year no dollar limit material and workmanship total system guarantee. The guarantee must not require Owner’s signature to activate.
  - i. Warranty shall include 72-mph wind rider at no additional cost to the owner.
- b) The manufacturer shall agree that the work covered under this contract shall remain free from water penetration and material defects caused by defective workmanship or materials for a period of twenty (20) years from the date of Final Acceptance by the Owner. The Contractor’s guarantee shall neither replace nor negate any agreement furnished by the manufacturer.

1.3.3.3 TPO (80-mil) Membrane Manufacturer’s Guarantee: Replacement Roof Areas – B1, B2, B3 & B4.

- a) The Contractor shall include in the base bid the cost of the manufacturer’s 30-year no dollar limit material and workmanship total system guarantee. The guarantee must not require Owner’s signature to activate.
  - i. Warranty shall include 72-mph wind rider at no additional cost to the owner.
- b) The manufacturer shall agree that the work covered under this contract shall remain free from water penetration and material defects caused by defective workmanship or materials for a period of thirty (30) years from the date of Final Acceptance by the Owner. The Contractor’s guarantee shall neither replace nor negate any agreement furnished by the manufacturer.

1.3.3.4 TPO (60-mil) Membrane Manufacturer’s Guarantee: (Deductive Alternate No. 1 All Roof Areas)

- a) The Contractor shall include in the base bid the cost of the manufacturer’s 20-year no dollar limit material and workmanship total system guarantee. The guarantee must not require Owner’s signature to activate.
  - i. Warranty shall include 72-mph wind rider at no additional cost to the owner.
- b) The manufacturer shall agree that the work covered under this contract shall remain free from water penetration and material defects caused by defective workmanship or materials for a period of twenty (20) years from the date of Final Acceptance by the Owner. The Contractor’s guarantee shall neither replace nor negate any agreement furnished by the manufacturer.

- 1.3.3.5 Metal Flashing Manufacturer – Prior to final payment, the contractor shall furnish one original and three copies of the metal flashing manufacturer’s twenty (20) year finish guarantee for factory applied finishes.
- 1.3.3.6 Sealant Manufacturer - Prior to final payment, Contractor shall submit one original and three (3) copies of the sealant manufacturer’s twenty (20) year premium warranty to the Owner.
- a) Where a problem has arisen with the material performance of a product that has been approved by the sealant manufacturer as a part of the work under this specification, but is not manufactured by the waterproofing or sealant manufacturer, and a product defect or failure occurs, even if the failure/defect does not result in leaks through the sealant and/or facility, the waterproofing and sealant manufacturer shall work in concert with the contractor to resolve such issues to the satisfaction of the Owner at no additional cost to the Owner.
- b) In the event that the sealant manufacturer should supply materials that they do not manufacture, to include such items as primer, and/or cleaning products; these items shall be included in the Guarantee coverage.
- 1.3.4 Emergency repairs to defects and leaks shall be performed within 24 hours of receiving notice from Owner. As soon as weather permits, permanent repairs and restoration of affected areas shall be accomplished in a manner in conformance with the original Contract requirements. This work shall be done without additional cost to the Owner, except if it is determined that such leaks and effects were caused by abuse, lightning, hurricane, tornado, hailstorm, or other unusual phenomena.
- 1.3.5 The warranties shall also state that the Owner has the right, at any time during the five-year Contractor's warranty period to make emergency repairs to protect the contents of the building or the building itself from damage due to leaking. The cost of emergency repairs made during the five-year period of the warranty shall be borne by the Contractor and action by the Owner shall not invalidate the warranty.
- 1.3.6 Starting dates of all warranties shall be the date of the final inspection and Owner acceptance which the Owner, Designer, Contractor and Manufacturer agree that all work has been completed in substantial compliance with the plans and specifications of the project.
- 1.3.7 All Guarantees shall be governed by and construed in accordance with the laws of the State of South Carolina.
- 1.3.8 No guarantee shall require dispute resolution to take place in any court other than those courts having jurisdiction over the site of the project.
- 1.3.9 All Guarantees shall be issued bearing a signature of an officer of the company and shall not require the signature of the Owner nor Designer.

**END OF SECTION**

(Print Warranty Body on Contractor’s Company Letterhead)

**CONTRACTOR’S ROOF WARRANTY**

1. Known all men by these presents, that we, *Contractor shall insert company name here* (Contractor), having installed insulation, roofing, flashings, and sheet metal work, and having accomplished certain other work on the Greer High School Roof Replacement project, under Contract between Greenville County Schools and (Contractor) warrant to Greenville County Schools, with respect to said work that for a period of five (5) years from date of final acceptance of said work by Greenville County Schools, the roofing including insulation, roofing membrane, flashings, and sheet metal work, shall be absolutely watertight and free from all leaks, provided however that the following are excluded from this warranty:
  - a) Defects or failure resulting from abuse by the Owner.
  - b) Defects in design involving failure of the structure, load-bearing walls, and/or foundations.
  - c) Damage caused by fire, tornado, hail, hurricane, acts of God, wars, riots, and/or civil commotion.
2. We agree that should any leaks occur in the roofing, we will promptly remedy said leaks in a manner to restore the roof to a watertight condition by methods compatible to the system and acceptable under industry standards and/or general practice.
3. We further agree that for a period of five years from date of final acceptance referred to above, we will make repairs at no expense to the Owner, to any defects which may develop in the work including, but not limited to, blisters, wrinkles, ridges, splits, warped insulation, and loose flashings, in a manner compatible to the system and acceptable under industry standards and general practice.
4. We also agree that the Owner has the right, at any time during the five-year warranty period, to make emergency repairs to protect the contents of the building or the building itself from damage due to leaking. The cost of emergency repairs made during the five years of the warranty period shall be borne by the Contractor and action by the Owner shall not invalidate the warranty.

IN WITNESS WHEREOF, we have caused this instrument to be duly executed, this \_\_day of \_\_\_\_\_, 2023.

\_\_\_\_\_ by \_\_\_\_\_  
Contractor President

\_\_\_\_\_  
Notary Public

(Print Warranty Body on Contractor’s Company Letterhead)

**CONTRACTOR’S WINDOW WARRANTY**

1. Known all men by these presents, that we, *Contractor shall insert company name here* (Contractor), having installed windows, flashings, and having accomplished certain other work on the “Greer High School Roof Recover and Replacement” project, under Contract between Greenville County Schools and (Contractor) warrant to Greenville County Schools, with respect to window replacement work that for a period of one (1) year from date of final acceptance of said work by Greenville County Schools, the replaced window system shall be absolutely watertight and free from all leaks, provided however that the following are excluded from this warranty:
  - d) Defects or failure resulting from abuse by the Owner.
  - e) Defects in design involving failure of the structure, load-bearing walls, and/or foundations.
  - f) Damage caused by fire, tornado, hail, hurricane, acts of God, wars, riots, and/or civil commotion.
2. We agree that should any leaks occur, we will promptly remedy said leaks in a manner to restore the window to a watertight condition by methods compatible to the system and acceptable under industry standards and/or general practice.
3. We further agree that for a period of one year from date of final acceptance referred to above, we will make repairs at no expense to the Owner, to any defects which may develop in the work including, but not limited to, peeling, flaking, or delamination of the finish on the interior or exterior of the window and installed flashings, cracking or fogging of glass, and failure of hardware that impacts the operation of the products, in a manner compatible to the system and acceptable under industry standards and general practice.
4. We also agree that the Owner has the right, at any time during the one-year warranty period, to make emergency repairs to protect the contents of the building or the building itself from damage due to leaking. The cost of emergency repairs made during the two years of the warranty period shall be borne by the Contractor and action by the Owner shall not invalidate the warranty.

IN WITNESS WHEREOF, we have caused this instrument to be duly executed, this \_\_ day of \_\_\_\_\_, 2023.

\_\_\_\_\_ by \_\_\_\_\_  
Contractor President

\_\_\_\_\_  
Notary Public

**SECTION 01 78 39**  
**PROJECT RECORD DOCUMENTS**

**PART 1 – GENERAL**

- 1.1 Summary: To maintain an accurate record of the project throughout its duration. Items to be noted include, but are not necessarily limited to:
- 1.1.1 Contract Documents
  - 1.1.2 Addendum
  - 1.1.3 Change Orders
  - 1.1.4 Field Orders and Instructions.
  - 1.1.5 Construction Schedule.
  - 1.1.6 Shop Drawings
  - 1.1.7 Product Samples
  - 1.1.8 Progress Reports
- 1.2 Quality Assurance:
- 1.2.1 The Contractor shall delegate responsibility for maintenance of the record documents to one person on the Contractor's staff as approved by the Designer.
  - 1.2.2 All entries shall be made within 24 hours after receipt of information.
- 1.3 Submittals: The Contractor shall submit the final record documents to the Designer for approval prior to submitting a request for final payment. Submit two copies of "as-built" documents to Designer with letter of transmittal indicating date, project title, Contractor's name and address, list of documents, and signature of Contractor.
- 1.4 Product Handling: Contractor shall take all necessary precautions to protect the record documents from deterioration loss and damage until completion of the work and transfer of the recorded data to the final record documents.

**PART 2 – PRODUCTS:** Not Used.

**PART 3 – EXECUTION:** Not Used.

**END OF SECTION**

**DIVISION 02**  
**EXISTING CONDITIONS**

**SECTION 02 41 13  
SELECTIVE DEMOLITION AND PREPARATIONS**

**PART 1 – GENERAL**

- 1.1 Related Work:
  - 1.1.1 Section 01 50 00 – Temporary Facilities and Controls
  - 1.1.2 Section 01 60 00 – Product Requirements
  - 1.1.3 Section 01 66 00 – Storage and Protection
  - 1.1.4 Section 06 10 53 – Miscellaneous Rough Carpentry
- 1.2 Protection: Refer to Section 01 66 00.

**PART 2 – PRODUCTS**

- 2.1 Sheet Metal: 20-gauge galvanized steel.
- 2.2 SODIUM HYPOCHLORITE 5% SOLUTION: Clorox, As Manufactured By The Clorox Company, 1221 Broadway Oakland, California 94612, or approved equal prior to bid.
- 2.3 Structural Wood Fiber: Aspen wood fibers bonded with inorganic hydraulic cement such as Tectum 1 panel or approved equal prior to bid. Nominal Panel Dimensions: To match existing.
- 2.4 Metal Deck Primer: Kem Kromik as manufactured by Sherwin Williams or approved equal.
- 2.5 Metal Deck: ASTM A 653, galvanized G-90 deck, manufactured in accordance with the requirements of the Steel Deck Institute, Inc. for wide rib (Type B). Minimum section properties:
  - 2.5.1 Yield strength = 33 ksi.
  - 2.5.2 Thickness: 22 gauge.
  - 2.5.3 Panel Coverage: minimum 36 inches.
- 2.6 Deck-To-Joist Fastener: ASTM A240, 410 stainless steel, self-drilling minimum #12 stainless steel screw with a nominal head diameter of 0.430 inches. Screws shall penetrate the substrate a minimum of 1-1/2 inch.
- 2.7 Deck Side Lap Screws: ASTM A240, 410 stainless steel, self-drilling minimum #10 stainless steel screw with a nominal head diameter of 0.415 inches. Screws shall penetrate the substrate a minimum of 1 inch.
- 2.8 Masonry Fastener:
  - 2.8.1 Masonry Anchor, minimum 1-1/4 inch into substrate, as manufactured by OMG Roofing Products
  - 2.8.2 Tapcon 1/4" x minimum 1-1/4" in the substrate, as manufactured by Buildex.
  - 2.8.3 Roofing Spike, minimum 1-1/4 inch into substrate, as manufactured by Powers Fasteners.
  - 2.8.4 Approved equal prior to bid.

- 2.9 Wood Screws: #12 double-coated galvanized steel screws or stainless steel self-tapping wood screws that shall be able to resist any galvanic action that may be able to develop between the nail and the pressure treatment. The use of a lesser quality screw will not be approved. Screws shall be of sufficient length to penetrate a minimum of 1-1/2-inches into the substrate.
- 2.10 Wood Nails: For securing new lumber to new lumber or new plywood/OSB to new lumber, double-coated galvanized steel, or stainless-steel ring shank nails to penetrate a minimum of 1-1/2 inches into the substrate but not smaller than 8d nails. Use 16d nails where material being secured is 1-1/2-inches to 2-inches thick.
- 2.11 Polyisocyanurate Roof Insulation: Flat and tapered, as specified, ASTM C1289, Type II, Class I. Board size shall not exceed 4' x 8' for mechanically attached insulation. Board size shall not exceed 4' x 4' for adhered insulation. Board size of tapered insulation shall not exceed 4' x 4'. The Long-Term Thermal Resistance shall be a minimum of 5.7 per inch. Insulation compressive strength shall be minimum 20 psi. Insulation density shall be 2 pcf minimum. Thermal insulating factor as specified; however, thicknesses of each layer of insulation shall not exceed 2 inches.

### **PART 3 – EXECUTION**

#### **3.1 Demolition:**

- 3.1.1 Refer to Section 01 11 00 Summary of Work.
- 3.1.2 The removal of roof-mounted equipment and/or curbs, as identified either on plans and/or marked on the roof, shall be included in the Base Bid.
- 3.1.3 The Designer and Contractor shall document the actual quantities removed for materials bid on a unit price basis.
- 3.1.4 All existing roof mounted equipment shall be lifted or removed so that existing flashings can be totally removed.
- 3.1.5 Remove only as much material as can be totally replaced in the same day.
- 3.1.6 Demolition shall be performed by personnel familiar with the replacement of materials being used.
- 3.1.7 Demolition adjacent to areas to remain shall be performed in a neat manner with straight lines to facilitate tie-ins of replacement materials. Contractor shall review tie-in methods with the Designer for approval. Designer has final approval of such methods.
- 3.1.8 Excessive demolition, as determined by the Owner's representative, shall be replaced with equal materials at the Contractor's expense in accordance with the General Conditions of the Contract.
- 3.1.9 No demolition shall be performed if the chance of precipitation is 40% or more as reported by the nearest office of the National Weather Service.

#### **3.2 Preparations:**

- 3.2.1 Prior to the installation of any new roofing, flashings, metal flashings, any other miscellaneous items, the Contractor shall clean surfaces of all dust, dirt, and other foreign materials.
- 3.2.2 Inspect the metal deck carefully. If, in Contractor's opinion, there are metal deck areas that require repair and/or replacement, notify the Designer. Do not proceed with any repairs or replacement until directed by the Designer.

- 3.2.3 Inspect the structural wood fiber deck carefully. If, in the Contractor's opinion, there are structural wood fiber deck units that require repair and/or replacement, notify the Designer. Do not proceed with any repairs or replacement until directed by the Designer.
- 3.2.4 Prior to the installation of any new roofing materials, extend all existing soil pipe vents through the roof to a minimum height of 8 inches (or as required by local plumbing codes) above the finished roof surface. Furnish a piece of PVC piping that will fit snugly into the existing soil pipe vent and shall extend into the pipe a minimum of 12 inches. Provide a second PVC pipe that fits snugly around the smaller PVC pipe and shall provide a minimum 8" height above the finished roof surface. The smaller pipe height shall match the outer pipe. Cement the two PVC pipes together with an approved pipe solvent/glue. Insert the extension into the existing soil pipe vent.
- Note: The placement of a PVC pipe extension directly on top of the existing soil pipe vent without the support method described above shall be removed by the Contractor and new extensions approved by the Designer shall be installed at no additional cost to the Owner.
- 3.2.5 **(Unit Price No. 1)** Where existing roofing is water saturated as identified by a moisture detection device, remove the wet roofing until dry materials are reached. Furnish and install new isocyanurate roof insulation to match the existing roofing in thickness. Secure the new roof insulation to the metal roof deck using low rise foam adhesive with 6 inches between beads maximum for all layers. The new roof insulation shall fit snugly to the existing roofing and vertical substrate. Gaps larger than 1/4 inch shall be filled with like materials.
- 3.2.5.1 Contract shall include an additional 22,000 square feet of existing roofing removal and installation of isocyanurate insulation in the Base Bid.
- 3.2.6 **(Unit Price No. 2)** Where wood blocking or curbs are damaged or deteriorated, remove existing wood blocking to a point 6 inches beyond the damage and/or deterioration, and repair and/or replace with new wood blocking to match existing. Secure new blocking to the substrate using specified screws at spacings not to exceed 12 inches on-center, staggered. Pattern.
- 3.2.6.1 Contract shall include 1,000 board feet of wood blocking replacement in the Base Bid.
- 3.2.7 **(Unit Price No. 3)** Where steel decking is rusted but remains structurally sound, wire brush deck units so that all rust is removed. Paint with specified metal primer, or approved equal, and allow to dry before proceeding with the installation of new materials.
- 3.2.7.1 Contract shall include 7,500 square feet of metal deck priming in the Base Bid.
- 3.2.8 **(Unit Price No. 4)** Where steel decking is damaged or rusted through in small areas, clean deck of rust with a wire brush. Paint with specified metal primer or approved equal. Install over the damaged area the specified sheet metal that shall be secured to the existing steel deck with specified deck screws located 1 inch from the perimeter of the plate, and at 6 inches on center. Extend the new steel plate a minimum of 6 inches onto the surface of the existing steel deck beyond the damaged area.
- 3.2.8.1 Contract shall include 4,500 square feet of sheet metal installation in the Base Bid.
- 3.2.9 **(Unit Price No. 5)** Where steel decking is severely damaged or has deteriorated over large areas, remove the entire existing deck unit, and install new specified decking. Lap new deck units over the existing in the same manner as originally installed. Secure to structural framing with specified screws at Steel Deck Institute 36/4 patterns each available framing member and not more than 24 inches on center at side laps using specified side lap screws. At the perimeter, specified deck fasteners shall be applied at spacings not to exceed 6 inches on-center along the parapet framing.

- 3.2.9.1 Contract shall include 360 square feet of metal deck replacement.
- 3.2.10 **(Unit Price No. 6)** At those locations where side lap screws have not been installed or side lap screws exceed 30-inches on-center, furnish, and install new self-tapping sheet metal screws at spacings not to exceed 30-inches on-center. Contractor shall submit technical data on the proposed screws before the start of this phase of the work.
- 3.2.10.1 Contract shall include the installation of 400 side laps screws in the Base Bid.
- 3.2.11 **(Unit Price No. 7)** At those locations where existing welds have broken from the top of the supporting members or have not been installed, furnish, and install new screws in accordance with Drawing A-504. Welding is not an acceptable means of attaching/re-attaching the deck to the supporting member. Fasteners shall penetrate the structural membrane a minimum of 1-1/2 inches.
- 3.2.11.1 Contract shall include the installation of 400 deck-to-joist screws in the Base Bid.
- 3.2.12 **(Unit Price No. 8)** Where the structural wood fiber decking is damaged or deteriorated in small areas less than 6 inches in diameter on the largest side, furnish and install over the damaged area a 20 ga. galvanized steel plate. Secure the plate to the existing deck with minimum 1/2" diameter toggle bolts located 1 inch from the perimeter of the plate, and at 6 inches on center. Extend the new steel plate a minimum of 6 inches onto the surface of the existing deck beyond the damaged area.
- 3.2.12.1 Contract shall include 600 square feet of sheet metal installation in the Base Bid.
- 3.2.13 **(Unit Price No. 9)** Where structural wood fiber deck units are deteriorated or damaged for areas larger than 6 inches on the smallest side, remove the entire deck unit and install new structural wood fiber deck unit to match the existing in thickness, width, length, and type.
- 3.2.13.1 Contract shall include 200 SF of structural wood fiber deck replacement.
- 3.2.14 Contractor shall include allowances as indicated on the Bid Form in the Base Bid. Contract will be increased at unit price rates for unit price work that exceeds allowances. Contract will be reduced for unused unit price work at the bid unit price rate. Owner reserves the right to negotiate lump sum modifications to the contract for bulk unit price work.
- 3.2.15 Cost associated with any anomaly areas identified on plans, on the roof, and/or in the Specification shall be included in the Base Bid.
- 3.2.16 Cost associated with any necessary removals at roof drains to install new roof drains and/or drain sumps shall be included in the Base Bid.
- 3.2.17 Abandoned Penetrations at Metal Roof Decks:
- 3.2.17.1 At all abandoned roof penetrations, less than 6 inches in diameter, secure a piece of 20 ga. galvanized steel to the existing deck at spacings not to exceed 6 inches on center and located approximately one inch from the edge of the opening. Sheet metal shall be secured to the deck with specified deck screws. The sheet metal shall extend onto the existing deck a minimum of 6 inches.
- 3.2.17.2 At abandoned openings, larger than 12 inches on any side but less than 24 inches, furnish and install new steel decking which matches the existing and install so that the ends and sides extend past the edges of the existing deck a minimum of 12 inches. The ends of the new steel deck shall extend over a structural member. Secure the new deck to the existing deck with specified deck screws at spacings not to exceed 6 inches on-center located

approximately 6 inches from the opening on all sides. The ends of the new deck shall be secured to the existing structural supports using specified deck screws at Steel Deck Institute 36/7 patterns. Install specified side lap screws along the side laps at spacings not to exceed 30 inches on-center.

3.2.17.3 At abandoned openings, larger than 24 inches on any side, furnish and install new steel decking which matches the existing and install so that the new deck unit is supported by a minimum of three structural supports. Ensure that the new deck section is “nested” tightly in the existing, which may require the removal of existing deck fasteners or grinding down existing welds. Secure the new deck to each structural member with specified deck screws at Steel Deck Institute 36/7 patterns. At side laps, furnish and install a minimum of 3 specified side lap screws between each structural member.

3.2.18 Abandoned Penetrations at Structural Wood Fiber Roof Decks

3.2.18.1 At abandoned roof openings, less than 6 inches in diameter on the largest side, install over the opening a 20-ga. galvanized steel plate. Secure the sheet metal to the existing deck with minimum ½” diameter toggle bolts located 1 inch from the perimeter of the plate, and at 6 inches on center. Extend the new steel plate a minimum of 6 inches onto the surface of the existing deck beyond the damaged area.

3.2.18.2 At abandoned roof openings, larger than 6 inches on the smallest side, remove the entire affected deck unit(s) and install new specified structural wood fiber deck unit(s) to match the existing in thickness and type. Install in accordance with manufacturer’s written requirements and screw each panel to the structural supports.

3.2.19 Cost associated with the removal of any abandoned equipment as identified on plans and/or on the roof shall be included in the Base Bid.

3.2.20 Scrape, prime, and paint existing roof access ladders to match edge metal.

3.2.21 Repair ladder attachment as needed.

3.2.22 Scrape, prime, and paint roof hatches safety yellow.

3.2.23 Scrape prime and paint structural steel at removed window locations prior to installation of new windows. Color of structural steel that will remain exposed after installation of new windows shall be selected by owner.

**END OF SECTION**

**DIVISION 06**  
**WOOD, PLASTICS, AND COMPOSITES**

**SECTION 06 10 53**  
**MISCELLANEOUS ROUGH CARPENTRY**

**PART 1 – GENERAL**

- 1.1 Work Included: Installation of blocking and/or curbs, as specified herein.
- 1.2 Related Work
  - 1.2.1 Section 02 41 13 – Selective Demolition and Preparations
  - 1.2.2 Section 07 22 16 – Roof Board Insulation
  - 1.2.3 Section 07 54 23 – Thermoplastic Polyolefin (TPO) Roofing
  - 1.2.4 Section 07 60 00 – Flashing and Sheet Metal
  - 1.2.5 Section 22 14 00 – Roof Drains
- 1.3 Submittals: In accordance with Section 01 33 00 of this Specification.
- 1.4 Environmental Conditions: Material installation shall proceed only when weather conditions are in compliance with the applicable manufacturer's recommendations for installation and no precipitation is imminent. Materials installed during adverse weather conditions shall be subject to removal and replacement with new materials at no additional cost to Owner.
- 1.5 Warranty: In accordance with Section 01 78 36 of this Specification.

**PART 2 – PRODUCTS**

- 2.1 Non-structural wood blocking: Nominal 1” x 6”, 2” x 2”, 2” x 4”, 2” x 6” and 2”x 10” pine, shop pressure-treated for above ground contact. Do not use oil-based preservatives.
- 2.2 CD-X Exterior Grade Plywood. Nominal ¾” and 1” thick.
- 2.3 Screws: #12 double-coated galvanized steel screws or stainless steel self-tapping wood screws that shall be able to resist any galvanic action that may be able to develop between the nail and the pressure treatment. The use of a lesser quality screw will not be approved. Screws shall be of sufficient length to penetrate a minimum of 1-1/2 inches into the substrate.
- 2.4 Nails: For securing new lumber to new lumber or new plywood/OSB to new lumber, double-coated galvanized steel, or stainless-steel ring shank nails to penetrate a minimum of 1-1/2 inches into the substrate but not smaller than 8d nails. Use 16d nails where material being secured is 1½ to 2 inches thick.
- 2.5 Masonry Fastener:
  - 2.5.1 Masonry Anchor, minimum 1-1/4 inch into substrate, as manufactured by OMG Roofing Products
  - 2.5.2 Tapcon ¼” x minimum 1-1/4” in the substrate, as manufactured by Buildex.
  - 2.5.3 Roofing Spike, minimum 1-1/4 inch into substrate, as manufactured by Powers Fasteners.
  - 2.5.4 Approved equal prior to bid.

**PART 3 – EXECUTION**

### 3.1 General

- 3.1.1 Furnish and install new wood blocking at all roof-mounted equipment as required to provide a minimum flashing height of 8 inches above roof level.
- 3.1.2 Blocking shall be installed under integral equipment curbs as required to maintain full cant face above roof level and secured to the deck with appropriate fasteners through the deck at spacings not to exceed 12 inches on-center, staggered pattern.
- 3.1.3 At small units (largest dimension up to 30") where wood blocking cannot be installed beneath the units, new pressure-treated wood blocking may be installed on top of the existing curb. The wood blocking shall match the curb in width and shall not exceed 2 inches in thickness, per layer. New wood blocking shall be attached to the curb using specified wood screws at spacings not to exceed 12 inches on-center and a minimum of 2 fasteners per side. Subsequent layers of wood blocking shall be secure using appropriate nails at spacings not to exceed 12 inches on-center and a minimum of 2 nails per side.
- 3.1.4 At large units (smallest dimension over 30") where wood blocking cannot be installed beneath the units, furnish and install new pre-manufactured galvanized steel curb extensions at units where required to meet a minimum 8" flashing height. Curb extensions shall be a made from minimum 14 ga. galvanized steel, shall be one piece, and shall fit on top of the existing curb. All joints shall be welded to provide a watertight, one-piece assembly. The contractor shall furnish and install insulation at the exterior side of the extensions, as necessary, to provide a smooth, consistent surface to apply base flashings. The base flashing shall be able to make a smooth transition over the juncture of the existing curb and the curb extension.
- 3.1.5 Extending and/or modifying wiring, and/or plumbing as part of this work shall be included in the Base Bid. This work shall be accomplished by a mechanical, electrical, or plumbing contractor, as applicable, licensed to perform this work in the state of the South Carolina for no less than 5-years.
- 3.1.6 The cost for raising curbs or installing curb extensions shall be included in the Base Bid.

### 3.2 Wood Blocking Installation

- 3.2.1 Furnish and install new wood blocking at all roof-mounted equipment as required to provide a minimum flashing height of 8 inches above roof level.
- 3.2.2 Furnish and install new pressure-treated tapered wood fiberboard as required to ensure positive shedding of water off the coping. Finished slope of wood blocking to have a minimum slope of 1 inch across the width of the parapet. Secure wood fiberboard to the existing with appropriate nails at spacings not to exceed 12 inches on-center, staggered pattern. Refer to Drawings.
- 3.2.3 Furnish and install new pressure-treated tapered wood blocking at roof-to-roof expansion joint curbs, as required, to maintain a minimum height of 8 inches above the roof surface. Wood blocking shall be secured through the top with screw type fasteners at spacings not to exceed 12 inches on-center. Screws shall penetrate the top of the existing curb a minimum of 1-1/2 inches. The entire length of the screw shall not exceed 4 inches. It may be necessary to drill into the new blocking to maintain adequate penetration into the existing curb. Furnish and install new 3/4" CD-X plywood. Fasten using appropriate fasteners at spacings not to exceed 12 inches on-center. Refer to Drawings.
  - 3.2.3.1 Ensure that the top of the wood is tapered so that water does not pond on top of the cover, when installed.
- 3.2.4 Furnish and install new pressure-treated tapered wood blocking at roof-to-wall expansion joint

curbs, as required, to maintain a minimum height of 8 inches above the new finished roof surface. Wood blocking shall be secured through the top with screw type fasteners at spacings not to exceed 12 inches on-center. Screws shall penetrate the top of the existing curb a minimum of 1-1/2 inches. The entire length of the screw shall not exceed 4 inches. It may be necessary to drill into the new blocking to maintain adequate penetration into the existing curb. Refer to Drawings.

- 3.2.4.1 Ensure that the top of the wood is tapered so that water does not pond on top of the cover, when installed.
- 3.2.5 Where the fan unit is either too large or too small relative to the existing curb, remove the existing curb and discard. Furnish and install a new wood or prefabricated curb that matches the size of the fan cover that sits on top of the curb. If a prefabricated curb is used, secure the flange to the deck using appropriate fasteners at spacings not to exceed 12 inches on center. If a wood curb is fabricated, furnish, and install the first layer of nominal 2" x 6" wood blocking and secure to the deck with appropriate fasteners at spacings not to exceed 12 inches on center. Add additional layers of wood blocking until the top of the blocking matches the thickness of the roof insulation. Secure each succeeding layer to the preceding with appropriate fasteners at spacings not to exceed 12 inches on center, staggered pattern. The vertical leg of the curb shall have a minimum height of 8 inches above the finished roof surface.
- 3.2.5.1 Contractor shall submit a shop drawing to the Owner's Representative of the proposed curb for review and approval prior to the start of this work. The size of the curb must consider the additional space required to install base flashings prior to the installation of the curb. Extending and/or modifying ductwork at curbs as part of this work shall be included in the Base Bid.
- 3.2.6 Furnish and install wood blocking where indicated in the drawings. Secure the first layer to the substrate with appropriate fasteners at spacings not to exceed 12 inches on center, staggered pattern. Secure succeeding layers to the preceding with appropriate nails at spacings not to exceed 12 inches on center, staggered pattern. Provide a 1/4-inch gap between ends of boards. Stagger end joints between layers a minimum of 12 inches.
- 3.2.7 Expansion Joints: At expansion joints shown on plan, furnish and install new wood blocking on either side of the joint. Install wood blocking to fill every flute. Blocking shall have beveled ends to ensure the wood blocking is tight to all surfaces. Secure the first layer of the wood blocking to the ridge framing or metal roof panels using specified screws spaced no more than 6 inches on-center, staggered pattern, and a minimum of 4 fasteners per panel. Secure any additional layers of beveled wood blocking to the first using specified nails at spacings not to exceed 6 inches on-center, staggered pattern, and a minimum of 4 nails per panel. Over the top of the beveled wood blocking, furnish and install one continuous layer of new nominal 1/2" x 6" plywood. Secure the plywood using specified nails at spaced no more than 12 inches on-center, staggered fashion. Refer to Drawings.

**END OF SECTION**

**DIVISION 07**  
**THERMAL AND MOISTURE PROTECTION**

**SECTION 07 22 16  
ROOF BOARD INSULATION**

**PART 1 – GENERAL**

- 1.1 Summary: Installation of new roof insulation, as specified herein.
- 1.2 Related Work:
  - 1.2.1 Section 06 10 53 – Miscellaneous Rough Carpentry
  - 1.2.2 Section 07 54 23 – Thermoplastic Polyolefin (TPO) Roofing
  - 1.2.3 Section 07 60 00 – Flashing and Sheet Metal
  - 1.2.4 Section 22 14 00 – Roof Drains
- 1.3 Submittals: Refer to Section 01 33 00 of this Specification.
  - 1.3.1 Provide manufacturer’s tested assembly to meet wind uplift requirements as listed on drawings.
  - 1.3.2 Contractor shall perform pull test to verify metal decking and fasteners meets manufacturer’s required pullout values. A copy of the pull test report shall be provided to the Designer.
  - 1.3.3 Contractor shall perform a pull test to verify adhesion of insulation to the cementitious wood fiber decking meets manufacturer’s requirements. A copy of the pull test report shall be provided to the Designer.
- 1.4 Environmental Conditions: Materials installation shall proceed only when weather conditions are in compliance with the applicable manufacturer's recommendations for installation and no precipitation is imminent. Materials installed during adverse weather conditions shall be subject to removal and replacement with new materials at no additional cost to Owner.
- 1.5 Warranty: Refer to Section 01 78 36 of this Specification.

**PART 2 – PRODUCTS**

- 2.1 Polyisocyanurate Roof Insulation: Flat and tapered, as specified, ASTM C1289, Type II, Class I. Board size shall not exceed 4’ x 8’ for mechanically attached insulation. Board size of adhered insulation shall not exceed 4’ x 4’. Board size of tapered insulation shall not exceed 4’ x 4’. The Long-Term Thermal Resistance shall be a minimum of 5.7 per inch. Insulation compressive strength shall be minimum 20 psi. Insulation density shall be 2 pcf minimum. Thermal insulating factor as specified; however, thicknesses of each layer of insulation shall not exceed 2 inches.
- 2.2 Wood Fiber Tapered Edge Strips: ASTM C208, Type II, Grade 1 (Built-Up Roofs), C209. Approved for use by approved roofing system manufacturer.
- 2.3 Cover Board: Gypsum Fiber Board, Nominal 1/2” thick, ASTM C 1177, 0 Flame Spread and 0 Smoke Developed when tested in accordance with ASTM E 84, nominal 900 psi minimum compressive strength, Class A, non-combustible, 4’ x 8’ board size.
- 2.4 Separator Board: Gypsum Fiber Board, nominal 1/4” thick, ASTM C 1177 or C1278, 0 Flame Spread and 0 Smoke Developed when tested in accordance with ASTM E 84, nominal 900 psi minimum compressive strength, Class A, non-combustible, 4’ x 8’ board size. Approved for use by the roofing system manufacturer to adhere membrane flashings.

2.5 Fasteners & Plates:

- 2.5.1 Insulation Fastener: Minimum #12 steel screw roof insulation fastener for steel decking as approved by the roofing materials manufacturer. Fasteners must pass a minimum of 15 cycles in the Kesternich SFW 2.0s DIN 50018 test with less than 15% red rust.
- 2.5.2 Insulation Fastener Plate: 3" ribbed, galvalume coated steel plate as approved by the roofing materials manufacturer.

**PART 3 – EXECUTION**

3.1 Coordination and Inspection

- 3.1.1 The substrate shall be clean, smooth, dry, and free of debris and all foreign matter prior to receiving insulation and cover board. Application of new materials shall constitute approval of the substrate by the Contractor.
- 3.1.2 The contractor bears the responsibility to locate any conduits that are in the decking flutes prior to the start of the work. The contractor shall be to the full extent possible, not engage these conduits with screws, fasteners, etc. Should power be lost due to penetrate a conduit, the Contractor bears the responsibility to locate and repair the conduit and/or enclosed wiring to the original condition to restore power to the Owner. Cost associated with these repairs shall be borne by the Contractor at no additional cost to the Owner.
- 3.1.3 Repairs to conduit, wiring, electrical equipment, and accessories under this paragraph shall be performed by an electrical contractor licensed to perform such work in the state of South Carolina with a minimum of 5 years' experience in this type of work.

3.2 General Installation: Roof Insulation and Cover Board

- 3.2.1 Apply insulation with end joints staggered approximately one-half the length of the units.
- 3.2.2 Offset insulation joints from the preceding layer a minimum of six (6) inches.
- 3.2.3 Fit insulation units snugly to each other and to all vertical surfaces.
- 3.2.4 Low-Rise Foam Adhesive – All Roof Areas: Secure each board to the substrate using low-rise adhesive beads at spacings in accordance with the manufacturer's requirements to resist the uplift pressures and/or ratings shown on drawings for each zone and the approved tested assembly number. The Contractor or Manufacturer shall submit assemblies. Ensure insulation contact with adhesive by weighting units. Prior to applying adhesive bead, apply one continuous bead of adhesive around the perimeter of the of the insulation board not further than 4 inches from the edge.
- 3.2.5 Replace damaged units as required to provide a smooth surface and uniform insulation thickness.

3.3 General Requirements: Crickets/Saddles

- 3.3.1 Cricket/Saddles shall also meet the requirements of Paragraph 3.2 above.
- 3.3.2 Start cricket construction by striking chalk lines for outer edges of tapered units. Install the first row along the chalk lines, mitering and fitting at the points where lines break.
- 3.3.3 Complete the cricket assembly using tapered isocyanurate and isocyanurate fill units. Fill unit shall not exceed 2 inches in thickness.

- 3.3.4 The thin edge of the tapered insulation shall be ½” and shall be located at the valley created by the tapered insulation and the roof insulation.
- 3.3.5 Remove and replace damaged units with new insulation or repair to provide a smooth surface and uniform insulation thickness.
- 3.3.6 Utilize tapered wood fiber edge strips that transition from 0” to 1/2” as the first layer of tapered insulation to provide a smooth transition. Set wood fiber on top of the insulation in one continuous band of low-rise foam adhesive.
- 3.4 Installation – Recover Roof Areas A1, A2, A3, A5, A6, A7, A8, A9, A10, A11, A12 (Sloped Metal Deck):
  - 3.4.1 Furnish and install tapered insulation to move water from walls, form valleys/crickets, as shown on roof plans, using factory-tapered isocyanurate units and isocyanurate fill units. Secure using low-rise adhesive.
  - 3.4.2 Furnish and install one layer of nominal ½-inch-thick cover board over all isocyanurate insulation and secure using low-rise foam adhesive.
- 3.5 Installation – Roof Area A4 (Sloped Metal Deck):
  - 3.5.1 At the primary drain & overflow scupper sumps shown on the plans, apply ½ inch per foot tapered isocyanurate, and isocyanurate fill units that extend from the drain bowl or scupper opening to a 2-foot width.
    - 3.5.1.1 Prior to installing the tapered insulation, furnish and install new flat isocyanurate insulation that ends approximately ¾ inch below the drain bowl. Secure each flat board to the substrate in accordance with Paragraphs 3.4.1 of this Section of the specification. The thin edge of the tapered insulation shall be located adjacent to the scupper. Increase the thickness of the tapered insulation until it matches the thickness of the new isocyanurate insulation. Remove and replace damaged units with new insulation or repair to provide a smooth surface and uniform insulation thickness. Apply the tapered insulation to the flat insulation secure by mechanical attachment.
  - 3.5.2 Furnish and install tapered insulation to move water from walls, form valleys/crickets, as shown on roof plans, using factory-tapered isocyanurate units and isocyanurate fill units. Secure using low-rise adhesive.
  - 3.5.3 Furnish and install one layer of nominal ½-inch-thick cover board over all isocyanurate insulation and secure using low-rise foam adhesive.
- 3.6 Installation – New Insulation (Anomalies)
  - 3.6.1 Furnish and install one layer of adhered isocyanurate insulation to the deck. Adhesive shall be applied with no more than 6” between beads.
  - 3.6.2 Furnish and install one layer of isocyanurate insulation adhered to the first layer of insulation. Thickness of both layers shall match the thickness of the existing roof assembly. Adhesive shall be applied with no more than 6” between beads.
  - 3.6.3 Furnish and install the new recover system as specified in paragraph 3.4 above and as stated elsewhere in this specification.
- 3.7 Installation – Roof Areas B1, B2, B3, B4 (Sloped Cementitious Wood Fiber Deck):

- 3.7.1 Apply one layer of 2-inch-thick isocyanurate insulation to the deck and secure using low-rise foam adhesive.
- 3.7.2 Apply one layer of 2-inch-thick isocyanurate insulation to the first layer of insulation and secure using low-rise foam adhesive.
- 3.7.3 Furnish and install tapered insulation to move water from walls, form valleys/crickets, as shown on roof plans, using factory-tapered isocyanurate units and isocyanurate fill units. Secure using low-rise adhesive.
- 3.7.4 Furnish and install one layer of nominal ½-inch-thick cover board over all isocyanurate insulation and secure using low-rise foam adhesive.

**END OF SECTION**

**SECTION 07 54 23**  
**THERMOPLASTIC POLYOLEFIN (TPO) ROOFING**

**PART 1 - GENERAL**

- 1.1 Work Included: Installation of a thermoplastic polyolefin (TPO) roof membrane, as specified herein.
- 1.2 Related Work
  - 1.2.1 Selective Demolition and Preparations – 02 41 13
  - 1.2.2 Roof Board Insulation - Section 07 22 16
  - 1.2.3 Flashing and Sheet Metal – Section 07 60 00
- 1.3 Submittals: In accordance with Section 01 33 00 of this Specification
  - 1.3.1 Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing agency or has been engineered by the manufacturer to resist uplift pressure calculated according to ASCE/SEI 7 and meets ASTM E 108 or UL 790 Class A fire rating. Wind up lift requirements can be found on drawings.
- 1.4 Environmental Conditions: Material installation shall proceed only when weather conditions are in compliance with the applicable manufacturer's recommendations for installation and no precipitation is imminent. Materials installed during adverse weather conditions shall be subject to removal and replacement with new materials at no additional cost to Owner.
- 1.5 Preconstruction Testing
  - 1.5.1 Contractor shall perform ANSI/SPRI FX-1 2021 test to verify the withdraw resistance of mechanical fasteners in the corner and perimeter zones of all roof areas.
    - 1.5.1.1 Provide testing reports to the designer, owner, and manufacturer.
- 1.6 Quality Assurance
  - 1.6.1 Contractor shall perform a minimum 8-hour water test at 15% of the primary drains as described after membrane and flashing installation at drains. Drains for testing to be selected by the Design Professional.
  - 1.6.2 Water test shall only be performed after sun set and when no inclement weather is expected over the next 24 hours.
  - 1.6.3 Document existing conditions with time/date stamped photographs beneath drains, including stained ceiling tiles, piping, and decking.
  - 1.6.4 Plug each drain using an elastomeric plug to prevent any water seepage.
  - 1.6.5 Fill the sump/drain area with water until a 2-inch head is accomplished directly over the center of the drain bowl. Cover the area with plastic and seal to prevent water evaporation.
  - 1.6.6 After a lapse of 8 hours, check the water head at the center of the drain bowl.
  - 1.6.7 Document conditions beneath and at drain bowls with time/date stamped photographs, including ceiling tiles, piping, and decking, relative to the existing conditions noted above.
  - 1.6.8 Prepare report of finding for Designer and Owner review
- 1.7 Warranty: In accordance with Section 01 78 36 of this Specification.
- 1.8 Wind Uplift Resistance: Refer to Drawings.
- 1.9 Fire Resistance: Class A.

## **PART 2 - PRODUCTS**

- 2.1 Acceptable Roofing System Manufacturers: (Deductive Alternate No. 1 – 60 mil)
  - 2.1.1 Carlisle Syntec: Sure-Weld, 80 mil.
  - 2.1.2 Firestone: UltraPly TPO, 80 mil.
  - 2.1.3 GAF: EverGuard TPO, 80 mil.
- 2.2 Thermoplastic Polyolefin Roofing Materials
  - 2.2.1 Thermoplastic Polyolefin Membrane. ASTM D6878, Nominal 80 mil overall thickness with minimum 30 mil polymer thickness above the scrim. A minimum tearing strength of 120 pounds as tested in accordance with ASTM D751. A minimum puncture resistance of 300 pounds as tested in accordance with FTM 101C, Method 2031.
    - 2.2.1.1. Maximum sheet width of 10-feet.
  - 2.2.2. Thermoplastic Polyolefin Membrane. ASTM D6878, Nominal 60 mil overall thickness with minimum 21 mil polymer thickness above the scrim. A minimum tearing strength of 120 pounds as tested in accordance with ASTM D751. A minimum puncture resistance of 300 pounds as tested in accordance with FTM 101C, Method 2031.
    - 2.2.2.1. Maximum sheet width of 10-feet.
  - 2.2.2 Membrane Adhesive (Solvent-Based), as manufactured by the approved roofing system manufacturer.
  - 2.2.3 General Purpose Sealant (White). As manufactured by the approved roofing system manufacturer.
  - 2.2.4 T-Joint Covers. As manufactured by the approved roofing system manufacturer.
  - 2.2.5 Inside/Outside Molded Corners. As manufactured by the roofing system manufacturer. The use of field-fabricated inside/outside corners is not acceptable.
  - 2.2.6 Large and Small Pipe Flashing. As manufactured by the roofing system manufacturer.
  - 2.2.7 Universal Pipe Boot. As manufactured by the roofing system manufacturer. Pre-fabricated flashing boot shall include a draw band for securing the top of the flashing boot to the pipe.
  - 2.2.8 Unsupported Membrane. As manufactured by the approved roofing system manufacturer. Minimum 55 mil thickness.
  - 2.2.9 Cut Edge Sealant. As manufactured by the approved roofing system manufacturer.
  - 2.2.10 Membrane Cleaner: As manufactured by the approved roofing system manufacturer. For use in removing foreign debris from the membrane prior to welding.
  - 2.2.11 Membrane-Clad Metal: As manufactured by the approved roofing system manufacturer, ASTM A653, minimum 24 ga. galvanized steel clad with membrane.
  - 2.2.12 Termination Bar. As manufactured or approved by the approved roofing system manufacturer.
  - 2.2.13 Polyurethane Caulk: As manufactured and/or approved by the roofing system manufacturer. To be applied at those locations identified by the manufacturer.
  - 2.2.14 Water Cut-Off Mastic: As manufactured and/or approved by the roofing system manufacturer. To be

applied at those locations identified by the manufacturer.

- 2.3 Membrane Welding Machines: As approved by the roofing system manufacturer. Contractor shall provide written documentation that operators have received the roofing system manufacturer's required training to operate equipment. Welders shall be maintained in good working order and shall be operated and maintained in accordance with the welding machine manufacturer's written instructions.
- 2.4 Walkway Pads: As manufactured by the approved roofing system manufacturer. Nominal 30" wide.
- 2.5 Foam Core: Compression tube that is a minimum of 1.5 times larger than the expansion joint opening, as approved for use by the approved roofing system manufacturer.
- 2.6 Roofing Nails: With minimum 1" head, such as Simplex nails or approved equal.
- 2.7 Fasteners
  - 2.7.1 Membrane Fastener: Minimum #15 steel screw roof fastener for steel decking as approved by the approved roofing materials manufacturer to resist uplift requirements shown on plans. Minimum pull-out in new Grade C, 22 gauge decking is 640 lbs. Fasteners must pass a minimum of 15 cycles in the Kesternich SFW 2.0s DIN 50018 test with less than 15% red rust. Provide fasteners of lengths to penetrate the top of the roof deck a minimum of 1-inch and no more than 1-1/2-inch.
  - 2.7.2 Seam Plate: Minimum 2-3/8" grooved, galvalume steel plate. As approved by the roofing materials manufacturer to use in conjunction with the specified membrane fasteners to attach thermoplastic membrane.
- 2.8 Masonry Anchor:
  - 2.8.1 Masonry Anchor, minimum 1-1/4 inch into substrate, as manufactured by OMG Roofing Products
  - 2.8.2 Tapcon 1/4" x minimum 1-1/4" in the substrate, as manufactured by Buildex.
  - 2.8.3 Roofing Spike, minimum 1-1/4 inch into substrate, as manufactured by Powers Fasteners.
  - 2.8.4 Approved equal prior to bid.

### **PART 3 - EXECUTION**

- 3.1 Inspection
  - 3.1.1 The substrate shall be clean, smooth, dry, free of debris and all foreign matter prior to installation of the roof membrane. Application of new materials shall constitute approval of the substrate by the Roofing Contractor.
  - 3.1.2 Insulation joints with gaps greater than 1/4" shall be filled with roof insulation in order to provide a smooth surface.
- 3.2 Fully Adhered Roof Membrane with Mechanical Enhancement Installation
  - 3.2.1 Unroll the membrane sheets and allow them to relax in accordance with the roofing system manufacturer's recommendations and ambient temperature at the time of this phase of the work.
  - 3.2.2 Remove any damaged or creased membrane sections, and discard.
  - 3.2.3 All membrane surfaces to be welded shall be clean and dry. No adhesive shall be present within the lap areas.
  - 3.2.4 Solvent-Based Adhesive

- 3.2.4.1 Fold the sheet back evenly without wrinkles onto itself to expose the underside. Position the sheet at any field splices by overlapping the membrane approximately 5 inches, unless the manufacturer has a more stringent requirement. Once the membrane is in place, mark the bottom sheet  $\frac{1}{2}$ " -  $\frac{3}{4}$ " from the edge of the top sheet every 4' - 6' with a lumber crayon or similar type marking device.
- 3.2.4.2 Sweep the substrate with a stiff broom to remove materials that will interfere with the proper installation of the membrane.
- 3.2.4.3 Apply the manufacturer's bonding adhesive to both the exposed underside of the sheet and the substrate to which it will be adhered to allow approximately the same drying time. Apply adhesive to provide an even and uniform film thickness. Care shall be taken not to apply adhesive over an area that is to be later cleaned and spliced to another sheet of flashing.
- 3.2.4.4 Allow adhesive to flash off until tacky. Touch the adhesive surface with a clean dry finger to be certain that the adhesive does not stick or string. Also push forward on the adhesive at an angle to ensure that the adhesive is ready throughout its thickness.
- 3.2.4.5 Starting at the fold, roll the previously coated portion of the sheet into the coated substrate slowly and evenly to minimize wrinkles. Compress the bonded half of the sheet to the substrate with a stiff push broom.
- 3.2.4.6 Fold the unadhered half of the membrane sheet back onto itself and repeat the bonding procedure to complete the bonding of the sheet.
- 3.2.5 Perimeters: Apply mechanical fasteners as approved by the roof system manufacturer to resist uplift pressures listed on drawings S-101 and S-102. Provide roof manufacturer's tested assembly to the designer for approval. At a minimum apply fasteners at the seams and at the center of sheets spaced 12" O.C. maximum for the distance shown on plans. Rows of fasteners shall be applied every 5' maximum. Use half sheets to the full extent possible.
  - 3.2.5.1 Picture framing the roof with half-sheets is not permissible.
- 3.2.6 Corners: Apply mechanical fasteners as approved by the roof system manufacturer to resist uplift pressures listed on drawings S-101 and S-102. Provide roof manufacturer's tested assembly to the designer for approval. At a minimum apply fasteners at the seams and at the center of sheets spaced 6" O.C. maximum for the distance shown on plans. Rows of fasteners shall be applied every 5' maximum. Use half sheets to the full extent possible.
- 3.2.7 At eaves, the membrane shall be mechanically fastened to the eave wood blocking using membrane fasteners and plates spaced no more than 12 inches on-center. Extend an additional membrane over the wood blocking a distance to match the depth of the gutter at gutter eaves or the rake flashing at rake eaves. Extend the additional membrane a minimum of 5 inches onto the roofing past the eave membrane fasteners. Fully adhere the membrane to the wood blocking and fasten to the vertical face of the wood blocking using roofing nails spaced no more than 12 inches on-center. Fully weld the membrane to the roofing. Set the edge of the membrane in continuous multi-purpose tape.
- 3.2.8 Vertical Surfaces:
  - 3.2.8.1 At vertical surfaces, turn the membrane up the vertical surface a minimum of 2 inches and fully adhere using the manufacturer's approved adhesive. Secure the membrane to the substrate using the roofing system manufacturer's approved termination bar or fasteners/plates, and secure in accordance with their written instructions. Fasteners shall penetrate the substrate at spacings and depths approved by the roofing system manufacturer.

3.2.8.2 At the base of curbs, parapets, and other vertical surfaces, the membrane shall be mechanically fastened to the metal decking using membrane fasteners and plates spaced no more than 12 inches on-center.

3.2.9 Primary Roof Drains: Where membrane laps are within 18-inches of the drain bowl, furnish and install a minimum 36" x 36" target patch centered over the roof drain and secure the exterior edge of the membrane to the roof deck as specified. Cut an opening in the target patch at the center of the drain bowl so that the membrane extends past the interior edge of the drain bowl a minimum of 1 inch. Extend the roofing membrane over the target patch fasteners a minimum of 3 inches. Fully weld target patch and field membrane splices a minimum of 2 inches on all sides. Weld in accordance with this section of the specification. Apply water block between the target patch and the drain bowl prior to applying the drain clamping ring.

3.2.9.1 Note: Contractor shall install drain assemblies to be water tight at the end of each work day.

3.2.10 Furnish and install the roofing system manufacturer's patches at all required locations such as intersecting field seams. Apply the manufacturer's approved seam caulk, as required, at locations specified by the roofing system manufacturer.

3.2.11 Prior to final inspection, the surface of the membrane shall be cleaned of all debris, dust, and foreign material. This may require the use of water, detergents, and other cleaning agents approved by the roofing system manufacturer. Contractor will be responsible for providing the necessary items to perform this task. Do not use any abrasive pads that can score the polymer.

### 3.3 Base Flashings Installation

3.3.1 Roll out the membrane to be used for base flashings and allow to relax in accordance with the roofing system manufacturer's written instructions.

3.3.2 Flashing pieces shall extend onto the roof a minimum 3 inches past the roof membrane fasteners at the edge of the sheet and up the vertical surface a minimum of 8 inches.

3.3.3 Fully adhere the flashing to the substrate using the roofing system manufacturer's approved flashing adhesive.

3.3.4 Base flashing shall be smooth to the substrate, and wrinkles in base flashing shall be grounds for rejection.

3.3.5 If base flashings terminate at a corner and edges would be exposed, furnish and install new 4-inch x 4-inch L-type membrane-clad metal closures with an exterior edge caulking cove. If base flashings terminate at walls and edges would be exposed, furnish and install new 4-inch-wide L-type membrane-clad metal closures with an exterior edge caulking cove. The closure shall be set in water cut-off mastic or butyl tape, and fastened to the substrate using appropriate fasteners at spacings not to exceed 12 inches on center. Completely hot air weld the base flashings to the membrane-clad metal. Apply a non-shrinking sealant, such as NP-1 or approved equal, to the caulking cove at the exterior edge of the closure. Completely remove all residual asphalt from the substrate prior to installing any sealant or caulking.

3.3.6 At inside and outside corners of curbs and parapets, Contractor shall use the roofing system manufacturer's pre-fabricated corner pieces. The use of field-fabricated pieces is not acceptable. Pre-fabricated pieces shall be installed in accordance with the roofing system manufacturer's written instructions.

3.3.7 At locations where base flashing seam transition from vertical to horizontal, the contractor shall furnish and install new unsupported patches at these locations shall extend a minimum of 3 inches past the

transition, centered over the seams in all directions.

- 3.3.8 Use the roofing system manufacturer's termination bar at base flashing that exceed 36 inches in height. Install rows of termination equally spaced up the wall. Fastener spacings not to exceed 8 inches on center. Set flashing in water cut-off mastic, set the bar over the edge of the base flashing, and apply caulk at the top of the flashing.
- 3.3.9 At a minimum, extend base flashings up and over the top horizontal surface of curbs and inside the curb a minimum of 1 inch, unless otherwise stated in specification or shown on drawings.
- 3.3.10 Extend the base flashing over the top of the parapet and down the outside face of the wood blocking. Base flashing shall extend down past the outside face of the parapet wood blocking a minimum of 1 inch. Fully adhere the membrane to the wood blocking and fasten to the vertical face of the wood blocking using roofing nails at spacings not to exceed 12 inches on-center. Set the edge of the membrane in continuous multi-purpose tape.
- 3.4 Expansion Joints: Install new membrane expansion joints as indicated on drawings. Secure the field membrane at the base of curbs as specified herein. Form a membrane envelope that matches the depth of the curb and roof insulation. Fill envelope with batt insulation. Furnish and fully adhere continuous foam core over the opening using the membrane manufacturer's bonding adhesive. Cover the joint and foam core with the base flashings and/or additional membrane as indicated on drawings. Reinforce the seams over the expansion joint with additional membrane that shall extend a minimum of 3 inches past the expansion joint seams in every direction.
- 3.5 Heat Welding
- 3.5.1 Hot air weld all sheet seams using either a machine or hand-held hot air welder approved by the roofing system manufacturer. A copy of the operating instructions shall be provided to the Designer prior to the start of the project.
- 3.5.2 Monitor the temperature of the hot air welder so as to minimize the amount of smoke that should develop and to ensure that the material from the bottom of the sheet begins to soften and flow from the seam. Hand held welders shall insure that membrane welding is immediately followed by a hand roller to press the heated membrane surfaces together with slow, even movements.
- 3.5.3 All seams shall be manually probed using a blunt rounded instrument daily. Any fishmouths or other seam defects where the seam is not fully adhered shall be repaired in accordance with the roofing system manufacturer's instructions.
- 3.5.4 After seams have set for approximately 8 hours, the Contractor shall make a minimum of 3, 2" x 12" test cuts across the seam, with at least one of the test cuts taken from the first seam of the day. If multiple welders are used, the minimum test cuts are applicable to each welder used. Test cuts shall be repaired by the Contractor daily and shall be done at no additional cost to the Owner. In lieu of test cuts, the contractor may perform peel tests. Peel test shall be performed with two 4" x 12" pieces of membrane that shall be welded together 1-1/2 inch for the machine welder and 2 inches for hand welders. The membrane shall be pulled apart across the seam. Test shall be dated, and one test shall be performed every time a welding device is turned on. An archive of test shall be available for Designer inspection.

Peel-test shall only be considered successful if:

- i there is a complete cohesion failure in a polymer layer, and/or
- ii there is an adhesion failure between a polymer layer and the scrim.
- iii Other instances as stated in writing by the membrane manufacturer.

3.5.5 Seams shall be tested in accordance with the roofing system manufacturer's instructions and evaluated for seam integrity. Seams that fail this test shall be subject to additional test cuts, as directed by the Designer and/or roofing system manufacturer, in order to further quantify the extend of the deficient condition. Repairs to deficient seams and/or test cut locations shall be performed by the Contractor at no additional cost to the Owner.

3.5.6 Seal the edges of the membrane where the reinforcing fabric is cut with the roofing system manufacturer's approved seam sealant. Such work shall be done on a daily basis.

### 3.6 Pipe Flashing Installation

3.6.1 Pipe penetrations shall be flashed using pre-manufactured pipe flashings. Cut the pipe flashing so that it will fit tight to the pipe penetration. Ensure that the field membrane is secured at the base of the pipe as required herein. Fully weld the pipe flashing flange to the field membrane in accordance with membrane manufacturer written instruction. Set the pipe flashing in water block against the pipe penetration, and secure the top of the pipe flashing to the pipe using a draw-band clamp. Seal the top of the pipe flashing to the pipe penetration using NP-1 sealant, or approved equal.

3.6.2 At locations where pre-manufactured pipe flashing cannot be installed, the contractor may field flash the pipe penetration. Field flashing shall extend onto the roofing membrane a minimum of 2 inches past the membrane fasteners. Field flashing shall extend up of the pipe penetration a minimum of 6 inches. The top of the field flashing shall receive water block, draw-band clamp, and sealant in accordance with Paragraph 3.5.1 above. At square penetrations, secure the top edge of the field flashing using a self-adhering membrane stripping membrane. Prime the penetration and membrane prior to applying the self-adhering membrane.

3.6.3 Install any necessary pre-molded pitch pans in accordance with manufacturer written instructions. Prior to applying pourable sealer, seal the penetration though the membrane with sealant.

### 3.7 Walkway Pad

3.7.1 Apply one row of walkway pads around all roof access hatches, at the base of roof access doors, at the top and bottom of ship ladders, and as shown on drawings. Install walkway pads in accordance with the roofing system manufacturer's written instructions. Refer to Drawings.

3.7.2 Walkway pads shall be spaced approximately 1 inch apart. Leave small opening on the downslope side of walkway pads to allow for any water beneath the pads to exit.

3.7.3 Clean the surface of the membrane to receive the walkway pads in accordance with the roofing system manufacturer's written instructions. Fully adhere the walkway pad to the membrane and hot-air weld all sides of the pads to the surface of the membrane in accordance with the roofing system manufacturer's written instructions.

### 3.8 Field Quality Requirements:

3.8.1 Manufacturer's Field Services: Upon Owner's request, provide material manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.

3.8.2 Minimum Manufacturer Inspections: Provide inspections by a Technical Representative employed by the roofing system manufacturer whom shall not perform any sales functions. Contractor shall complete any necessary repairs required for issuance of warranty. Minimum schedule of material manufacturer inspections:

3.8.2.1 Pre-Construction Conference

- 3.8.2.2 Mock-Up Evaluation
- 3.8.2.3 25% Completion
- 3.8.2.4 50% Completion
- 3.8.2.5 Final Completion

3.8.3 Contractor shall provide Owner and Designer a copy of the manufacturer's inspection report within 48-hours of each inspection.

3.9 Prior to final inspection, the surface of the membranes shall be cleaned of all debris, dust, and foreign material. This may require the use of water, detergents, and other cleaning agents approved by the roofing system manufacturer. Contractor will be responsible for providing the necessary items to perform this task. Do not use any abrasive pads that can score the polymer.

**END OF SECTION**

**SECTION 07 60 00  
FLASHING AND SHEET METAL**

**PART 1 – GENERAL**

- 1.1 Summary: Includes the fabrication and installation of sheet metal and related accessories associated with roofing membranes, providing physical protection to membrane, base flashings and membrane terminations, as specified herein.
- 1.2 Related Work:
- 1.2.1 Section 02 41 13 – Selective Demolitions and Preparations
  - 1.2.2 Section 06 10 53 – Miscellaneous Rough Carpentry
  - 1.2.3 Section 07 22 16 – Roof Board Insulation
  - 1.2.4 Section 07 54 23 – Thermoplastic Polyolefin (TPO) Roofing
  - 1.2.5 Section 22 14 00 – Roof Drains
- 1.3 Submittals: In accordance with Section 01 33 00 of this Specification
- 1.4 Environmental Conditions: Material installation shall proceed only when weather conditions are in compliance with the applicable manufacturer's recommendations for installation and no precipitation is imminent. Materials installed during adverse weather conditions shall be subject to removal and replacement with new materials at no additional cost to Owner.
- 1.5 Warranty: In accordance with Section 01 78 36 of this Specification.

**PART 2 – PRODUCTS**

- 2.1 General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- 2.2 Galvanized Steel: Structural quality galvanized steel Coating Class G-90, ASTM A653.
- 2.3 Stainless Steel: Type 316 (16% chromium, 10% nickel, and 2% molybdenum) ASTM A240, mill finished.
- 2.4 Flat Bar: ¼" x 1" (stiffener for gutter and counter flashing), 1/16" x 1" (gutter spacers) and ¼" x 1 – ½" (gutter brackets) flat stock galvanized steel.
- 2.5 Termination Bar: ¼" x 1" aluminum.
- 2.6 Kynar 500-Based Finish: Shall be factory applied, oven-finish. Finish and primer shall be applied in strict accordance with the formulator's specifications and shall meet the performance criteria of AAMA 605.2-90 specification. Finish coat thickness shall be a minimum of 1.0 mil. Primer coat thickness shall be a minimum of 0.3 mil. Color to match the existing color to be selected by owner.
- 2.7 Solder: ASTM D32-66T with 50% lead and 50% tin unless otherwise specified. Follow manufacturer's recommended soldering procedures.
- 2.8 Non-Shrinking Sealant: ASTM C920, Type S or M, Grade NS, Class 25, for Use NT, M, A, and O.
- 2.9 Manufacturer's approved liquid applied flashing at drains.

- 2.10 Pop rivets: 1/8" diameter stainless steel pop rivets color to match adjoining metal.
- 2.11 Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.
  - 2.11.1 Fasteners:
    - 2.11.1.1 Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
  - 2.11.2 Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
  - 2.11.3 Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim to remain watertight.
  - 2.11.4 Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
  - 2.11.5 Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- 2.12 Minimum Acceptable Metal Weights (All metal to be finished with Kynar 500 coating or approved equal prior to bid unless otherwise specified).
  - 2.12.1 Coping: 24-gauge galvanized steel
  - 2.12.2 Coping Cleat: 22-gauge galvanized steel
  - 2.12.3 Counterflashing: 24-gauge galvanized steel
  - 2.12.4 Downspout: 24-gauge galvanized steel
  - 2.12.5 Expansion Joint Cover: 24-gauge galvanized steel
  - 2.12.6 Expansion Joint Cleat: 24-gauge galvanized steel
  - 2.12.7 Gutter: 24-gauge galvanized steel
  - 2.12.8 L-Style Eave Flashing: 24-gauge galvanized steel (membrane clad)
  - 2.12.9 L-Style Eave Flashing Cleat: 22-gauge galvanized steel
  - 2.12.10 A-Style Eave Flashing: 24-gauge galvanized steel (membrane clad)
  - 2.12.11 A-Style Eave Flashing Cleat: 22-gauge galvanized steel
  - 2.12.12 Overflow Scupper: 26-gauge galvanized steel (membrane clad)
  - 2.12.13 Overflow Scupper Exterior Flange: 24-gauge galvanized steel
  - 2.12.14 Sheet Metal Window Edging: 24 ga. galvalume steel (Kynar coated)
  - 2.12.15 Sheet Metal Window Enclosure: 24 ga. galvalume steel (Kynar coated)

### PART 3 – EXECUTION

- 3.1 General Installation Requirements:
  - 3.1.1 Inspect all surfaces to which metal is to be applied. Do not install metal unless surfaces are even, sound, clean, dry, and free from defects which might affect the application.
  - 3.1.2 Follow recommendations of the National Roofing Contractors' Association (NRCA) and Sheet Metal and Air Conditioning Contractors National Association Architectural Sheet Metal Manual

- (7<sup>th</sup> Edition) for fabricating in-shop and on-site, and for installation, unless otherwise specified herein.
- 3.1.3 Follow published instructions of the product manufacturer for installation of extruded or proprietary metal products, unless otherwise specified herein.
  - 3.1.4 Metal flashings installed at edges and/or parapets of low-sloped roofing shall adhere to ANSI/SPRI ES-1 wind uplift requirements, as necessary. Specified fastening along with metal flashing thicknesses, gauges, and/or weights listed herein are the minimum required. In the event additional fastening or thicker, lower gauge, or heavier metal flashings are required, the contractor shall satisfy the requirements of ANSI/SPRI ES-1. In some instances, shop-formed metal flashings cannot satisfy ANSI/SPRI ES-1 requirements without additional testing or proprietary systems are necessary. Such cost for testing and/or propriety systems shall be included in the Bid as required.
  - 3.1.5 Gutters shall adhere to ANSI/SPRI GT-1 wind uplift requirements, as necessary. Specified fastening along with metal flashing thicknesses, gauges, and/or weights listed herein are the minimum required. In the event additional fastening or thicker, lower gauge, or heavier metal flashings are required, the contractor shall satisfy the requirements of ANSI/SPRI GT-1. In some instances, shop-formed metal cannot satisfy ANSI/SPRI GT-1 requirements without additional testing or proprietary systems are necessary. Such cost for testing and/or propriety systems shall be included in the Bid as required.
    - 3.1.5.1 Gutter system components 8-feet or longer shall have identification embedded in or affixed to gutter system components stating the gutter system has been tested according to the ANSI/SPRI test standard for gutter systems.
  - 3.1.6 Use nails, screws, bolts, cleats, or other fasteners of the same material or of material chemically compatible with the contacted metal.
  - 3.1.7 Fabricate cleats to be a minimum of one gauge heavier than fascia metal.
  - 3.1.8 Do not place dissimilar metals in direct contact or in positions where water sheds across both metals.
  - 3.1.9 Install metal to be water and weather tight with lines, arises and angles sharp and true and with paint surfaces free of waves and buckles.
  - 3.1.10 Install shop-formed metal flashings in 10-foot lengths maximum with a minimum number of pieces in each straight run.
  - 3.1.11 Shop-form all metal shapes, which are to be formed of prefinished metal, with protective plastic film in place. Do not remove plastic film until just prior to (or, if possible, after) installation.
  - 3.1.12 At all corners, shop form corner pieces of fascia and drip edge flashing from a single section of metal with minimum 36-inch legs on either side of the corner.
  - 3.1.13 Cleats: Cleats shall be secured with nails that penetrate the wood a minimum of 1 inch at spacings not to exceed 6 inches on center. Nails shall be applied along the vertical face of the wood blocking and located approximately 1-3/4-inch from the bottom of the cleat. Metal flashing drip legs shall be fold snugly over the cleat.
  - 3.1.14 Lapped Metal: Apply a continuous bead of caulk between any lapped metal sections, except for counterflashing lapped joints. The application of caulk after metal components have been lapped is unacceptable and will be grounds for rejection.
  - 3.1.15 Flat Drive Cleats: Refer to NRCA Detail. Lap vertical sections a minimum of 2-inches and hem

the top of the sections. Apply the flat drive cleat and fold down the outside face of both sides of the coping a minimum of 1 inch, snug to the vertical flange of the coping. Trim excess flat drive cleat from the vertical face of the coping.

### 3.2 Coping Cap Installation

- 3.2.1 Prior to the installation of the coping cap, verify TPO base flashing extends up and over the existing wood blocking and down the exterior vertical face beyond the wood blocking a minimum of 1 inch or a distance to match the length of the coping.
- 3.2.2 Coping shall be applied at locations where fastener height will not be less than 8 inches above the new roof surface. A-style flashing shall be applied where parapet height is below 8 inches.
- 3.2.3 Any deviations to the design shown in the Drawings shall be submitted to the Engineer for approval along with documentation that the revised detail meets the ANSI/SPRI ES-1 wind uplift requirements.
- 3.2.4 Use maximum 10-foot lengths and a minimum number of pieces in each straight run.
- 3.2.5 Secure both vertical legs of the coping with a continuous cleat nailed to the wood blocking. The coping drip edge shall be folded snugly over the cleat. Cleats shall be secured with nails that penetrate the wood a minimum of 1 inch at spacings not to exceed 6 inches on center. Nails shall be applied along the vertical face of the wood blocking.
- 3.2.6 Join sections with flat drive cleats. Refer to the Drawings. Lap vertical sections a minimum of 3 inches and hem the top of the sections. Apply the flat drive cleat, fold the drive cleat ends down the outside face of the coping, and fold the drive cleat ends under the cleat on both sides of the coping.
- 3.2.7 At locations where coping intersects at corners, the Contractor shall join sections with double lock standing seams as shown in the Drawings.

### 3.3 Counterflashing Installation

- 3.3.1 Exposed flashing shall be prefinished roll-formed 24-gauge galvanized steel with “Kynar 500” resin fluoropolymer. Color shall be selected by Owner from manufacturer’s standard color selections.
- 3.3.2 Provide flashing in 10-foot-long sections shop formed.
- 3.3.3 Anchors shall be provided at 6” o.c. unless otherwise noted or in accordance with the manufacturer’s requirements if more stringent.
- 3.3.4 Notch and lap sections a minimum of 3 inches.
- 3.3.5 At places where the counterflashing is being installed behind a frame or existing sheet metal flashing, slide counterflashing behind frame/existing flashing a minimum of one inch. Furnish and install stainless steel bonded neoprene washers with screws to secure counter flashing to curbs at spacings not to exceed 12” o.c.
- 3.3.6 At places where counter flashing will be surface-mounted, form a sealant cove at the top of the counterflashing. Apply termination bar over the counter flashing and secure the counter flashing and termination bar to the substrate using appropriate fasteners at spacings not to exceed 6” o.c. Fill the cove with sealant.
- 3.3.7 Notch and lap joints and inside corners. Notch and seam outside corners. Do not rivet or otherwise

secure joints and corner. To the extent possible, form corners from a single piece that extends 5 feet on either side of the corner.

### 3.4 Overflow Scupper Liner Installation

- 3.4.1 Scupper liner and interior flange shall be formed from membrane-clad metal. Any necessary seams shall be set in sealant, lapped a minimum of 1 inch, and pop riveted with stainless steel pop rivets at spacings not to exceed 1 inch on-center. The seam shall then be covered with a continuous strip of unsupported membrane flashings that shall be full welded to the metal.
- 3.4.2 Apply two continuous beads of sealant on membrane flashings to be in contact with scupper. Set the flange over the sealant and wall and secure to the substrate with specified fasteners at spacings not to exceed 6 inches and a minimum of 2 fasteners per side.
- 3.4.3 Flash the interior flange with membrane flashings per manufacturer's written instructions that shall extend to the edge of the scupper opening and a minimum of 6 inches past the scupper liner interior flange.
- 3.4.4 Set the exterior flange against the wall in a bead of non-shrinking sealant. Secure the exterior flange to the wall with a row of fasteners located approximately one inch from the edge, spaced no more than 6 inches on center. Hem the scupper liner to the exterior flange and set the seam in continuous sealant. Hem the exterior edges of the exterior flange towards the wall and seal the top edge to the cladding.
- 3.4.5 Furnish and install a section of surface mounted counterflashing above the exterior scupper flange in accordance with Section 07 60 00 Paragraph 3.4 of the Specification. The counterflashing shall extend a minimum of 1" beyond the ends of the scupper flange.

### 3.5 Gutter Installation

- 3.5.1 Gutter size shall box-style and shall be a minimum of 5" x 6" to match existing. The back of the gutter shall be a minimum of 1 inch higher than the front. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 1-2, Style A.
- 3.5.2 Provide butt type expansion joints in gutters at spacings required for the type of material used to fabricate gutters. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 1-7.
- 3.5.3 Provide gutter spacers at 3'-0" on center. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 1-12. Spacers shall be formed from minimum 1/16" x 1" flat stock galvanized steel. Continuous nominal 1/4" x 1" galvanized steel flat bar shall be installed at the front of the gutter and secured with stainless steel bolts and nuts at spacer locations.
- 3.5.4 Provide gutter brackets at 3'-0" on center and alternating in location from gutter spacers. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 1-12. Brackets shall be formed from minimum 1/4" x 1 - 1/2" flat stock galvanized steel and secured with stainless steel screws through pre-drilled holes. Brackets should be primed and double coated with an approved field-applied Kynar 500 paint prior to installation.

### 3.6 Downspout Installation

- 3.6.1 Downspouts shall be box-style and shall be 4" x 6" unless otherwise noted. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 1-32B and 1-32F.

- 3.6.2 Lap sections a minimum of 3 inches and secure sections with a minimum of 2 stainless steel sheet metal screws.
- 3.6.3 Form 45° elbow where water discharges onto the roof or ground.
- 3.6.4 Form or provide new round to rectangular downspout metal transition pieces to tie into existing underground drainage system formed from the same material as the downspouts.
- 3.6.5 Form downspout hangers from the same material as downspouts using material not less than 2 gauges heavier than downspouts. Secure downspouts to wall with hangers spaced not more than 5 feet on center. Refer to SMACNA Architectural Sheet Metal Manual Figure 1-35H. Apply one coat of metal primer and two coats of field-grade Kynar 500 paint to all hangers. Color shall match the downspouts.
  - 3.6.5.1 Locate downspout hangers at same locations as existing downspout hangers and to cover existing hanger fastener holes. Seal holes in exterior cladding from existing hanger fasteners.
- 3.6.6 Furnish and install new concrete splash blocks where water discharges onto new roofing or grounds. Refer to SMACNA Architectural Sheet Metal Manual Figure No. 1- 36.
  - 3.6.6.1 Where splash blocks are installed on new roof surfaces, furnish and install new sacrificial cap sheet under all concrete splash blocks. Membrane protection pads shall extend a minimum of 3 inches beyond all sides of the splash block and shall be adhered to the roof surface.
- 3.7 A-Style Flashing:
  - 3.7.1 At locations shown on Drawings, furnish and install new membrane clad A-type flashing. The flashing shall extend a minimum of 1 inch above the roof level. The flashing shall have a 4-inch horizontal flange. Refer to NRCA Details SM-14 and UL-25 and Drawings. The flashing shall cover the exterior wall cladding a distance to match the existing; however, the vertical flange of the flashing shall not be more than 8 inches. If additional area of wall needs to be covered with flashing to match the existing, furnish and install new face extenders. Install face extender prior to installing flashing.
    - 3.7.1.1 Prior to installing the flashing, ensure the roof membrane ends down the exterior face of the wall a distance to the match the flashing.
    - 3.7.1.2 Set horizontal flange in a continuous bead of sealant on top of the roofing.
    - 3.7.1.3 At high eaves, join sections using cover plates.
    - 3.7.1.4 At rake eaves, join sections by lapping.
    - 3.7.1.5 Strip in the flange as specified elsewhere.
- 3.8 L-Style Flashing:
  - 3.8.1 At locations shown on Drawings, furnish and install new membrane clad L-type flashing. The flashing shall have a 4-inch horizontal flange. Refer to NRCA Details SM-16, and TP-4 and Drawings. The flashing shall cover the exterior wall cladding a distance to match the existing; however, the vertical flange of the flashing shall not be more than 8 inches. If additional area of wall needs to be covered with flashing to match the existing, furnish and install new face extenders. Install face extender prior to installing flashing.

- 3.8.1.1 Prior to installing the flashing or gutter, ensure the roof membrane ends down the exterior face of the wall a distance to the match the flashing or gutter, whichever is greater.
- 3.8.1.2 Set horizontal flange in a continuous bead of sealant on top of the roofing.
- 3.8.2 Install gutters before flashing. Flashing shall extend into gutter a minimum of 2 inches.
- 3.8.3 A continuous cleat is not required at gutter locations. At other locations, flashing shall engage a continuous cleat.
- 3.8.4 Form new L-style closures using similar metal as shown on Drawings.
- 3.8.5 Strip in the flange as specified elsewhere.
- 3.9 Cleaning and Protection
  - 3.9.1 Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
  - 3.9.2 Clean and neutralize flux materials. Clean off excess solder.
  - 3.9.3 Clean off excess sealants.
  - 3.9.4 Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.
  - 3.9.5 Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

**END OF SECTION**

**SECTION 07 92 00**  
**JOINT SEALANTS**

**PART 1 - GENERAL**

- 1.1 Drawings and general provisions of the contract, including General Conditions of the Contract, Supplementary General Conditions, and other Division 1 specification sections apply to work of this section.
- 1.2 Work Included - Installation of backer rods and sealant at storefront and preformed sealant at stone coping caps.
- 1.3 Related work specified elsewhere - Selective Demolition and Preparations- Section 02 41 13
- 1.4 Submittals
  - 1.4.1 Submit copies of manufacturer's literature for the following:
    - 1.4.1.1 Product Data consisting of sealant manufacturer's product information for components, materials, accessories, and equipment necessary to perform the work.
    - 1.4.1.2 Applicable detail and shop drawings for the work.
    - 1.4.1.3 Samples for initial selection purposes in form of manufacturer's color charts or chips showing full range of colors and textures.
    - 1.4.1.4 Installer certificates signed by sealant system manufacturer and written certification certifying that the installer complies with requirements included under the "Quality Assurance" section of the Specification.
    - 1.4.1.5 Operation and Maintenance Data as required by the warranty.
    - 1.4.1.6 Manufacturer's Certificates: Certify products meet or exceed specified requirements.
  - 1.4.2 Refer to Section 01 33 00 of Specification.
- 1.5 Environmental Conditions
  - 1.5.1 Material installation shall proceed only when weather conditions are in compliance with manufacturer's recommendations for installation and no precipitation is imminent. Materials installed during adverse weather conditions shall be subject to rejection including removal and replacement.
  - 1.5.2 Use manufacturer's standard test method to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
- 1.6 Quality Assurance
  - 1.6.1 Contractor: Joint Sealant applicator must be approved, authorized, or licensed in writing by the approved sealant product manufacturer and have a minimum of five years' experience as an approved, authorized, or licensed applicator with that manufacturer and be approved at a level capable of providing the specified warranty. The applicator must supply the names, locations and client contact information of five projects of similar size and scope that the applicator has constructed using the manufacturer's sealant products submitted for this project within the previous three years.

1.6.2 Contractor shall perform ***destructive*** adhesion test in accordance with the latest edition of ASTM C1521. Test shall be documented with photographs. Test results and photographs shall be composed into a report that shall be issued to the Owner and Designer within 24 hours of the test. Adhesion test shall be performed by a North Carolina licensed third party firm with a minimum of 5 years experience in material testing. A minimum of 2 tests shall be performed (1 in a joint between EIFS and EIFS and 1 in a joint between brick and EIFS). Each test shall be performed on a minimum of 6 linear inches of sealant. Any repairs to sealant as a result of failure under this paragraph shall be performed by the Contractor at no additional cost to the Owner.

- 1.6.2.1 Make a transverse cut in the new sealant across the entire width of the sealant.
- 1.6.2.2 Make parallel cuts down the length of the joint starting at the transverse cut on either side of the sealant for a distance of 3 inches.
- 1.6.2.3 Pull the top of the cut sealant out tight to a 90 degree angle to the wall.
- 1.6.2.4 Make a mark that is 1 inch away from the wall down the length of the pulled out section.
- 1.6.2.5 Pull the sealant at this angle until the mark made at 1 inch is at 4 inches and no adhesive or cohesive failure has occurred.
- 1.6.2.6 This represents a 300% elongation and a successful test.
- 1.6.2.7 Document and record results.
- 1.6.2.8 All pull tests under this paragraph shall be repaired by the Contractor at no additional cost to the Owner.

1.6.3 Manufacturer: Manufacturer shall have a minimum of 10 years of continuous, concurrent experience providing specified materials including the current year.

1.7 Warranty - Refer to Section 01 78 36 of this specification.

## **PART 2 - PRODUCTS**

### 2.1 Materials, General

2.1.1 Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

2.1.2 Colors of Exposed Joint Sealants: To match existing wall finish as selected by Owner.

### 2.2 Joint Sealants

2.2.1 Silicone, non-sagging, non-staining, low modulus sealant; ASTM C 920, Type S or M, Grade NS, Class 100/50, for Use NT, M, A, and O:

- 2.2.1.1 For use in joining stone, metal, and/or composite plastic at joints.
- 2.2.1.2 Products: Subject to compliance with requirements. All listed manufacturers and products are provided as examples of the salient characteristics to be found in the submitted product. Any additional manufacturers not listed must meet the requirements set forth in this specification and be approved prior to bid in accordance with Section 01 60 00. Products that may be incorporated into the Work include, but are not limited to the following:

- i Dow Corning Corporation; 790 Silicone Building Sealant
- ii Sika Corporation; SikaSil 15LM

iii Tremco; Dymonic 100

## 2.3 Joint Sealant Backing

- 2.3.1 General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- 2.3.2 Cylindrical Sealant Backings: ASTM C 1330, type C (closed-cell material with a surface skin) and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance. Approximately 1.25 – 1.33 times larger than the openings, unless manufacturer has more stringent requirements.
- 2.3.3 Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

## 2.4 Miscellaneous Materials

- 2.4.1 Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates.
- 2.4.2 Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- 2.4.3 Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

## **PART 3 - EXECUTION**

### 3.1 Examination

- 3.1.1 Sealant and backer rod installation shall be performed by a qualified and experienced installer having at least 5 years of experience in this type of work.
- 3.1.2 Contractor shall make every effort to match the new sealant with the existing wall panels.

### 3.2 Preparation

- 3.2.1 Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  - 3.2.1.1 Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 3.2.1.2 Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning

operations above by vacuuming or blowing out joints with oil-free compressed air. Ensure surface roughness inside joints is as necessary for sealant application in accordance with joint sealant manufacturer written instructions.

- 3.2.1.3 Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- 3.2.1.4 Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primer to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- 3.2.1.5 Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.3 Installation of Joint Sealants

- 3.3.1 General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- 3.3.2 Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- 3.3.3 Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability:
  - 3.3.3.1 Do not leave gaps between ends of sealant backings.
  - 3.3.3.2 Do not stretch, twist, puncture, or tear sealant backings.
  - 3.3.3.3 Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
  - 3.3.3.4 Set depth of backing in accordance with manufacturer written instructions for optimal joint depth.
- 3.3.4 Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  - 3.3.4.1 Place sealants so they directly contact and fully wet joint substrates.
  - 3.3.4.2 Completely fill recesses in each joint configuration.
  - 3.3.4.3 Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant adhesion and movement capability.
- 3.4 Cleaning - Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.
- 3.5 Protection - Protect joint sealants during and after curing period from contact with contaminating

substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

**END OF SECTION**

**SECTION 08 43 13**  
**ALUMINUM-FRAMED STOREFRONTS**

**PART 1 – GENERAL**

1.1 SECTION INCLUDES

- 1.1.1 Aluminum-framed storefront, with vision glass.
- 1.1.2 Aluminum doors and frames.
- 1.1.3 Weatherstripping.
- 1.1.4 Door hardware.

1.2 RELATED REQUIREMENTS

- 1.2.1 Section 079200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- 1.2.2 Section 084413 - Glazed Aluminum Curtain Walls.

1.3 REFERENCE STANDARDS

- 1.3.1 AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site 2015.
- 1.3.2 AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems 2015.
- 1.3.3 AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls and Sloped Glazing Systems 2014.
- 1.3.4 AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document) 2015.
- 1.3.5 ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- 1.3.6 ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- 1.3.7 ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2019.
- 1.3.8 ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014 (Reapproved 2021).
- 1.3.9 ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference 2015 (Reapproved 2023).
- 1.3.10 FBC TAS 201 - Impact Test Procedures; Testing Application Standard 1994.
- 1.3.11 FBC TAS 203 - Criteria for Testing Products Subject To Cyclic Wind Pressure Loading; Testing Application Standard 1994.

1.4 ADMINISTRATIVE REQUIREMENTS

- 1.4.1 Coordinate with installation of other components that comprise the exterior enclosure.
- 1.4.2 Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.5 SUBMITTALS

- 1.5.1 See Section 01 33 00 - Submittals for submittal procedures.
- 1.5.2 Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, Per FPA FL29081 R2, glass and infill, door hardware, and internal drainage details.
- 1.5.3 Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.

- 1.5.4 Include design engineer's stamp or seal on shop drawings for attachments and anchors.
- 1.5.5 Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- 1.5.6 Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.
- 1.5.7 Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
- 1.5.8 Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
- 1.5.9 Designer's qualification statement.
- 1.5.10 Manufacturer's qualification statement.
- 1.5.11 Installer's qualification statement.
- 1.5.12 Specimen warranty.

## 1.6 QUALITY ASSURANCE

- 1.6.1 Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- 1.7.1 Handle products of this section in accordance with AAMA CW-10.
- 1.7.2 Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

## 1.8 FIELD CONDITIONS

- 1.8.1 Do not install sealants when the ambient temperature is less than 40 degrees F (5 degrees C). Maintain this minimum temperature during and 48 hours after installation.

## 1.9 WARRANTY

- 1.9.1 See Section 01 78 36 – Warranty and Guarantees for additional warranty requirements.
- 1.9.2 Correct defective Work within a two-year period after Date of Substantial Completion.
- 1.9.3 Provide two-year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- 1.9.4 Provide two-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

## **PART 2 – PRODUCTS**

### 2.1 MANUFACTURERS

#### 2.1.1 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING

- 2.1.1.1 Center-Set Style, Thermally Broken:
- 2.1.1.2 Basis of Design: Trulite CT451 Store Front System.
- 2.1.1.3 Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep (51 mm wide by 114 mm deep).

- 2.1.2 Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed below:

- 2.1.3 Substitutions: See Section 01 60 00 - Product Requirements.

- 2.1.4 For any product not identified as "Basis of Design", submit information as specified for substitutions.

## 2.1.5 BASIS OF DESIGN -- SWINGING DOORS

2.1.5.1 Trulite Glass & Aluminum Solutions, LLC; Series 500 Wide Stile Swing Entrances:  
[www.trulite.com/#sle](http://www.trulite.com/#sle).

2.1.5.2 Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed below:

## 2.2 ALUMINUM-FRAMED STOREFRONT

2.2.1 Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage, and attachment devices.

2.2.1.1 Finish: Class I color anodized.

2.2.1.2 Factory finishes all surfaces that will be exposed in completed assemblies.

2.2.1.3 Finish Color: Green.

2.2.1.4 Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.

2.2.1.5 Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.

2.2.1.6 System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

2.2.1.7 Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F (95 degrees C) over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.

2.2.1.8 Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.

2.2.1.9 Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

### 2.2.2 Performance Requirements

2.2.2.1 Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.

i Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.

2.2.2.2 Air Leakage: 0.06 cfm/sq ft (0.3 L/sec sq m) maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf (75 Pa) pressure difference.

## 2.3 COMPONENTS

2.3.1 Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.

2.3.1.1 Glazing Stops: Flush.

## 2.4 MATERIALS

2.4.1 Extruded Aluminum: ASTM B221 (ASTM B221M).

2.4.2 Fasteners: Stainless steel.

2.4.3 Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

2.5 FINISHES

2.5.1 Color: As indicated in the drawings.

2.6 HARDWARE

2.6.1 For each door, include weatherstripping, sill sweep strip, and threshold.

2.6.2 Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.

2.6.3 Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

2.6.4 Threshold: Extruded aluminum, one piece per door opening, ribbed surface; provide on all doors.

2.6.5 Hinges: Butt type, swing clear; top and bottom.

2.6.6 Push/Pull Set: Standard configuration push/pull handles.

2.6.7 Exit Devices: Panic type.

2.6.8 Door Closers: Concealed overhead.

2.6.9 Locks: Dead latch with thumb turn inside ; keyed cylinder outside.

**PART 3– EXECUTION**

3.1 EXAMINATION

3.1.1 Verify dimensions, tolerances, and method of attachment with other work.

3.1.2 Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

3.2 INSTALLATION

3.2.1 Install wall system in accordance with manufacturer's instructions.

3.2.2 Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

3.2.3 Provide alignment attachments and shims to permanently fasten system to building structure.

3.2.4 Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

3.2.5 Provide thermal isolation where components penetrate or disrupt building insulation.

3.2.6 Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

3.2.7 Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

3.2.8 Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

- 3.2.9 Set thresholds in bed of sealant and secure.
- 3.2.10 Install hardware using templates provided.
- 3.2.11 Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

### 3.3 FIELD QUALITY CONTROL

- 3.3.1 Provide services of storefront manufacturer's field representative to observe for proper installation of system and submit report.
- 3.3.2 Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
  - 3.3.2.1 Provide repairs at no additional cost to the owner.
  - 3.3.2.2 Cost of retesting shall be borne by the contractor at no additional cost to the owner.

### 3.4 ADJUSTING

- 3.4.1 Adjust operating hardware and sash for smooth operation.

### 3.5 CLEANING

- 3.5.1 Remove protective material from pre-finished aluminum surfaces.
- 3.5.2 Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.
- 3.5.3 Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

### 3.6 PROTECTION

- 3.6.1 Protect installed products from damage until Date of Substantial Completion.

**END OF SECTION**

**SECTION 08 71 00  
DOOR HARDWARE**

**PART 1 – GENERAL**

1.1 SECTION INCLUDES

- 1.1.1 Hardware for aluminum doors.
- 1.1.2 Thresholds.
- 1.1.3 Weatherstripping and gasketing.

1.2 RELATED REQUIREMENTS

- 1.2.1 Section 084313 - Aluminum-Framed Storefronts: Door hardware, except as noted in section.

1.3 REFERENCE STANDARDS

- 1.3.1 ADA Standards - 2010 ADA Standards for Accessible Design 2010.
- 1.3.2 BHMA A156.1 - Standard for Butts and Hinges 2021.
- 1.3.3 BHMA A156.3 - Exit Devices 2020.
- 1.3.4 BHMA A156.4 - Door Controls - Closers 2019.
- 1.3.5 BHMA A156.6 - Standard for Architectural Door Trim 2021.
- 1.3.6 BHMA A156.13 - Mortise Locks & Latches Series 1000 2017.
- 1.3.7 BHMA A156.18 - Materials and Finishes 2020.
- 1.3.8 BHMA A156.21 - Thresholds 2019.
- 1.3.9 BHMA A156.22 - Standard for Gasketing 2021.
- 1.3.10 ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.
- 1.3.11 NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2022.
- 1.3.12 NFPA 101 - Life Safety Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- 1.3.13 UL (DIR) - Online Certifications Directory Current Edition.

1.4 ADMINISTRATIVE REQUIREMENTS

- 1.4.1 Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.
- 1.4.2 Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- 1.4.3 Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section; attendance is required by affected installers and the following:
  - 1.4.3.1 Designer
  - 1.4.3.2 Installer's Architectural Hardware Consultant (AHC).
  - 1.4.3.3 Hardware Installer.
  - 1.4.3.4 Owner's Security Consultant.
- 1.4.4 Keying Requirements Meeting:
  - 1.4.4.1 Attendance Required:
    - i Contractor.
    - ii Owner.
  - 1.4.4.2 Agenda:
    - i Establish keying requirements.
    - ii Verify locksets and locking hardware are functionally correct for project requirements.
    - iii Verify that keying and programming complies with project requirements.
    - iv Establish keying submittal schedule and update requirements.
  - 1.4.4.3 Incorporate "Keying Requirements Meeting" decisions into keying submittal upon review of door hardware keying system including, but not limited to, the following:
  - 1.4.4.4 Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

1.4.4.5 Deliver established keying requirements to manufacturers.

## 1.5 SUBMITTALS

1.5.1 See Section 01 33 00 - Submittals for submittal procedures.

## 1.6 QUALITY ASSURANCE

1.6.1 Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.

1.6.2 Installer Qualifications: Company specializing in performing work of the type specified for commercial door hardware with at least three years of documented experience.

## 1.7 DELIVERY, STORAGE, AND HANDLING

1.7.1 Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

## 1.8 WARRANTY

1.8.1 See Section 01 78 36 – Warranty and Guarantees for additional warranty requirements.

1.8.2 Manufacturer's Warranty: Provide warranty against defects in material and workmanship for period indicated. Complete forms in Owner's name and register with manufacturer.

1.8.2.1 Closers: Five years, minimum.

1.8.2.2 Exit Devices: Three years, minimum.

1.8.2.3 Locksets and Cylinders: Three years, minimum.

1.8.2.4 Other Hardware: Two years, minimum.

## **PART 2 – PRODUCTS**

### 2.1 DESIGN AND PERFORMANCE CRITERIA

2.1.1 Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.

2.1.2 Provide individual items of single type, of same model, and by same manufacturer.

2.1.3 Provide door hardware products that comply with the following requirements:

2.1.3.1 Applicable provisions of federal, state, and local codes.

2.1.3.2 Accessibility: ADA Standards and ICC A117.1.

2.1.3.3 Applicable provisions of NFPA 101.

### 2.2 Fasteners:

2.2.1 Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.

2.2.1.1 Aluminum fasteners are not permitted.

2.2.1.2 Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.

2.2.2 Fire-Rated Applications: Comply with NFPA 80.

2.2.2.1 Provide wood or machine screws for hinges mortised to doors or frames, strike plates to frames, and closers to doors and frames.

2.2.2.2 Provide steel through bolts for attachment of surface mounted closers, hinges, or exit devices to door panels unless proper door blocking is provided.

### 2.3 HINGES

2.3.1 Manufacturers:

2.3.1.1 Basis of Design: Trulite

2.4 EXIT DEVICES

2.4.1 Exit Devices: Comply with BHMA A156.3, Grade 1.

2.4.1.1 Lever design to match lockset trim.

2.4.1.2 Provide cylinder with cylinder dogging or locking trim.

2.4.1.3 Provide exit devices properly sized for door width and height.

2.4.1.4 Provide strike as recommended by manufacturer for application indicated.

2.4.1.5 Provide UL (DIR) listed exit device assemblies for fire-rated doors and panic device assemblies for non-fire-rated doors.

2.5 MORTISE LOCKS

2.5.1 Mortise Locks: Comply with BHMA A156.13, Grade 1, Security, 1000 Series.

2.5.1.1 Latchbolt Throw: 3/4 inch (19 mm), minimum.

2.5.1.2 Deadbolt Throw: 1 inch (25.4 mm), minimum.

2.5.1.3 Backset: 2-3/4 inch (70 mm) unless otherwise indicated.

2.5.1.4 Strikes: Provide manufacturer's standard strike for each latch set or lockset with strike box and curved lip extending to protect frame in compliance with indicated requirements.

i Finish: To match lock or latch.

2.6 DOOR PULLS AND PUSH BARS

2.6.1 Door Pulls and Push Bars: Comply with BHMA A156.6.

2.6.1.1 Bar Type: Bar set, unless otherwise indicated.

2.6.1.2 Material: Aluminum, unless otherwise indicated.

2.7 CLOSERS

2.7.1 Closers: Comply with BHMA A156.4, Grade 1.

2.7.1.1 Type: Surface mounted to door.

2.7.1.2 Provide door closer on each exterior door.

2.8 THRESHOLDS

2.8.1 Thresholds: Comply with BHMA A156.21.

2.8.1.1 Provide threshold at each exterior door, unless otherwise indicated.

2.8.1.2 Type: Flat surface.

2.8.1.3 Material: Aluminum.

2.8.1.4 Threshold Surface: Fluted horizontal grooves across full width.

2.8.1.5 Field cut threshold to profile of frame and width of door sill for tight fit.

2.8.1.6 Provide non-corroding fasteners at exterior locations.

2.9 WEATHERSTRIPPING AND GASKETING

2.9.1 Weatherstripping and Gasketing: Comply with BHMA A156.22.

2.9.1.1 Head and Jamb Type: Adjustable.

2.9.1.2 Door Sweep Type: Encased in retainer.

2.9.1.3 Material: Aluminum, with brush weatherstripping.

2.10 BUMPER GUARD

2.10.1 Bumper Guard: Provide to protect door surface and operating hardware from being damaged by heavy objects that move through opening.

- 2.10.1.1 Type: Exit device, surface mounted.
- 2.10.1.2 Material: Stainless steel.

## 2.11 FINISHES

- 2.11.1 Finishes: Provide door hardware of same finish as existing hardware, unless otherwise indicated.
- 2.11.2 Exceptions:
  - 2.11.2.1 Where base material metal is specified to be different, provide finish that is an equivalent appearance in accordance with BHMA A156.18.

## **PART 3 – EXECUTION**

### 3.1 INSTALLATION

- 3.1.1 Install hardware in accordance with manufacturer's instructions and applicable codes.
- 3.1.2 Use templates provided by hardware item manufacturer.
- 3.1.3 Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list; unless noted otherwise in Door Hardware Schedule or on drawings.
- 3.1.4 Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

### 3.2 PROTECTION

- 3.2.1 Protect finished Work and replace damaged components at no additional cost to owner.
- 3.2.2 Do not permit adjacent work to damage hardware or finish.

### **END OF SECTION**

**SECTION 08 80 00  
GLAZING**

**PART 1 – GENERAL**

1.1 SECTION INCLUDES

- 1.1.1 Insulating glass units.
- 1.1.2 Glazing compounds.

1.2 RELATED REQUIREMENTS

- 1.2.1 Section 084313 - Aluminum-Framed Storefronts: Glazing provided as part of storefront assembly.

1.3 REFERENCE STANDARDS

- 1.3.1 ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- 1.3.2 ASTM C1036 - Standard Specification for Flat Glass 2021.
- 1.3.3 ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.
- 1.3.4 ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass 2021a.
- 1.3.5 ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings 2016.
- 1.3.6 ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation 2019.
- 1.3.7 GANA (SM) - GANA Sealant Manual 2008.
- 1.3.8 NFRC 100 - Procedure for Determining Fenestration Product U-factors 2020.
- 1.3.9 NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence 2020.
- 1.3.10 NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems 2023.

1.4 SUBMITTALS

- 1.4.1 See Section 01 33 00 - Submittals for submittal procedures.
- 1.4.2 Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- 1.4.3 Certificate: Certify that products of this section meet or exceed specified requirements.
- 1.4.4 Manufacturer's qualification statement.
- 1.4.5 Installer's qualification statement.
- 1.4.6 Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 FIELD CONDITIONS

- 1.5.1 Do not install glazing when the ambient temperature is less than 40 degrees F (4 degrees C).

1.6 WARRANTY

- 1.6.1 See Section 01 78 36 – Warranty and Guarantees for additional warranty requirements.
- 1.6.2 Insulating Glass Units: Provide a two (2) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

**PART 2 – PRODUCTS**

## 2.1 MANUFACTURERS

### 2.1.1 Glass Fabricators:

- 2.1.1.1 Trulite Glass & Aluminum Solutions, LLC: [www.trulite.com/#sle](http://www.trulite.com/#sle).
- 2.1.1.2 Substitutions: See Section 016000 - Product Requirements.

## 2.2 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

### 2.2.1 Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.

- 2.2.1.1 Design Pressure: Calculated in accordance with ASCE 7.
- 2.2.1.2 Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
- 2.2.1.3 Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
- 2.2.1.4 Glass thicknesses listed are minimum.

### 2.2.2 Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and/or air barrier.

- 2.2.2.1 In conjunction with weather barrier related materials described in other sections, as follows:

### 2.2.3 Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:

- 2.2.3.1 Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
- 2.2.3.2 Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
- 2.2.3.3 Solar Optical Properties: Comply with NFRC 300 test method.

## 2.3 GLASS MATERIALS

### 2.3.1 Float Glass: Provide float glass-based glazing unless otherwise indicated.

- 2.3.1.1 Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
- 2.3.1.2 Tinted Type: ASTM C1036, Class 2 - Tinted, Quality - Q3, with color and performance characteristics as indicated.
- 2.3.1.3 Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

## 2.4 INSULATING GLASS UNITS

### 2.4.1 Insulating Glass Units: Types as indicated.

- 2.4.1.1 Durability: Certified by an independent testing agency to comply with ASTM E2190.
- 2.4.1.2 Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
- 2.4.1.3 Spacer Color: Black.
- 2.4.1.4 Edge Seal:
- 2.4.1.5 Color: Black.

- 2.4.1.6 Purge interpane space with dry air, hermetically sealed.
- 2.4.1.7 Capillary Tubes: Provide tubes from air space for insulating glass units without inert type gas that have a change of altitude greater than 2500 feet (762 m) between point of fabrication and point of installation to permit pressure equalization of air space.
- 2.4.1.8 Capillary Tubes: Tubes to remain open and be of length and material type in accordance with insulating glass fabricator's requirements.

2.4.2 Type IG-1 - Insulating Glass Units: Vision glass, double glazed.

- 2.4.2.1 Applications: Exterior glazing unless otherwise indicated.
- 2.4.2.2 Space between lites filled with air.
- 2.4.2.3 Outboard Lite: Annealed float glass, 1/4 inch (6.4 mm) thick, minimum.
- 2.4.2.4 Tint: Clear.
- 2.4.2.5 Inboard Lite: Annealed float glass, 1/4 inch (6.4 mm) thick, minimum.
- 2.4.2.6 Tint: Match existing.
- 2.4.2.7 Sound Transmission Class (STC) rating of 31, with special acoustical spacer and edge seal.
- 2.4.2.8 Total Thickness: 1 inch (25.4 mm).
- 2.4.2.9 Thermal Transmittance (U-Value), Summer - Center of Glass: 0.45, maximum.

2.5 BASIS OF DESIGN - INSULATING GLASS UNITS

2.5.1 Basis of Design - Insulating Glass Units: Vision glazing, with low-e coating.

- 2.5.1.1 Applications: Exterior insulating glass glazing unless otherwise indicated.
- 2.5.1.2 Space between lites filled with air.
- 2.5.1.3 Total Thickness: 1 inch (25.4 mm).
- 2.5.1.4 Thermal Transmittance (U-Value), Summer - Center of Glass: 0.45, nominal.
- 2.5.1.5 Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
- 2.5.1.6 Spacer Color: Black.
- 2.5.1.7 Edge Seal:
- 2.5.1.8 Color: Black.
- 2.5.1.9 Purge interpane space with dry air, hermetically sealed.

2.6 ACCESSORIES

2.6.1 Concealed nonprogressive structural glass mounting system.

- 2.6.1.1 Glass Panel Mounting System: Two-part patented system of interlocking metal rail brackets structurally connected to substrate surface and backs of glass units for concealed support.
  - i Applications: As indicated on drawings for wall mounted glass units.
  - ii Mounting Action: Hook shape of mounting rail bracket interlocks with hook shape of another mounting bracket.
  - iii Maximum Reveal Width Between Panel Edges: 1/4 inch (6.4 mm) at completed installation.

**PART 3 – EXECUTION**

3.1 VERIFICATION OF CONDITIONS

- 3.1.1 Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- 3.1.2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

### 3.2 PREPARATION

- 3.2.1 Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- 3.2.2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- 3.2.3 Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

### 3.3 INSTALLATION, GENERAL

- 3.3.1 Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- 3.3.2 Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- 3.3.3 Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- 3.3.4 Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

### 3.4 FIELD QUALITY CONTROL

- 3.4.1 Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- 3.4.2 Monitor and report installation procedures and unacceptable conditions.

### 3.5 CLEANING

- 3.5.1 Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- 3.5.2 Remove nonpermanent labels immediately after glazing installation is complete.
- 3.5.3 Clean glass and adjacent surfaces after sealants are fully cured.
- 3.5.4 Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

### 3.6 PROTECTION

- 3.6.1 After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- 3.6.2 Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

**END OF SECTION**

**DIVISION 22**

**PLUMBING**

**SECTION 22 05 29**  
**HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT**

**PART 1 – GENERAL**

- 1.1 Summary: installation of non-penetrating, rooftop support system for roof-mounted gas piping, refrigerant lines, and conduit lines.
  - 1.1.1 Existing copper P-traps and condensation lines will remain.
  - 1.1.2 Existing PVC P-traps and condensation lines will be replaced with copper.
- 1.2 References:
  - 1.2.1 ASTM A53 – Standard Specification for Pipe, Steel, Black, and Hot-Dipped, Zinc-Coated, Welded and Seamless
  - 1.2.2 ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 1.2.3 ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - 1.2.4 ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes.
  - 1.2.5 ASTM B88 - Standard Specification for Seamless Copper Water Tube
  - 1.2.6 ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings
  - 1.2.7 ASTM B302 - Standard Specification for Threadless Copper Pipe, Standard Sizes
  - 1.2.8 MSS SP-58 - Pipe Hangers and Supports -- Materials, Design and Manufacture; Manufacturers Standardization Society of the Valve and Fittings Industry.
  - 1.2.9 MSS SP-69 - Pipe Hangers and Supports -- Selection and Application; Manufacturers Standardization Society of the Valve and Fittings Industry.
- 1.3 System Description: Support existing piping on roof with an engineered prefabricated pipe support system designed for installation without roof penetrations, flashing or damage to the roofing material. The system shall consist of bases, made of high-density polypropylene or polycarbonate plastics with UV Protection, a HDG structural steel frame and suitable pipe hangers for the application. Nuts, threaded rods and washers shall be HDG, spring nuts and bolts for spring nuts will be electro-plated. System shall be custom designed to fit piping and conduit to be installed and the actual conditions of service.
- 1.4 Submittals:
  - 1.4.1 Submit under provisions of Section 01 33 00.
  - 1.4.2 Product Data: Submit for all products proposed for use, describing physical characteristics and method of installation.
  - 1.4.3 Shop Drawings: Show installation layout, sizes of units, and details of installation.

- 1.5 Quality Assurance:
  - 1.5.1 Manufacturer Qualifications: Company specializing in manufacturing pipe support systems, with a minimum of five years of documented experience.
- 1.6 Delivery, Storage, and Handling:
  - 1.6.1 Deliver all materials to project site in manufacturer's original packaging, marked with manufacturer's name, product model names and catalog numbers, identification numbers, and other related information.
  - 1.6.2 Store materials under cover until needed for installation.

## **PART 2 – PRODUCTS**

- 2.1 Pipe Support Manufacturers:
  - 2.1.1 Acceptable Manufacturers:
    - 2.1.1.1 Miro Industries, 844 South 430 West Suite 100, Heber City, Utah,
    - 2.1.1.2 CADDY, a registered trademark of Erico International Corporation, 31700 Solon Road, Solon, Ohio,
    - 2.1.1.3 PHP Systems, 5534 Harvey Wilson Drive, Houston, Texas,
    - 2.1.1.4 or approved equal prior to bid.
- 2.2 Materials:
  - 2.2.1 Support Spacing: 8 feet unless otherwise specified by the manufacturer. Within 12 inches of each elbow, turn, and juncture.
  - 2.2.2 Copper: ASTM B88, cold rolled temper, 20 oz. Copper to meet Federal Specification QQ-C-576b. Copper to be commercially pure alloy 110. Surfaces shall be free of all water staining and weathering oxides.
  - 2.2.3 Solder: ASTM D32-66T with 50% lead and 50% tin unless otherwise specified. Follow manufacturer's recommended soldering procedures.
  - 2.2.4 3-RAH-12 with polycarbonate base and roller for piping up to 3" in diameter.
  - 2.2.5 6-RAH-12 with polycarbonate base and roller for piping up to 6" in diameter.
  - 2.2.6 Two (2), Model 2.5-Conduit Support-2 for electrical juncture boxes.
  - 2.2.7 Model 1.5 for condensation lines.
  - 2.2.8 Outdoor, Appliance Flexible Connectors: Comply with ANSI Z21.75.
    - 2.2.8.1 Corrugated stainless-steel tubing with polymer coating.
    - 2.2.8.2 Operating-Pressure Rating: As required for existing conditions.

2.2.8.3 End Fittings: Zinc-coated steel.

2.2.8.4 Threaded Ends: Comply with ASME B1.20.1.

2.2.8.5 Maximum Length: 24 inches

2.2.9 Refer to manufacturer recommendations for line and piping support.

### **PART 3 – EXECUTION**

3.1 Examination: Verify that roofing system is complete and that roof surfaces are smooth, flat, and ready to receive work of this section.

3.2 Preparation:

3.2.1 Clean surfaces of roof in areas to receive portable support bases.

3.2.2 Use care in handling portable support system components during installation, to avoid damage to roofing, flashing, equipment, or related materials.

3.2.3 Furnish and install new copper condensation lines with P-traps at all HVAC units. Size lines to fit snugly to drainage outlets. P-Trap stem length shall be 2 times the HVAC drainage outlet diameter, and returns shall be equal to half of the stem. Consult HVAC manufacturer for additional recommendations.

3.2.4 Extend line to nearest primary drainage facility.

3.2.5 Using a jelly flux, solder copper lines and fittings in accordance with solder manufacturer recommendations.

3.2.6 Threaded copper lines and fitting may be used in lieu of solder.

3.2.7 Raise gas lines refrigerant lines, and conduit lines as needed to ensure that lines are not in contact with the finished roof surface.

3.2.8 Wire brush existing gas lines to remove all scaling rust and existing paint. Prime existing gas lines using Sherwin Williams Kem Kromik metal primer, or approved equal, and allow to dry. Apply two coats of Sherwin Williams All Surface Enamel Latex Base, or approved equal, over-all gas lines using safety yellow paint.

3.2.9 Existing and/or new roofing shall be adequately protected during this phase of the work. Should rust stains or paint discolor new roofing the Contractor shall install additional membrane at affected areas at no additional cost to the Owner.

3.3 Installation:

3.3.1 Locate bases and support framing as specified herein.

3.3.2 The use of wood for supporting piping is not permitted.

3.3.3 Furnish and install manufacturers TPO walkway protection pads under support stands. Walkway pads shall be partially heat welded to the substrate. The pad shall be a minimum of 18" x 18" in size but shall be a minimum of 12 inches wider than the base.

- 3.3.4 Adhere support bases in the middle of walkway protection pads using continuous double-sided butyl tape on all four sides of the base. Leave a minimum 1-inch gap at each side for nominal water exit underneath base.
  - 3.3.5 Once all supports are in place, adjust the height of supports so that piping is uniformly loaded.
  - 3.3.6 Install pipe supports in accordance with manufacturer written instructions.
- 3.4 Cleaning and Protection:
- 3.4.1 Remove all packaging, unused fasteners, adhesive, and other installation materials from the project site.
  - 3.4.2 Remove adhesive from exposed surfaces of supports and bases and leave the work in clean condition.
  - 3.4.3 Provide protection as required to leave the work in undamaged condition at the time of substantial completion.

**END OF SECTION**

**SECTION 22 14 00  
ROOF DRAINS**

**PART 1 – GENERAL**

- 1.1 Work Included
  - 1.1.1 Extension of existing piping/drains as needed to accommodate new roof system height.
  - 1.1.2 Installation of new cast iron drain bowls, domes, clamping rings and fasteners at all existing drains.
- 1.2 Related Work
  - 1.2.1 Section 02 41 13 – Selective Demolition and Preparations
  - 1.2.2 Section 06 10 53 – Miscellaneous Rough Carpentry
  - 1.2.3 Section 07 22 16 – Roof Board Insulation
  - 1.2.4 Section 07 54 23 – Thermoplastic Polyolefin (TPO) Roofing
  - 1.2.5 Section 07 60 00 – Flashing and Sheet Metal
- 1.3 References
  - 1.3.1 ASME A112.6.4 – Standard Specification for Roof, Deck, and Balcony Drains.
  - 1.3.2 ASTM C564 – Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
  - 1.3.3 ASTM C1277 – Standard Specification for Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings.
  - 1.3.4 ASTM D1784 – Standard Specification for Rigid Poly (Vinyl Chloride)(PVC) Compounds and Chlorinated Poly(Vinyl Chloride)(CPVC) Compounds.
  - 1.3.5 ASTM D1785 – Standard Specification for Poly(Vinyl Chloride)(PVC) Plastic Pipe, Schedules 40, 80, and 120.
  - 1.3.6 ASTM D2466 – Standard Specification for Poly(Vinyl Chloride)(PVC) Plastic Pipe Fittings, Schedule 40.
  - 1.3.7 ASTM D2564 – Standard Specification for Solvent Cements for Poly (Vinyl Chloride)(PVC) Plastic Piping Systems.
  - 1.3.8 ASTM D2665 – Standard Specification for Poly(Vinyl Chloride)(PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
  - 1.3.9 ASTM D2855 – Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride)(PVC) Pipe and Fittings.
  - 1.3.10 ASTM F656 – Standard Specification for Primers for Use in Solvent Cement Joints of Poly(Vinyl Chloride)(PVC) Plastic Pipe and Fittings.
  - 1.3.11 Manufacturers Standardization Society SP-58-2009 – Pipe Hangers and Supports – Materials,

Design, Manufacture, Selection, Application, and Installation.

1.4 Environmental Conditions

1.4.1 Materials installation shall proceed only when weather conditions are in compliance with the applicable manufacturer's recommendations for installation and no precipitation is imminent. Materials installed during adverse weather conditions shall be subject to removal and replacement with new materials at no additional cost to Owner.

1.5 Quality Assurance

1.5.1 Manufacturer Qualifications: Work of this Section to be executed by manufacturers specializing in the fabrication of the materials specified. Manufacturer shall have a minimum of 10 years of continuous, concurrent experience providing specified materials including the current year.

1.5.2 Installer Qualifications: Work associated with the installation of new drains, drain leaders, and piping shall be performed by a plumbing contractor licensed to perform such work in the state of South Carolina and shall have a minimum of 5 years of experience in this type of work.

1.6 Environmental Conditions

1.6.1 Material installation shall proceed only when weather conditions are in compliance with the applicable manufacturer's recommendations for installation and no precipitation is imminent. Materials shall not be installed when ambient temperature is below 40 degrees or above 110 degrees Fahrenheit. Materials installed during adverse weather conditions shall be subject to removal and replacement with new materials at no additional cost to Owner.

**PART 2 – PRODUCTS**

2.1 Acceptable Manufacturers: Tech Specialties Company, Zurn, Josam and Smith.

2.2 Roof Drains:

2.2.1 Shall be a coated cast iron roof drain, having large cast iron locking dome, nonpuncturing clamp ring with integral gravel stop, large sump with wide roof flange, bottom outlet no-hub connection, deck clamp, sump receiver, and hardware packages included or equal. Provide adjustable extension sleeves to accommodate specified insulation thickness.

2.2.2 Roof Drain Receivers - Shall be a heavy gage galvanized steel pan manufactured by the cast iron drain manufacturer specifically designed to support the roof drain.

2.2.3 Roof Drain Extensions – Static or adjustable to allow the drain body to be applied at the height of the surrounding insulation as specified.

2.2.4 Under Deck Clamping Ring - Shall be as manufactured by the cast iron drain manufacturer specifically designed to secure the roof drain to the roof deck and Roof Drain Receiver.

2.3 Drainage Pipe and Fittings: Shall be solvent weld joint, schedule 40 PVC conforming to ASTM D-2665 including necessary fittings.

2.4 Insulation: Shall be 1-1/2" thick heavy density pre-formed fiberglass, single-seam pipe insulation with self-sealing lap, conforming to ASTM C-547, Class 2, similar or equal to Certainteed 500 degree, Snap-On-Pipe Insulation.

2.5 Stainless Steel: Cold rolled, annealed, pickled, type 316L, with 2B finish conforming to ASTM A-240.

- 2.6 Fasteners – See Section 06 10 53 – Miscellaneous Rough Carpentry.
- 2.7 Fire Wrap – Shall be an aluminum foil fiberglass reinforced blanket encapsulating insulation which is specifically designed to provide a single layer, flexible enclosure around combustible items located within a return air plenum. It shall be ½” thick (minimum), 8 pcf, scrim encapsulated. It shall meet ASTM E-136 for non-combustibility, ASTM E-84/UL 723 Surface Burning Characteristics. Flame spread rating of 0 (unfaced blanket) and less than 25 (encapsulated). Smoke Developed Rating of 0 (unfaced blanket) and less than 50 (encapsulated). Its core material shall be made from calcia, magnesia and silica chemistry. Design Basis is FyreWrap by Unifrax I LLC 716-278-3800, [www.unifrax.com](http://www.unifrax.com)
- 2.8 No-Hub Coupling:
- 2.8.1 4-band, No-Hub coupling meeting ASTM C1277. Coupling gaskets meeting ASTM C564. Model NH-66 as manufactured by Fernco Incorporated, or approved equal prior to bid. For use connecting at piping less than 5-inches in diameter.
- 2.8.2 6-band, No-Hub coupling meeting ASTM C1277. Coupling gaskets meeting ASTM C564. Model NH-66 as manufactured by Fernco Incorporated, or approved equal prior to bid. For use connecting at piping greater than or equal to 5-inches in diameter.

### **PART 3 – EXECUTION**

#### **3.1 General Installation Requirements**

- 3.1.1 Inspect all surfaces to which drainage system is to be applied. Do not install unless surfaces are even, sound, clean, dry, and free from defects which might affect the application.
- 3.1.2 Examine project prior to installation and report in writing to Owner and Engineer any defects or other site conditions that would cause problematic installation products or possible deficiency.
- 3.1.3 Follow published instructions of the product manufacturer for installation of extruded or proprietary metal products, unless otherwise specified herein.
- 3.1.4 Use nails, screws, bolts, cleats, or other fasteners as recommended by the approved drainage system manufacturer.
- 3.1.5 Changes to pipe in size or direction shall be made with pre-manufactured fittings.

#### **3.2 Drain Installation**

- 3.2.1 Remove existing drain components, bowls, and strainers. Modify piping as necessary.
- 3.2.2 Shorten or lengthen existing drain leaders as necessary to allow installation in accordance with detail drawings.
- 3.2.3 Furnish and install specified roof drains with flat drain receivers, clamping rings, dome strainers, and under-deck clamps at locations indicated on drawings.
- 3.2.4 Install flat drain receivers to the top flat portion of the deck. Fasten the receivers with Tek 5 screws through the top flat portion of the deck, approximately 1-inch from the edge of the pan. Fasteners shall penetrate through the decking a minimum of ¾ inches.
- 3.2.5 Set the height of the drain bowl so that the top of the bowl is flush with the top of the surrounding sump insulation using static and adjustable extensions, as required. Install extensions in

accordance with manufacturer recommendations.

- 3.2.6 Connect the drain bowl to the existing drain leaders using 4-band no-hub clamps. Apply new minimum R-10 insulating wrap on the underside of the drain bowl and onto the drain leader for 60-feet. Refer to Drawings.
  - 3.2.7 Install new drains in accordance with membrane manufacturer's recommendations and detail drawings in this specification.
- 3.3 Operations/Cleaning
- 3.3.1 Ensure that all lines, drains, and other drainage system components are clean and clear of debris at the time of final acceptance by the Owner.
  - 3.3.2 The Contractor shall water test all new drains prior to the final acceptance by the Owner.
  - 3.3.3 The cost for any repairs or adjustments required to any new drainage system component as a result of a failed water test due to leaking, including the drain, connections, piping, hangers, anchors, pipe connections, pipe expansion joints, or any other new component of the drainage system, shall be borne by the Contractor at no additional cost to the Owner.

**END OF SECTION**

**END OF SPECIFICATION**