



211 HIGHLAND CROSS DRIVE • SUITE 220 • HOUSTON, TEXAS 77073
PHONE: (281) 209-1724 • FAX: (281) 209-2724 • TOLL FREE (800) 966-6088

PROJECT MANUAL ROOF REPLACEMENT & EXTERIOR WALL REPAIRS/RESTORATION

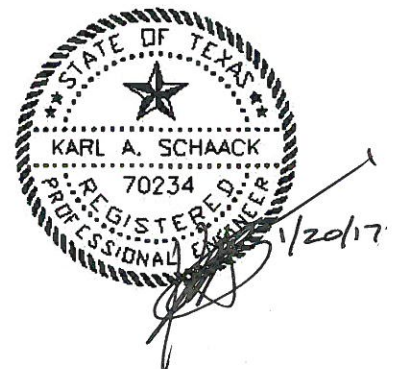
**FOR
UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER
JESSE JONES LIBRARY
1133 JOHN FREEMAN BOULEVARD
HOUSTON, TEXAS**



**PREPARED BY
PRICE CONSULTING, INC.
211 HIGHLAND CROSS DRIVE, #220
HOUSTON, TEXAS 77073**

TEXAS REGISTERED ENGINEERING FIRM NO. F-3814

**PCI PROJECT NO. 11212.15
JANUARY 20, 2017**



DOCUMENT 00 00 02

PROJECT DIRECTORY

PROJECT: Jesse Jones Library
Roof Replacement and Wall Restoration
1133 John Freeman Boulevard
Houston, Texas

OWNER: University of Texas System
Office of Facilities Planning and Construction
7000 Fannin Street
JCT M125
Houston, Texas 77030
Contact: Ms. Monica Haley, Project Manager
Phone: 713-817-0818 Cell
Email: Monica.N.Haley@uth.tmc.edu

CONSULTANT/ENGINEER: Price Consulting, Inc.
211 Highland Cross Drive
Suite 220
Houston, Texas 77073
Contact: Mr. Karl A. Schaack, P.E., RRC
Office: (281) 209-1724
Cell: (281) 827-9250
Email: kschaack@priceconsulting.com

END OF PROJECT DIRECTORY

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SUPPLEMENTAL INFORMATION TO BIDDERS

PART ONE - GENERAL

1.01 GENERAL:

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

1.02 ROOF CONSTRUCTION SUMMARY:

- A. The roof construction observed at core locations consists of the following (see attached photographs):
1. Areas "A" & "B": Spray-applied polyurethane foam (SPUF) (2-inches to 3-inches+ thick) with elastomeric coating applied over a multi-layer felt and asphalt built-up roof with gravel embedded in asphalt on top of a concrete roof deck.
 2. Areas "C" & "D": Spray-applied polyurethane foam (SPUF) (1-1/2-inch to 3-inches+ thick) with elastomeric coating applied over a multi-layer felt and asphalt built-up roof with gravel embedded in asphalt on top of tapered lightweight insulating concrete fill on a concrete roof deck.
 3. Areas "E" & "F": Standing seam metal panels over fiberglass blanket insulation and open steel framing.
 4. Areas "G", "H", & "I": Spray-applied polyurethane foam (SPUF) (1-1/2-inch thick) with elastomeric coating applied over a concrete deck.

1.03 LABORATORY ANALYSIS:

- A. Laboratory Analysis: Representative samples of the roof membrane and base flashings located at curbs and parapet walls were collected and tested for asbestos content. Asbestos was detected in the flashing sample collected and tested from Area "D". A copy of the laboratory analysis report is attached.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF DOCUMENT 00 31 19

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1. ROOF CORE ON AREA "A"



2. ROOF CORE ON AREA "B"



3. ROOF CORE ON AREA "D"



4. ROOF CORE ON AREA "H"



LOFLIN ENVIRONMENTAL SERVICES, INC.

November 13, 2015

University of Texas Health Science Center
1851 Crosspoint OCB 1.330
Houston, Texas 77054

Attention: Ms. Jennifer Laine

Subject: Results of Asbestos Testing
Jesse Jones Library Roof
Loflin Environmental Services Project No. 549-15-33

Dear Ms. Laine,

Loflin Environmental Services, Inc. (**LOFLIN**) has completed asbestos testing of roofing materials at the above referenced location. The purpose of this work was to identify the presence and of asbestos components within the roofing systems of the building. This work was performed on November 13, 2015, by James Murray, DSHS Inspector #602374.

LOFLIN met with roof inspectors assessing the general building envelope. They described the library roof as having two vintages, north and south sides. The roofing appearance was consistent throughout with a layer of foam insulation having been applied since the roofs were installed.

One sample of the roofing field (flat area) and one sample of flashing were taken from each roof for a total of five samples. All were analyzed using Polarized Light Microscopy (PLM) coupled with dispersion staining in accordance with EPA's "Method For The Determination Of Asbestos In Bulk Samples" EPA 600/R-93/116, July 1993.

Based on laboratory analysis, one of the sampled materials were found to be asbestos containing. Flashing felt on the north portion of the building was found to contain asbestos. Flashing felt can assumed to be present around the perimeter, penthouses and all penetrations. Roof fields and flashing on the south (original) portion of the building were not found to contain asbestos.

Attached is a table of laboratory results.

*Loflin Environmental Services, Inc. appreciates this opportunity to provide these testing services.
If you have any questions concerning this report or the work performed please contact us.*

Sincerely,

LOFLIN Environmental Services, Inc.

A handwritten signature in black ink, appearing to read "James A. Murray". The signature is fluid and cursive, with the first name "James" and last name "Murray" clearly distinguishable.

*James A. Murray, CIH, CSP
Vice President*



NVLAP 10-2044
TDH Lab 30-0031

Loflin Environmental Services, Inc. 2020 Montrose Blvd., Houston, Texas 77006
(713) 521-3300 Fax (713)523-0829

Report of Bulk Sample Analysis For Asbestos Identification

Polarized Light Microscopy (PLM)
EPA 600/R-93/116, July 1994

Client: UNIVERSITY OF TEXAS HSC
Client Address: 1851 CROSSPOINT, HOUSTON, TX 77034
Project No: 549-15-33
Project Name: JESSE JONES LIBRARY

Date Received: 11/13/2015
Date Analyzed: 11/13/2015
Page 1 of 1

Lab Number	Field Number	Sample Description (Components)	Sample Location	Asbestos Detected	Additional Constituents
L244525	JJ-01	BLACK, FIBROUS NONHOM (ROOF FIELD)	SOUTH ROOF	NONE DETECTED	40% CELLULOSE TAR
		BLACK, TARRY (LAYER 2)		NONE DETECTED	TAR, AGGREGATE
L244526	JJ-02	BLACK, FIBROUS NONHOM (ROOF FLASHING)	SOUTH ROOF	NONE DETECTED	40% CELLULOSE TAR
		BLACK, TARRY (LAYER 2)		NONE DETECTED	TAR, AGGREGATE
L244527	JJ-03	BLACK, FIBROUS NONHOM (ROOF FIELD)	NORTH ROOF	NONE DETECTED	40% CELLULOSE TAR
		WHITE, CRUMBLY (LAYER 2)		NONE DETECTED	CALCITE, OTHER
L244528*	JJ-04	BLACK, FIBROUS NONHOM (ROOF FLASHING)	NORTH ROOF	13-15% CHRYSOTILE	20% CELLULOSE TAR
		BLACK, TARRY (LAYER 2)		NONE DETECTED	TAR, AGGREGATE

Laboratory Manager

*Asbestos-containing materials - The type and percentage of various fibrous components was determined by the microscopist in accordance with U.S. Environmental Protection Agency "Method For The Determination Of Asbestos In Bulk Samples" EPA/600/R-93/116, July 1993.

Departures from the test method: **None**

The above test report must not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government. Analysis results on this test report pertain only to those materials tested.

Disclaimers: Asbestos content is quantified using Calibrated Visual Estimate. PLM analysis has been known to be inaccurate for materials with low concentrations of asbestos. Negative PLM results cannot be guaranteed. LES recommends using TEM analysis for materials reported as <1% or none detected. This report may not be reproduced, except in full, without written approval by LES

SECTION 01 01 00

SUMMARY OF WORK

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Roof replacement and roof related renovations and repairs/restoration of the exterior walls of the existing facility known as Jesse Jones Library located at 1133 John Freeman Boulevard in Houston, Texas. Work includes, but is not limited to, the following:
1. Roof Replacement:
 - a. Remove and properly dispose of existing roofing, insulation, and sheet metal down to the existing concrete deck on designated roof areas.
 - b. Apply modified bitumen secondary roof on top of concrete deck.
 - c. Remove abandoned equipment, curbs, and/or penetrations and repair openings in deck.
 - d. Install plywood sheathing to inside surface of parapet and rise walls.
 - d. Install flat-stock polyisocyanurate insulation board set in low-rise foam adhesive on substrate.
 - e. Install tapered polyisocyanurate insulation board set in low-rise foam adhesive.
 - f. Install gypsum roof cover board in low-rise foam adhesive.
 - g. Install two-ply modified bitumen roof membrane.
 - h. Install new modified bitumen flashings and sheet metal flashing at parapet walls, rise walls, equipment curbs, and penetrations.
 - i. Install new sheet metal flashings along roof perimeters, rise walls, curbs, and penetrations.
 - j. Install new sheet metal coping on parapet walls.
 - k. Install new walk pads at roof access areas, around equipment, and at high-trafficked areas and as required by Owner.
 - l. Disconnect roof-top lightning protection system to install new roofing system and re-install upon completion of new roof system installation.
 - m. Install insulation, cover board, and single-ply membrane overlay on standing seam metal roofs on elevator penthouses.
 - n. Install gutters and downspouts at low eave of penthouse roofs.
 - o. Install plywood sheathing, air barrier, rigid insulation, Zee furring, and metal wall panels on elevator penthouse walls.
 - p. Replace metal stairs between Roof Areas "A" and "C".
 - q. Remove roof hatches as indicated.
 - r. Power wash and apply traffic coating to roof access landing and stairs.
 - s. Replace gutters and downspouts at low roofs.
 - t. Provide specified contractor and manufacturer warranties.
 - u. Replace and enlarge through-wall scuppers.

2. Exterior Wall Repairs:
 - a. Replace sealant between window/louver frames and wall.
 - b. Apply sealant between glass/spandrel stone and window frame (wet seal).
 - c. Repair damaged/spalled/disbonded plaster.
 - d. Replace sealant between precast concrete panel butt joints.
 - e. Replace control joint/expansion joint seals between buildings including around perimeter of exterior steps.
 - f. Repair damaged concrete.
 - g. Prepare and paint exposed steel.
 - h. Prepare and paint HM steel doors and frames.
 - i. Replace roof access HM steel door and frame.
 - j. Prepare and apply elastomeric coating to walls of roof access stair well.
 - k. Apply sealant at wall penetrations through exterior walls.
 - l. Excavate soil around South and West elevations to level minimum 2-inches below bottom of stone veneer; Install composite weeps in vertical joints of stone at approximately 30-inches on center.
 - m. Perform miscellaneous tuckpointing of mortar joints between stone panels.
 - n. Seal around through-wall scuppers.
 - o. Replace sheet metal closure panels around wall penetrations.
 - p. Replace clear glazing in rest-rooms at level 1 on South elevation with obscure glass to match existing adjacent obscure glass.
 - q. Install expansion joint seal around West elevation stairs and landing.
 - r. Clean all glazing and window frames upon completion of work.
3. Alternates:
 - a. Power wash exterior plaster.
 - b. Apply elastomeric coating to plaster.
 - c. Prepare and paint existing mill finish aluminum window frames.
 - d. Apply water repellent sealer to stone panels.
 - e. Remove existing lightweight insulating concrete from roof deck on Areas "C" and "D" and install new roofing system over secondary roof membrane applied on roof deck.

1.02 WEATHER PROTECTION:

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

1.03 CONTRACTOR'S USE OF PREMISES:

- A. Confine operations at site to areas permitted by law, ordinances, permits, and to limits of Contract as shown on Contract Documents.
- B. Do not unreasonably encumber site with materials or equipment.
- C. Provide protection around area of work.
- D. Provide overhead protection as necessary.

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- E. Do not load structure with weight that will endanger structure.
- F. Assume full responsibility for protection and safekeeping of products stored on premises.
- G. Move stored products which interfere with operations of Owner.
- H. Obtain and pay for use of additional storage or work areas needed for operations.
- I. Coordinate use of premises under direction of Owner's Representative.
- J. Use of Site for Work and Storage:
 - 1. Restrict Work to areas indicated on Drawings.
 - 2. Store materials off site except for minor amounts of material which may be stored at designated staging area as approved by Owner.
 - 3. Access site in areas approved by Owner.
 - 4. Restrict parking to specific areas as approved by Owner.
 - 5. Restrict debris removal to Owner-approved area of building site.
 - 6. Restrict location of construction cranes to areas as approved by Owner.
 - 7. Do not allow construction traffic on existing roof membrane except as absolutely necessary to perform new work. Provide protection such as plywood/sheathing and plastic sheeting over existing roof membrane at traffic and work areas.
- K. Maintenance of Access and Operations:
 - 1. Do not perform operations that would interrupt or delay Owner's daily operations.
 - 2. Maintain access to existing building, facilities, parking, streets, and walkways; especially fire lanes.
 - 3. Schedule demolition and renovation operations with Owner in such a manner as to allow Owner operations to continue with minimum interruption.
 - 4. During period of construction, do not obstruct exit ways of Owner-occupied areas in any manner.
- L. Maintenance of Existing Services:
 - 1. Do not disrupt existing utility services to existing building.
 - 2. Maintain environmental control in existing building, especially temperature, humidity, and dust control.
 - 3. Provide temporary lines and connections as required to maintain existing mechanical and electrical services in building.
 - 4. Gas piping at rooftop units may be temporarily disconnected (maximum four hours) to raise piping and replace flashing. Maintain cooling operation of unit during this period.
 - 5. Notify Owner a minimum of two days prior to each required interruption of mechanical or electrical services in building. These interruptions shall be only at such times and for lengths of time as approved by Owner. In no event shall interruption occur without prior approval of Owner.
- M. Building Access:
 - 1. Access to roof construction areas shall be by way of exterior scaffolding and/or lifts on the face of the building as designated by Owner.
 - 2. Contractor will not have access to building interior except as pre-arranged with Owner.

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1.04 OWNER OCCUPANCY:

- A. Owner will occupy premises during entire period of construction for the conduct of normal, daily operations. Cooperate with Owner's Representative in all construction operations to minimize conflict and to facilitate Owner usage.
- B. Contractor shall conduct his operations so as to ensure least inconvenience to Owner's operations.
- C. Contractor shall take precautions to avoid excessive noise or vibration that would disturb Owner's operations. When directed by Owner, Contractor shall perform certain operations at designated time of day or night in order to minimize disturbance to Owner's operations.
- D. Contractor shall take all necessary precautions to assure a watertight condition in the operation portion of the building during construction.
- E. Refer to Section 01 12 00 for provisions on security, special sequence of Work, maintenance of access and operations, maintenance of existing utilities and services, and building access restrictions.
- F. Contractor shall work weekends or after hours in areas that may disrupt building occupants and/or visitors, such as work at building entries.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 01 00

SECTION 01 02 60

UNIT PRICES

PART ONE - GENERAL

1.01 SECTION INCLUDES:

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

1.02 MEASUREMENT AND PAYMENT:

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

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

3.01 UNIT PRICE ITEMS:

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

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- 2. Roof Deck: Remove, replace, and/or repair damaged/deteriorated decking, matching existing type, weight, gauge, and dimension:
 - a. Concrete deck repair: \$_____ per square foot
- 3. Replace existing roof drain: \$_____ each
- 4. Repair plaster: \$_____ per square foot
- 5. Tuckpointing: \$_____ per linear foot
- 6. Replace dynamic joint sealants: \$_____ per linear foot
- 7. Repair concrete: \$_____ per cubic foot
- 8. Replace stone cladding: \$_____ per panel
- 9. Replace HM door and frame: \$_____ each

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

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

END OF SECTION 01 02 60

SECTION 01 03 00

ALTERNATES

PART ONE - GENERAL

1.01 DESCRIPTION:

- A. Identification of Alternate by number and description of basic changes to be incorporated into the Work only when that Alternate is made part of Work by specific provisions in the Owner-Contract Agreement.
- B. Alternates, as described below, add work to or deduct work from the Base Bid.
- C. These Specifications or Drawing Details stipulate pertinent requirements for products and methods to achieve the Work stipulated under each Alternate.
- D. Coordination of pertinent related Work and modification surrounding Work as required to properly integrate Work under each Alternate and to provide the complete construction required by Contract Documents.

1.02 DESCRIPTION OF ALTERNATES:

- A. Alternate No. 1: Power-wash plaster finish on exterior walls.
- B. Alternate No. 2: Apply elastomeric coating to plaster finish on exterior walls.
- C. Alternate No. 3: Prepare and paint existing mill-finish aluminum-framed windows.
- D. Alternate No. 4: Apply water repellent sealer to stone panels.
- E. Alternate No. 5: Remove existing lightweight insulating concrete from roof deck and install new roofing system.
- F. Alternate No. 6: Install pre-engineered guard rail cable system along roof edge at East and West ends of Roof Area "C"; East, North, and West sides of Roof Area "D"; and South, West, and West end of North sides of Area "B".

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 03 00

SECTION 01 07 50

DEFINITIONS

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Definitions for construction terminology not otherwise defined in Contract Documents.
- B. Definitions for special terminology used for this Project.

1.02 ABANDONED - (NO LONGER NECESSARY OR IN USE):

- A. "Remove" items so noted, or later defined, as an all inclusive responsibility within this contract. Pay for all work in connection with removal of these items, including municipal, disposal, utility, and service charges. Dispose of all "Excess".

1.03 ADDITION - (TO ADD TO AND BE INCORPORATED) ALSO TO "ADD":

- A. Work supplementary to that indicated to accomplish that which is required by the Contract Documents. To bring to a new condition; to extend, fasten, patch, and match to that which is existing.

1.04 DEFECTIVE - (NOT ACCEPTABLE):

- A. Refer to Conditions of the Contract, that which does not conform to the Contract Documents. As it applies to "Salvage", in addition to the above, shall mean "unsuitable".

1.05 EXCESS - (NOT REQUIRED):

- A. More quantity than required to conform to the Contract Documents and not desired by the Owner. Debris shall be considered "Excess" and not be used as fill or be buried on this site. Remove "Excess" from the site and legally dispose of. "Excess" "Suitable" "Salvage" shall be property of Contractor unless otherwise specified.

1.06 EXISTING - (PRESENTLY THERE):

- A. Also may be noted "original". Present conditions and assumed locations, if known, as of the Date of Contract Documents.

1.07 NEW - (TO BE INCORPORATED) NOT EXISTING:

- A. Refer to various specification sections for requirements of Work to be incorporated.

1.08 REINSTALL - (TO INCORPORATE AS WAS ONCE DONE):

- A. "Remove" and "salvage" existing from its location, if it does exist. "Restore", "Renovate", or "Remodel" and "Reinstall: in its existing location. Reincorporate and "re-work" the original work to the extent required by the Contract Documents.
- B. If the "Existing" item, so indicated, is missing, defective, or unsuitable as "Existing", then "Reconstruct" only that portion with "New" products and incorporate as was original. Syn. Replace.

1.09 RELOCATE - ("REINSTALL" IN A NEW LOCATION):

A. "Reinstall" in a new location as indicated on Drawings.

1.10 REMAIN - (TO LEAVE WHERE IT IS EXISTING):

A. The final location of an item in its "existing" position, however, this shall not mandate the fact that this item will not move during this contract, specifically in order to "Preserve" or "Rework".

1.11 REMOVE - (TO TAKE FROM EXISTING LOCATION):

A. Work required to extract a portion or whole by one or a combination of methods and moved to a new location.

1. "Abandoned": Remove items by dismantling, excavation, extraction, or demolition, if acceptable.

2. Salvage: Remove by disassembly. "Relocate".

3. Products: Where a specific portion of component of an assembly or whole is to be removed, take all precautions to prevent damage, defacement, and displacement to the "existing" to remain (i.e., mortar, bricks, and finishes).

1.12 RENOVATE - (TO REPAIR AND MAKE NEW):

A. The process required to bring an item to a present new standard of condition required by the Contract Documents (e.g., to "rework" "existing" "suitable" "salvage" "products" and perform "new" work and "additions" required). (Syn. rehabilitate, recondition, repair.)

1.13 REPLACE - (TO TAKE THE PLACE OF):

A. "Remove" "existing" unserviceable product and provide "new" product in place of unserviceable product.

1.14 REUSE - (TO USE AS ONCE WAS):

A. The use of "suitable" "salvage" for incorporation or re-incorporation in the Work. "Remove", "Relocate", and "Reinstall" as required for "Reuse".

1.15 SALVAGE - (TO BECOME ABANDONED):

A. "Remove", protect, "preserve" incomplete material condition as found "existing". Also to "Save". Determine suitability for incorporation in this Contract. Store at a location mutually agreed upon. Dispose of all "Excess".

1.16 UNKNOWN - (NOT SHOWN ON DRAWINGS):

A. Products beneath surfaces indicated by drawings and encountered during the Work. Immediately support, shore, and protect. Immediately notify the Consultant and authority having jurisdiction. Allow free access for inspection. "Preserve" in proper condition until the Consultant determines definition and interpretation of Work. Take such measures as required for protection, reinforcement, or adjustment.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 07 50

SECTION 01 12 00

ALTERATIONS PROJECT PROCEDURES

PART ONE - GENERAL

1.01 DESCRIPTION:

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

1.02 SCHEDULING AND ACCESS:

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

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

1.03 ALTERATIONS, CUTTING AND PROTECTION:

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

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

1.04 PATCHING, EXTENDING, AND MATCHING:

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

E. Transitions:

1. Where new work abuts or finishes flush with existing work, make the transition as smooth and workmanlike as possible. Patched work shall match existing adjacent work in texture and appearance so as to make the patch or transition invisible to the eye at a distance of no closer than 3 feet (1m).
2. Where masonry or other finished surface is cut in such a way that a smooth transition with new work is not possible, terminate the existing surface in a neat fashion along a straight line at a natural line of division and provide trim appropriate to the finished surface.

F. Restore existing work that is damaged during construction to a condition equal to its condition at the time of the start of the Work, and to satisfaction of Owner.

1.05 REPAIR:

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

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 12 00

SECTION 01 20 00

PROJECT MEETINGS

PART ONE - GENERAL

1.01 PROJECT MEETINGS:

- A. Project meetings will be held at the site at a time to be designated by Owner.
- B. Representatives of Contractor shall meet with Owner or his appointed representative.

1.02 PRE-CONSTRUCTION MEETING

- A. Attendance:
 - 1. Owner.
 - 2. Consultant/Engineer.
 - 3. Contractor.
- B. Sign-in list for all attending including names, title, phone number, and company.
- C. Contract Review:
 - 1. Schedule of values and progress payment processing.
 - 2. Notice to proceed and start date.
 - 3. Project communications and problem resolution.
- D. Job Site Conditions and Requirements:
 - 1. Services (temporary):
 - a. Water.
 - b. Power (110, 220).
 - c. Sanitary facilities.
 - d. Parking areas.
 - 2. Site Access and Restrictions:
 - a. Set-up areas, material storage, and handling.
 - b. Protection of buildings, grounds, and building interior.
 - 3. Working Area and Preparation:
 - a. Review work flow and schedule.
- E. Technical Sections:
 - 1. Function of on-site inspector and other on site personnel.
 - 2. Material storage methods.
 - 3. System review.
 - 4. Manufacturer inspections:
- F. Safety and Security - Review Contractor responsibilities, and establish Owner monitoring procedures.
- G. Summary and Questions
- H. Issue record of meeting minutes to all attendees.

1.03 PROJECT MEETING

- A. Attendance:
 - 1. Owner.
 - 2. Consultant/Engineer.
 - 3. Contractor.
 - 4. Subcontractors.
- B. Sign-in list for all attending, including names, titles, phone numbers, and company name.
- C. Project Review:
 - 1. Problem resolution.
 - 2. Project communication.
 - 3. Review projected work flow and schedule against work completed to date.
 - 4. Progress payment processing.
- D. Job Site Conditions:
 - 1. Review set-up area, material storage, and handling.
 - 2. Review work to date against schedule.
 - 3. Review quality of work to-date.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 20 00

SECTION 01 30 00

SUBMITTALS

PART ONE - GENERAL

1.01 SECTION INCLUDES:

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

1.02 REQUIRED SUBMITTALS:

- A. Applicator's License Certificate: Copy of the roofing material manufacturer's agreement/contract indicating date application was approved and expiration date.
- B. Copy of the Contractor's executed insurance certificate.
- C. Material manufacturer's written approval/acceptance of specified roof system including roof system components, general installation requirements, performance criteria of proposed systems, and warranty to be issued for project.
- D. Copies of independent test reports indicating criteria of proposed roof system(s) meeting specified roof system performance.
- E. Shop drawings of details, if proposed different from project drawings.
- F. Manufacturer's product data sheets and Safety Data Sheets (SDS) on each material proposed for usage.
- G. Sample of warranties that are to be issued upon project completion.
- H. Detailed project schedule with annotated plans and elevations showing work phasing and proposed daily progress schedule.
- I. Written Safety Program.

1.03 SHOP DRAWINGS:

- A. Original drawings, prepared by Contractor, subcontractor, supplier, or distributor, which illustrate some portion of the Work, showing fabrication, layout, setting, or erection details, prepared by a qualified detailer.
- B. Prepare shop drawings for those details that are proposed different than the project drawings. Indicate on a roof plan, the proposed location of detail presented on shop drawing.
- C. Indicate joints, types, and locations of fasteners, shapes, sizes, expansion joints, special conditions, and installation procedures for each flashing condition. Note critical dimensions, gauge, and finish of sheet metal for each flashing condition.
- D. Submit shop drawings showing layout, joining, profiles, and anchorages of fabricated work, including counter flashings, metal edge flashings, and expansion joint systems.

1.04 PRODUCT DATA:

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

1.05 SAMPLES:

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

1.06 CONTRACTOR RESPONSIBILITIES:

- A. Review shop drawings, product data, and samples prior to submission. Initial, sign, or stamp, certifying the Contractor's review of the submittal.
- B. Verify:
 - 1. Field measurements.
 - 2. Field construction criteria.
 - 3. Catalog numbers and similar data.
- C. Coordinate each submittal with requirements of Work and of Contract Documents.
- D. Contractor's responsibility for errors and omissions in submittals is not relieved by Consultant review of submittals.
- E. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by the Consultant's review of submittals, unless Consultant gives written acceptance of specific deviations.
- F. Begin no work which requires submittals until return of submittals with Consultant's stamp and initials or signature indicating review and indication to proceed as noted. Work performed prior to submission and approval of submittals may be subject for rejection.

1.07 SUBMISSION REQUIREMENTS:

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

1.08 RE-SUBMISSION REQUIREMENTS:

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

1.09 DISTRIBUTION OF SUBMITTALS AFTER REVIEW:

- A. Engineer will retain approved submittals.
- B. Engineer will forward approved submittals to Owner.
- C. Engineer will return submittals to Contractor.

1.10 LIST OF SUBMITTALS:

SECTION 01 30 00 - SUBMITTALS

- Submittals - 1 electronic copy.

SECTION 02 07 20 - MINOR DEMOLITION AND RENOVATION WORK

- Product Data.

SECTION 04 42 00 - STONE RESTORATION AND CLEANING

- Product Data.
- Mock-up.
- Safety Data Sheets.
- Samples.

SECTION 07 18 13 - PEDESTRIAN TRAFFIC COATING

- Product Data.
- Safety Data Sheets.
- Samples, if requested.

SECTION 07 22 00 - ROOF AND DECK INSULATION

- Product Data.
- Safety Data Sheets.
- Samples, if requested.

SECTION 07 27 13 - SELF-ADHERING SHEET AIR BARRIER

- Product Data.
- Safety Data Sheets.
- Shop Drawings, where applicable.
- Samples, if requested.

SECTION 07 41 13 - METAL WALL PANELS

- Product Data.
- Shop Drawings, where applicable.
- Samples, if requested.

SECTION 07 52 10 - SECONDARY ROOF

- Product Data.
- Safety Data Sheets.
- Samples, if requested.

SECTION 07 52 50 - MODIFIED BITUMEN MEMBRANE ROOFING

- Product Data.
- Roof system test reports.
- Safety Data Sheets.
- Shop Drawings, where applicable.
- Samples, if requested.

SECTION 07 54 00 - THERMOPLASTIC SINGLE-PLY MEMBRANE ROOF SYSTEM

- Product Data.
- Roof system test reports.
- Safety Data Sheets.
- Shop Drawings, where applicable.
- Samples, if requested.

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

- Product Data.
- Fabrication certifications.
- Safety Data Sheets.
- Shop Drawings, where applicable.
- Color Chart.

SECTION 07 92 13 - JOINT SEALANTS

- Product Data.
- Safety Data Sheets.
- Color Chart.

SECTION 08 81 00 - GLASS AND GLAZING

- Product Data.
- Glass Sample.

SECTION 09 91 00 - PAINTING

- Product Data.
- Safety Data Sheets.
- Color Chart.

SECTION 09 96 53 - ELASTOMERIC COATING

- Product Data.
- Safety Data Sheets.
- Color Chart.

SECTION 09 24 33 - PORTLAND CEMENT PLASTER

- Product Data.
- Applicators certifications.
- Safety Data Sheets.
- Color Chart.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 30 00

SECTION 01 40 00

QUALITY CONTROL

PART ONE - GENERAL

1.01 SECTION INCLUDES:

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

1.02 QUALITY CONTROL, GENERAL:

- A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce work of specified quality.
- B. Contractor shall be approved by manufacturer to perform the work for the specified guarantee period. Contractor shall have completed previous projects utilizing same materials and provide same warranty as specified herein.
- C. Examine each phase of Work and have defective conditions corrected before starting subsequent operations which would cover, or are dependent upon, work in question.
- D. Where visual examination is not sufficient, such as in verifying slope of roof deck for proper drainage, use instruments with qualified operators to examine work.
- E. Perform roof removal and new roof material installation using full-time employees of the Contractor.

1.03 WORKMANSHIP:

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

1.04 MANUFACTURER'S FIELD SERVICES:

- A. When specified in respective Specification Section, require manufacturer to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, and to make appropriate recommendations.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 40 00

SECTION 01 43 00

MOCK-UPS

PART ONE - GENERAL

1.01 DESCRIPTION:

- A. Preparation of mock-ups representing proposed finished metal wall panels, sheet metal fabrications, sealants, elastomeric/pedestrian coatings, paint finishes, plaster repair, and stone sealer for review and approval.

1.02 QUALITY ASSURANCE:

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

1.03 SCHEDULE OF MOCK-UPS:

- A. Typical metal edge/fascia; size 3-feet minimum; 2 color options.
- B. Typical metal gutter/downspout; size 3-feet minimum; 2 color options.
- C. Typical sheet metal coping; size 3-feet minimum; 2 color options.
- D. Typical sheet metal column cap; 2 color options.
- E. Typical sealant joint conditions; size 3-feet minimum; 2 color options..
- F. Typical pedestrian coating; size 1-square foot minimum; 2 color options.
- G. Typical elastomeric coating; size 1-square foot minimum; 2 color options.
- H. Typical plaster repair; size 1-square foot minimum.
- I. Typical clear sealer; size 4-square feet minimum
- J. Typical mortar joint tuckpointing.
- K. Typical metal wall panel assembly; 3-feet X 3-feet.
- L. Typical paint finishes; size 1-square foot minimum; 2 color options.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 43 00

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART ONE - GENERAL

1.01 SANITARY FACILITIES:

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

1.02 STORAGE OF MATERIALS:

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

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

1.03 TEMPORARY WATER:

- A. Make arrangements with Owner for water required for construction. Owner will pay for costs of water.
- B. Provide hoses for conveyance.

1.04 TEMPORARY ELECTRICAL ENERGY:

- A. Make arrangements with Owner for temporary electrical service for completion of the Work. Owner will pay energy charges for temporary power and lighting.
- B. Provide all necessary temporary wiring (in conduit if requested by Owner), extensions, and temporary lighting devices.

1.05 TEMPORARY LADDERS, SCAFFOLDS, HOISTS:

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

1.06 GUARDRAILS, BARRICADES, AND TEMPORARY COVERINGS:

- A. Provide barricades as required to protect natural resources, site improvements, existing property, adjacent property, and passers-by.
- B. Where pedestrian traffic is through or adjacent to work areas, provide necessary guardrails and barricades to protect pedestrians and to prevent pedestrian access to Work areas.
- C. Remove guardrails and barricades at completion of construction.
- D. Provide suitable temporary watertight coverings over windows and roof openings as required to protect interior equipment from inclement weather.
- E. Provide suitable protection for stairs, elevator, and/or walls and floors in areas used for contractor roof access.

1.07 PROTECTION:

- A. Maintain bench marks, monuments, and other reference points. If disturbed or destroyed, replace as directed.
- B. Protect existing adjacent streets, sidewalks, curbs, buildings, and property including trees, lawns, and plants.
- C. Refer to Section 01 12 00 - Alterations Project Procedures, for protection requirements of existing building.

1.08 TEMPORARY FIRE PROTECTION:

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

1.09 EMPLOYEE CONTROL:

- A. Do not allow construction employees to enter Owner-occupied areas. Maintain construction traffic in designated access routes.

1.10 PARKING FACILITIES:

- A. Parking area for a designated number of construction personnel vehicles will be made available at the site by Owner.

1.11 CLEANING DURING CONSTRUCTION:

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

- G. Keep streets and access to site free of rubbish and debris.
- H. Lower waste materials in a controlled manner with as few handlings as possible. Do not drop or throw materials from heights.

1.12 LEAK (WATER) DAMAGE CONTROL:

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

1.13 PERMITS:

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

1.14 REGULATORY REQUIREMENTS:

- A. International Building Code (IBC), latest edition; as amended by the governing body.
- B. Occupation Safety and Health Administration (OSHA) requirements, as applicable.
- C. United States Environmental Protection Agency (EPA) requirements, as applicable.
- D. Adhere to all limitations, cautions, and regulatory standards referenced by the manufacturer of each material provided.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 50 00

SECTION 01 60 00

MATERIAL AND EQUIPMENT

PART ONE - GENERAL

1.01 SECTION INCLUDES:

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

1.02 REUSE OF EXISTING MATERIAL:

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

1.03 MANUFACTURER'S INSTRUCTIONS:

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

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

1.04 TRANSPORTATION AND HANDLING:

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

1.05 SUBSTITUTIONS AND PRODUCT OPTIONS:

- A. Contractor's Options:
1. For products specified only by reference standard, select any product meeting that standard, by any manufacturer.
 2. For products specified by naming several products or manufacturers, select any product and manufacturer named.
 3. Products specified by naming only one product and manufacturer are to establish a quality standard. For products other than the named product, submit request for substitution as specified below.
- B. Substitutions:
1. During Bidding, Consultant will consider written requests from Bidders and manufacturers for substitutions of products in place of those specified. Such requests must be received at least two days prior to Bid Date. Requests received after that time will not be considered. Approval of proposed substitutions will be set forth in an Addendum or letter of approval. Requests for substitutions shall include data listed below.
 2. Submit two copies of request for each substitution, supported with complete data, drawings, and appropriate samples substantiating compliance of proposed substitution with Contract Documents, including:
 - a. Product description, performance and test data, and applicable reference standards.
 - b. Name and address of similar projects on which product was used and date of installation.
 - c. Itemized comparison of qualities of proposed substitution with that specified.
 - d. Changes required in other elements of Work because of substitution.
 - e. Affect on construction schedule.
 - f. Availability of maintenance service and source of replacement materials.

- C. Contractor's Representation: Request for substitution constitutes a representation that Contractor:
 - 1. Has investigated proposed product and determined that it is equal to or superior in all respects to that specified.
 - 2. Will provide same warranties for substitution as for product specified.
 - 3. Will coordinate installation of accepted substitution into Work and make such other changes as may be required for Work to be complete in all respects.
 - 4. Waives all claims for additional costs, under his responsibility, related to substitution which subsequently becomes apparent.
- D. Substitutions will be not be considered if:
 - 1. They are indicated or implied on Shop Drawings or Product Data submittals without formal request submitted in accordance with this Section.
 - 2. They are submitted after time limit specified above.
 - 3. Acceptance will require substantial revision of Contract Documents.
- E. If substitution is not approved or accepted, Contractor shall furnish specified product.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 60 00

SUBSTITUTION REQUEST FORM

TO:
Mr. _____
Owner

PROJECT NO.: **11212.16**
FROM(CONTRACTOR/BIDDER):

Attn:

CONTRACTOR (BIDDER) HEREBY REQUESTS ACCEPTANCE OF THE FOLLOWING PRODUCT OR SYSTEM AS A SUBSTITUTION IN ACCORDANCE WITH PROVISIONS OF DIVISION ONE OF THE SPECIFICATIONS:

1. SPECIFIED PRODUCT OR SYSTEM:

Substitution request for (Generic Description):
Specification Section No. _____ Article(s) _____ Para.(s) _____

2. SUPPORTING DATA:

Product data for proposed substitution is attached (description of product, reference standards, performance and test data).
 Sample is attached Sample will be sent if requested

3. QUALITY COMPARISON:

	<u>SPECIFIED PRODUCT</u>	<u>SUBSTITUTION</u>
Name, Brand:	_____	_____
Catalog No.:	_____	_____
Manufacturer:	_____	_____
Vendor:	_____	_____
Significant Variations:	_____	_____
	_____	_____

Maintenance Service Available: Yes No

Spare Parts Source:

4. PREVIOUS INSTALLATIONS:

Identification of similar projects on which proposed substitution was used:
Project: _____ Architect: _____
Address: _____ Owner: _____
Date Installed: _____

5. REASON FOR NOT GIVING PRIORITY TO SPECIFIED ITEMS:

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6. EFFECT OF SUBSTITUTION:

Proposed substitution affects other parts of Work: No Yes
(If yes, explain)

Substitution changes contract time: No Yes
Add/Deduct _____ days

Substitution requires dimensional revision or redesign of structure or M & E Work:
 No Yes (If yes, attach complete data.)

Saving or credit to Owner, if any, for accepting substitution: \$_____
Extra cost to Owner, if any, for accepting substitution: \$_____.

7. CONTRACTOR'S (BIDDER'S) STATEMENT OF CONFORMANCE OF PROPOSED SUBSTITUTION TO CONTRACT REQUIREMENTS:

I/we have investigated the proposed substitution. I/we:

- believe that it is equal or superior in all respects to specified product, except as stated above;
- will provide the same warranty as specified for specified product;
- will pay redesign and special inspection costs caused by the use of this product;
- will pay additional costs to other contractors caused by the substitution;
- will coordinate the incorporation of the proposed substitution in the Work;
- will modify other parts of the Work, as may be needed, to make all parts of the Work complete and functioning;
- waive future claims for added cost to Contract caused by the substitution.

Contractor (Bidder): _____ Date: _____

By: _____

Answer all questions and complete all blanks - use "NA" if not applicable.

CONSULTANT'S REVIEW AND ACTION

Resubmit Substitution Request Form:
Provide more information in the following categories: _____

Sign Contractor's (Bidder's) Statement of Conformance.

Substitution is accepted.

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Substitution is accepted with the following comments: _____

Substitution is not accepted.

Substitution Request Form received too late.

Consultant

Title

Date

Owner

SECTION 01 70 00

CONTRACT CLOSEOUT

PART ONE - GENERAL

1.01 GENERAL:

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

1.02 SUBSTANTIAL COMPLETION:

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

1.03 FINAL INSPECTION:

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

1.04 CLOSE-OUT SUBMITTALS:

- A. Evidence of compliance with requirements of governing authorities.
- B. Warranties and Bonds: Refer to requirements of this Section.
- C. Evidence of Payment and Release of Liens: Refer to requirements of General and Supplementary Conditions.

1.05 WARRANTY/GUARANTEE:

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

1.06 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS:

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

1.07 FINAL APPLICATION FOR PAYMENT:

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

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 70 00

SECTION 01 71 00

CLEANING

PART ONE - GENERAL

1.01 GENERAL:

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

1.02 REQUIREMENTS OF REGULATORY AGENCIES:

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

PART TWO - PRODUCTS

2.01 CLEANING MATERIALS:

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

PART THREE - EXECUTION

3.01 DURING CONSTRUCTION:

- A. Keep work area and all occupied property in neat and orderly condition at all times. Oversee cleaning and ensure that building and grounds are maintained free from accumulations of waste materials and rubbish. Sprinkle dusty debris with very fine water mist to control accumulation of dust. Do not use water in quantity so as to puddle. Do not allow waste and other materials such as rubbish, debris, wrappers, etc., to accumulate and become unsightly or hazardous. Promptly remove equipment and excess materials as they become no longer needed for the progress of the work. At not less than every day during progress of work, clean up work and access areas and dispose of waste materials, rubbish, and debris.

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

3.02 FINAL CLEANING:

- A. Employ skilled workmen for final cleaning.
- B. Remove grease, mastics, adhesives, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior surfaces.
- C. Repair, patch, and touch-up marred surfaces to match adjacent finishes.
- D. Broom clean paved surfaces; rake clean other surfaces of grounds.
- E. Clean areas impacted by work activities.
- F. Prior to final completion or Owner occupancy, conduct an inspection of sight-exposed interior and exterior surfaces and all work areas to verify that entire Work area is clean.

END OF SECTION 01 71 00

SECTION 02 07 20

MINOR DEMOLITION AND RENOVATION WORK

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Removing existing roofing, insulation, flashing, and sheet metal.
- B. Modifying existing roof penetrations, equipment supports or curbs, reglets, piping, and utility services to provide proper flashing heights and flashing details.
- C. Installing new wood nailers at designated locations.
- D. Installing new supports for roof-top piping and equipment.
- E. Removing abandoned penetrations and repairing openings in deck.
- F. Repairing deck as required.
- G. Performing other miscellaneous and incidental work required to install complete roofing system as specified and to obtain specified manufacturer's warranty.
- H. Removing existing damaged/spalled/disbonded plaster and repairing as necessary.
- I. Removing and replacing soil adjacent to building to facilitate work.
- J. Removing and replacing metal panels around wall penetrations.
- K. Removing and replacing HM steel door and frame at roof access.
- L. Installing plywood sheathing to inside surfaces of parapet and rise walls.
- M. Installing plywood sheathing over existing metal wall panels on exterior walls of elevator penthouses.

1.02 RELATED SECTIONS:

- A. 04 01 00 - Masonry Restoration and Cleaning
- B. 06 11 00 - Rough Carpentry
- C. 07 22 00 - Roof and Deck Insulation.
- D. 07 52 50 - Modified Bitumen Membrane Roofing.
- E. 07 62 00 - Sheet Metal Flashing and Trim.
- F. 09 24 33 - Portland Cement Plaster

1.03 REFERENCES:

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

1.04 PROJECT CONDITIONS:

- A. Environmental Requirements:
 - 1. Do not remove existing roofing and flashing in inclement weather or when rain is predicted with 30 percent possibility.
 - 2. When ambient temperature is below 60 degrees Fahrenheit (15 degrees Celsius), expose only enough cement and adhesive required within four hour period.
 - 3. Do not expose membrane and accessories to constant temperature in excess of 180 degrees Fahrenheit (82 degrees Celsius).

- B. Emergency Equipment: Maintain on-site materials necessary to apply emergency temporary seal in event of sudden storms or inclement weather.
- C. Smoking is prohibited on roof areas, in existing building, and all of Owner's property.

1.05 SEQUENCING AND SCHEDULING:

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

1.06 WARRANTY:

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

PART TWO - PRODUCTS

2.01 MATERIALS:

- A. Receiver in Reglet: Soft, malleable lead sheet, size and shape to fit in joint and maintain compression against receiver
- B. Rust Inhibitive Primer: 100 percent acrylic resin primer such as "Metalclad Interior-Exterior Acrylic Latex Flat Primer & Finish #41702", Devoe & Reynolds Co.
- C. Non-shrink Grout: Quick-setting grout formula meeting Corps of Engineers specification CRD-C-621, Type D and ASTM C-1107, Grade C, such as "Five Star Instant Grout" by Five Star Products, Inc., "Sika Grout 212" by Sika Corp., or approved equal.
- D. Deck Repair Materials:
 - 1. Lightweight Insulating Concrete Repair Material: Quick-setting, cementitious-based material such as "Strong Seal Quick-Set Patching Material" by The Strong Co., "Zono Patch" by Siplast, "Thin Patch" by Celcore, or approved equal.
 - 2. Concrete Deck Repair Material: Multi-component, polymer modified Portland cement mortar, trowel-grade such as "SikaTop 122 Plus" by Sika, or approved equal.
- E. Paint for Roof-top Items: Lusterless (Flat) Acrylic Finish: Two coats over filler coat or primer coat such as Acrylic Primer of "ProIndustrial Acrylic Primer" by Sherwin Williams and Finish Coat of "ProIndustrial Acrylic Paint" by Sherwin Williams or approved equal.
- F. Roof Access HM Door and Frame, and Hardware: 18 gauge insulated hollow metal door with 16 gauge steel frame, and weather-stripping. Stainless steel ball bearing butt hinges (minimum 3 per leaf), stainless steel keyed exterior/thumb turn interior passage set with construction core (cylinder to match building), and full width aluminum threshold with interior ½-inch lip.

- G. Roof Hatch: 12-inch (300mm) high, 14 gauge paint bond G-90 galvanized steel curb with 3-1/2-inch (87.5mm) horizontal fastening flange, integral cap flashing, same gauge as curb and fully welded corners and joints with pre-punched holes, size to fit existing openings, such as "Type S-50" by The Bilco Co.
- H. Roof Hatch Railing System: Tubular rail system complying with OSHA fall protection regulation 1910.23 with self-closing gate such as "PRS Roof Hatch Protection System" by Premier Rail Systems, "Caged Roof Hatch Grab Bars" by LadderTech, LLC, or "Roof-Top Hatch Safety Guard-Rail" by RoofTop Accessories.
- I. Roof Hatch Safety Post: Telescoping tubular post, hot-dipped galvanized, spring-balanced automatic locking position such as "Ladder UP-Model LU-2" by Bilco.
- J. Piping/Conduit Supports: Pre-manufactured assembly with molded plastic/rubber base, 10-inches by 16-inches (250mm by 400mm); 1/2-inch (13mm) threaded rods and accessory bar, "Type PP-10 with Strut" for conduit/condensate or "Type PP-10 with Roller" for steel/gas piping as manufactured by PHP Systems/Design, Houston, Texas (800/797-6585). Pre-manufactured assembly with steel base and molded rubber roller such as Models 48-R-AH and 24-R-AH by Miro Industries, Inc. (800/768-9678).
- K. Pipe Hanger: Pre-manufactured pipe supports constructed from 1-7/8-inch by 1-7/8-inch (47mm by 47mm) 12 gauge channel steel with rectangular support bases. Use roller pipe hangers for supporting steel pipes and clevice (saddle) type hanger for supporting insulated pipe such as Models "Type PS-1-2", "Type PSE-2-2", and "Type PS-E-Custom" as manufactured by PHP Systems/Design, Houston, Texas (800/797-6585).
- L. Duct Support: Pre-manufactured supports constructed from 1-7/8-inch by 1-7/8-inch (47mm by 47mm) 12 gauge tube steel with rectangular molded plastic/rubber support bases such as Model "Type PPH-D" as manufactured by PHP Systems/Design, Houston, Texas (800/797-6585).
- M. Roof Stair Platform: Pre-manufactured stair with handrails constructed from 1-7/8-inch by 1-7/8-inch (47mm by 47mm) 12-gauge channel steel with rectangular support bases and grated metal stairs and walk planks such as manufactured by PHP Systems/Design, Houston, Texas (800/797-6585).

PART THREE - EXECUTION

3.01 EXAMINATION:

- A. Examine existing building and existing roofing to determine existing physical conditions that affect removal of existing roofing and installation of new roofing.
- B. Verify that required barricades and other protective measures are in place.
- C. Contractor shall work weekends or after hours in areas that may disrupt building occupants and/or visitors, such as work at building entries.

3.02 PREPARATION:

- A. Take measures to maintain watertight conditions during term of Contract.
- B. Install interior protection and dust partitions where deck penetrations shall be removed or replaced.

- C. Protect adjacent surfaces.
- D. Roof Drains:
 - 1. Examine existing drain lines for debris or blockage.
 - 2. Clean drains and drain lines, removing debris, excessive bitumen, or aggregate. Flush with water to ensure that drains flow freely.
 - 3. Cap drains with drain plugs during daily operations.
 - 4. Remove plugs after daily clean-up and prior to onset of rainfall.

3.03 MINOR DEMOLITION OPERATIONS:

- A. Execute demolition in careful and orderly manner with least possible disturbance or damage to adjoining surfaces and structure.
- B. Avoid excessive vibrations in demolition procedures that would be transmitted through existing structure and finish materials.
- C. Roof Removal:
 - 1. Remove existing roofing, insulation, and flashings; abandoned and obsolete equipment; pitch pans, vents, curbs, and other such items; and sheet metal down to roof deck.
 - 2. Remove designated roofing material identified as asbestos-containing materials in accordance with governing regulations and Owner's requirements. Coordinate removal, disposal, and documentation thereof with Owner's representative and perform in accordance with applicable guidelines.
 - 3. Trim existing counterflashing as required for installation of new materials.
 - 4. Do not stockpile debris on roof surface. Promptly dispose of obsolete equipment and debris at authorized disposal site each day. Use chutes to transfer debris from roof surface to dumpsters.
 - 5. Provide protective method, such as plywood set on minimum 1-inch (25mm) EPS insulation, when hauling debris over existing roof membrane.
- D. Plaster Removal: Remove existing damaged/spalled/disbonded plaster to stable underlying substrate.
- E. Soil Removal: Remove existing soil in planting beds to an elevation a minimum of 2-inches below concrete footings. Install weeps in vertical mortar joints at not less than 32-inches on center.
- F. Metal Closure Panel Removal: Remove existing sheet metal closure panels around wall penetrations on West elevation, level 1. Install new sheet metal closure panels sealed around wall penetrations.
- G. Roof Access HM Door and Frame:
 - 1. Remove existing HM door and frame at roof access stair landing.
 - 2. Raise curb at base of wall opening 4-inches.
 - 3. Install new stainless steel cap over top of curb with counterflashing exterior receiver lip on curb set into bed of sealant.
 - 4. Install door frame, door, and hardware.
 - 5. Install sealant and backer rod exterior and interior of door frame perimeter.

3.04 MINOR RENOVATION WORK:

- A. Prepare substrates in accordance with roofing manufacturer's recommendations.
- B. Enlarge existing supper openings in parapet walls.
- C. Decking:
 - 1. Concrete Decking:
 - a. Perform repairs to concrete deck in accordance with patching material manufacturer's recommendations.
 - b. Apply rust inhibitor to exposed rebar.
 - c. Remove loose and defective concrete.
 - d. Patch spalled areas and exposed rebar areas with non-shrink grout.
 - e. Trowel smooth the properly placed grout.
 - f. Seal cracks and/or joints in concrete deck with modified bitumen membrane prior to installation of new roof materials.
 - g. Cover holes or openings 12-inches (300mm) in diameter or smaller with a plate of 18 gauge sheet metal. Extend plate minimum 4-inches (100mm) beyond edge of hole and onto adjacent unaffected rib.
 - h. Holes Larger Than 12-Inches: Holes or openings greater than 12-inches by 12-inches (300mm by 300mm), frame opening with 2X wood nailers with intermediate spanning members spaced 16-inches (400mm) on-center. Install plywood flush with top of deck. Install layer of gypsum sheathing on bottom side of nailers. Provide finish on bottom side of opening to match adjacent finish in exposed areas.
 - 2. Lightweight Insulating Concrete Fill:
 - a. Perform repairs to lightweight insulating concrete fill to remain in accordance with patching material manufacturer's recommendations.
 - b. Remove loose, crumbly, wet, or otherwise non-salvageable fill material.
 - c. Mix and blend repair materials in accordance with manufacturer's guidelines. Spread repair material after mixing and screed to desired thickness. Trowel smooth the properly placed repair material.
 - d. Cover holes or openings in deck from removal of abandoned penetration 12-inches (300mm) in diameter or smaller with a plate of 18 gauge sheet metal. Extend plate minimum 4-inches (100mm) beyond edge of hole and onto adjacent deck and secure to deck with appropriate fasteners.
 - e. Remove lightweight insulating concrete fill in its entirety down to the concrete deck as an Alternate Bid item. Wet fill material to be removed as necessary to minimize dust production. Remove fill material from surface of deck to provide suitable substrate to receive secondary roof.
- D. Equipment and Curb Renovation:
 - 1. Remove, retain, and reinstall existing equipment as required to facilitate new flashing.
 - 2. Securely fasten equipment on curbs after new flashing is installed with grommetted screws spaced 12-inches on-center, minimum, two per side of equipment.
 - 3. Curb and hatch flashing height shall be 8-inches (200mm) minimum above newly finished roof surface.

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4. Include raising of curbs to provide minimum 8-inch (200mm) flashing height for new roof system in Base Bid cost.
- E. Rooftop Equipment:
1. Move and elevate air conditioning units and other rooftop equipment as required to install roofing materials complete and in accordance with plans and specifications.
 2. When units or equipment are to be moved, disconnect and move to protected area to prevent damage to parts or components. Reset and reconnect at Contractor's expense.
 3. Disconnection and reconnection shall be performed by mechanical and/or electrical company licensed to perform such work and approved by Owner's Representative.
 4. Re-install equipment on top of new support curb or existing curb. Secure equipment to curb with grommetted fasteners spaced 12-inches (300mm) on-center, minimum two fasteners per side. Set equipment on top of pre-manufactured support and secure to support.
 5. Install stainless steel strap, one per side, over top of existing equipment and secure through vertical flange and into curb with appropriate fastener.
- F. Curbs and Ducts:
1. Secure and modify curbs, ducts, and other work which pass through roof as required to receive new roofing system.
 2. Remove designated abandoned curbs down to deck. Remove concrete curbs by use of saw-cutting or other mechanical methods. Provide finish on deck after curb removal to provide suitable substrate to receive secondary roof. Repair opening in deck as noted herein.
 3. Seal joints in sheet metal ducts and vent hoods with reinforcing fabric and elastomeric coating. Apply coating to exposed surfaces of ducts and vent hoods.
- G. Piping and Conduit Modifications:
1. Schedule piping and unit downtime for equipment modifications to coordinate with Owner's operations. Switchover time shall be limited to meet Owner's requirements.
 2. Replace existing supports for units and associated piping with new supports.
 3. Provide temporary supports to maintain unit and piping in operational condition except during switchover.
 4. Furnish new fittings, piping, and accessories to match existing to replace deteriorated, damaged, or non-functional components or to accommodate new unit elevation, where necessary.
 5. Provide auxiliary make-up air units to supply HVAC needs during equipment downtime, when required.
 6. Upon completion of roof installation, paint steel piping with exterior grade acrylic paint and replace or clean aluminum jacketing of insulated pipe.
- H. Piping/Equipment Supports:
1. Furnish and install new supports for piping (conduit, gas, water, condensate, etc.).

2. Install supports at maximum spacing of 10 feet (3m) on-center and within 2 feet (600mm) of changes in plane or direction. Space supports for piping 10-inches (250mm) in diameter or larger and multiple pipes 8 feet (2.4m) on-center.
 3. Elevated Duct Supports: Install new pre-fabricated supports at maximum spacing of 5-feet (2.4m) on-center.
 4. Install new stair access platform in designated location. Set platform on protection pads on surface of new roof. Secure platform to wall with brackets.
- I. Roof Drains and Sleeves to Remain:
1. Secure and modify drains and sleeves to receive new roofing system.
 2. Verify drain bowls and pipes are properly secured and sealed.
 3. Remove, replace, lower, or raise drain bowl as required to accommodate new roofing system, including insulation and deck conditions.
 4. Replace damaged, missing, or otherwise non-salvageable drain components with new components. Replace plastic strainers with cast iron units.
 5. Drill and tap existing drain bowls as required for complete assembly of drain. Secure clamp rings with stainless steel bolts and washers. Clamp rings to be secured throughout project. Wire brush, clean, and paint existing cast iron clamp rings and strainers to be reinstalled.
 6. Water test each roof drain with inflatable plug. Position plug in leader so test will cover connection of pipe to bowl. Extend "test" water on top of roof membrane beyond clamping ring. Maintain "test" water for one hour while performing interior observations for water leakage. Replace drain bowl assemblies that cannot be made watertight during leak test.
 7. Paint new strainers and clamp rings prior to installation.
- J. Overflow Scuppers:
1. Enlarge width and height of roof overflow scupper openings to minimum 12-inches wide by 6-inches high.
 2. Provide opening utilizing wet-saw cutting methods or other appropriate method for subject materials.
 3. Repair damaged dampproofing or other barrier materials present in wall assembly.
- K. Plumbing Vents:
1. Extend plumbing vents or modify as necessary to accommodate new roof installation.
 2. Provide pipe extensions and no-hub couplings where necessary to achieve minimum 8-inch (200mm) height above top of newly finished roof surface.
 3. Utilize same material type and size as existing for new extension.
- L. Ventilators: Raise ventilators as required for 8-inch (200mm) minimum flashing height.
- M. Sheet Metal Fabrications:
1. Remove and replace ferrous rooftop sheet metal fabrications to match existing.
 2. Modify existing sleeves and umbrellas on existing equipment as scheduled.
 3. Repair and renovate non-ferrous rooftop and drainage system sheet metal fabrications as required for permanent watertight installation.

4. Paint sheet metal with metal primer. Paint existing equipment hoods, covers, heat-flues/exhausts, steel framed supports, and other rooftop related exposed steel, penetration sleeves, and other sheet metal items to remain. Use rotary wire wheel or other mechanical abrading method to remove corrosion on sheet metal surfaces down to bare sound metal. Clean prepared areas and adjacent surfaces to receive new paint. Apply paint to prepared and cleaned surfaces in adequate coverage utilizing napped rollers to achieve monolithic finish appearance. Utilize heat resistant paint at heat exhaust vents.
- N. Plaster Wall Substrate:
1. Remove loose or damaged concrete substrate.
 2. Repair damaged substrate as necessary.
- O. Penthouse Doors and Thresholds:
1. Modify doors and thresholds to accommodate new flashing installation and to provide minimum 8-inch (200mm) flashing height.
 2. Cut bottom of door to length necessary to accommodate new threshold height.
 3. Install new 12-inch high stainless steel kick-plate at bottom of interior and exterior of door and secure with flat head self-tapping screws.
 4. Install new nailers to construct new threshold.
 5. Install new stainless steel cap over top of threshold with new door step.
 6. Relocate low hinges as required.
 7. Reinstall door and install new weatherstripping, aluminum threshold, and sweeps.
 8. Install sealant and backer rod exterior and interior of door frame perimeter.

3.05 CLEANING:

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

END OF SECTION 02 07 20

SECTION 04 42 00

STONE RESTORATION AND CLEANING

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Repair loose, damaged, and/or cracked masonry.
- B. Perform miscellaneous tuckpointing.
- C. Perform miscellaneous repairs.
- D. Cleaning and sealing stone (Alternate No. 4).

1.02 RELATED SECTIONS:

- A. 02 07 20 - Minor Demolition and Renovation Work.
- B. 07 62 00 - Sheet Metal Flashing and Trim.
- C. 07 92 13 - Joint Sealants.

1.03 REFERENCES:

- A. American Society for Testing and Materials (ASTM).
- B. Brick Institute of America (BIA).

1.04 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical data for each product, including recommendations for product application, installation, and use.
- B. Samples: Provide on-site in-place sample or "mock-up", 4 square foot minimum, depicting cleaned masonry surface, typical mortar joint tuckpointing, and application of clear sealer.
- C. Quality Control Submittals: Submit test reports and certifications substantiating that products comply with requirements.
- D. Submit manufacturer's written Material Safety Data Sheet (MSDS) for each material used in this Section.
- E. Submit sample of brick masonry unit to be used for brick replacement units. Sample to show dimension, color, texture, and appearance.

1.05 QUALITY ASSURANCE:

- A. Installation Qualifications: Work must be performed by a firm having not less than five years successful experience in comparable masonry restoration projects and employing personnel skilled in comparable restoration processes and operations.

1.06 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials to site in manufacturer's original unopened containers and packaging, bearing labels including manufacturer's name, product name, type of material, batch number, date of manufacture, shelf life, and instructions for use.
- B. Carefully pack, handle, and ship masonry units and accessories strapped together in suitable packs or pallets or in heavy cartons. Unload and handle to prevent chipping and breakage.

- C. Protect masonry restoration materials during storage and construction from wetting by rain, snow, or ground water and from staining or intermixture with earth or other types of materials.
- D. Protect grout, mortar, and other materials from deterioration by moisture and temperature. Store in dry location or in waterproof containers. Keep containers tightly closed and away from open flames. Protect liquid components from freezing. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage and installation.
- E. Remove damaged, deteriorated, or out-of-date material from site.

1.07 PROJECT CONDITIONS:

- A. Protect persons, motor vehicles, and surfaces around masonry being restored, building site, and surrounding buildings from injury, contamination, soiling, and damage resulting from masonry work.
- B. Prevent chemical solutions from coming into contact with pedestrians, motor vehicles, landscaping, adjacent buildings, and other surfaces which could be damaged by contact.
- C. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.
- D. Dispose of runoff from cleaning operations by legal means and in manner to prevent soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.
- E. Furnish and erect temporary protection covers over pedestrian walkways and at points of entrance and exit for persons and for vehicles which must remain in operation during course of masonry restoration work.
- F. Do not repair or install mortar joints or repair masonry unless air temperatures are between 40 degrees Fahrenheit (4 degrees Celsius) and 80 degrees Fahrenheit (27 degrees Celsius) and will remain so for forty-eight hours minimum after repair.
- G. Prevent grout or mortar used in repair work from staining face of surrounding masonry and other surfaces. Remove grout and mortar in contact with exposed masonry and other surfaces immediately.
- H. Protect sills, ledges, and projections from mortar droppings.
- I. Shore as required to complete the work and protect all masonry to remain. Removal and rebuilding shall be done in limited sections so as not to compromise in any way the structural stability of the building. Provide temporary watertight protection to all open areas. Contractor shall provide a work plan.

1.08 SEQUENCING AND SCHEDULING:

- A. Perform masonry restoration work in following sequence.
 - 1. Repair loose stone.
 - 2. Grind out deteriorated and/or missing mortar and tuckpoint mortar joints.
 - 3. Clean construction debris from stone surfaces.

1.09 WARRANTY:

- A. Provide contractor's warranty for a period of two years for labor and material to reinstall any work not performing as intended.

PART TWO - PRODUCTS

2.01 MORTAR MATERIALS:

- A. Portland Cement:
 - 1. ASTM C 150, Type I.
 - 2. Provide nonstaining Portland cement complying with staining requirement of ASTM C 91 for not more than 0.03 percent water soluble alkali for stonework and other masonry.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Aggregate For Mortar: ASTM C 144.
- D. Water: Clean, free of oil, acids, alkalis, and organic matter.

2.02 STONE UNITS:

- A. Units to match existing in shape, size, color, texture, and material.
- B. Colored Mortar Aggregate:
 - 1. Natural or manufactured, hand selected to produce mortar color.
 - 2. Provide sand with rounded edges for pointing mortar.
 - 3. Match size, texture, and gradation of existing mortar as closely as possible.
- C. Colored Mortar Pigment:
 - 1. Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes.
 - 2. Use only pigments with record of satisfactory performance in masonry mortars.

2.03 CLEANING MATERIALS AND EQUIPMENT:

- A. Water for Cleaning: Clean, potable, free of oils, acids, alkalis, salts, and organic matter.
- B. Warm Water: Heat water to temperature of 140 degrees Fahrenheit to 180 degrees Fahrenheit (60 degrees Celsius to 82 degrees Celsius).
- C. Brushes: Fiber bristle only.
- D. Cleaning Products:
 - 1. "Sure Klean Restoration Cleaner", ProSoCo, Inc.
 - 2. Or approved equal.

2.04 WATER REPELLENT SEALER:

- A. Acceptable Manufacturers for Water Repellent Sealer: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to:
 - 1. ProSoCo, Inc.
 - 2. BASF.
 - 3. Others require written approval from Consultant.
- B. Water Repellent Sealer: Clear penetrating or silane suitable for use on masonry surfaces:
 - 1. "Weather Seal SL40" by ProSoCo.
 - 2. "ENVIROSEAL 40" by BASF.
 - 3. Or approved equal.

- C. Strippable Masking: Temporary coating designed for application to glass, unpainted metal, and polished stone to protect from cleaning materials and mortar such as “Sure Klean Strippable Masking”, by ProSoCo.

2.05 MORTAR MIXES:

- A. Measurement and Mixing:
 - 1. Measure cementitious and aggregate materials in dry condition by volume or equivalent weight.
 - 2. Do not measure by shovel; use known measure.
 - 3. Mix materials in clean mechanical batch mixer.
- B. Mixing Repair Mortar:
 - 1. Thoroughly mix cementitious and aggregate materials together before adding water.
 - 2. Mix again adding only enough water to produce damp, unworkable mix which will retain its form when pressed into ball.
 - 3. Maintain mortar in this dampened condition for one to two hours.
 - 4. Add remaining water in small portions until mortar of desired consistency is reached.
 - 5. Use mortar within thirty minutes of final mixing.
 - 6. Do not retemper or use partially hardened material.
- C. Admixtures: Do not use admixtures in mortar.
- D. Mortar Proportions, Repair Mortar for Brick: One part Portland cement, one part lime, and four and one-half to six parts mortar aggregate.
- E. Colored Mortar:
 - 1. Produce mortar of color required with selected ingredients.
 - 2. Do not adjust proportions without Consultant’s acceptance.
- F. Color Pigmented Mortar: Do not exceed pigment-to-cement ratio of 1-to-10 by weight.
- G. Admixtures: Do not use admixtures in mortar.
- H. Mortar Proportions:
 - 1. Pointing Mortar for Brick:
 - a. One part white Portland cement, two parts lime, and six parts colored mortar aggregate.
 - b. Add colored mortar pigment to produce mortar colors.

PART THREE - EXECUTION

3.01 PREPARATION:

- A. Comply with recommendations of manufacturers for protecting building surfaces and for installation procedures.
- B. Protect glass, unpainted metal trim, and stone from contact with acidic chemical cleaners or mortar by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape. Apply masking agent in accordance with manufacturer's recommendations. Do not apply liquid masking agent to painted or porous surfaces.

- C. Protect unpainted metal from contact with alkali chemical cleaners by covering metal with either liquid strippable masking agent or polyethylene film and waterproof masking tape.

3.02 CLEANING EXISTING STONE:

- A. Clean stone in preparation for application of water repellent sealer.
- B. Determine method of cleaning based upon adjoining materials, site conditions, and manufacturer's requirements.
- C. Use water blasting or hand method to clean substrate and open pores.
- D. Verify surfaces to be restored are clean, free of efflorescence, stains, mildew, grime, dirt, tar, oil, grease, or other foreign matter and discoloration detrimental to application.

3.03 CLEANING METHODS OF EXISTING STONE:

- A. Cleaning:
 - 1. Proceed with cleaning in an orderly manner; work from top to bottom and from one end of each elevation to the other.
 - 2. Determine method of cleaning based upon adjoining materials, site conditions, and manufacturer's requirements.
 - 3. Use water blasting, sandblasting, or hand method which will clean substrate and open pores.
 - 4. Metal surfaces may be cleaned by Commercial Blast Cleaning (SSPC-SP6), by hand or power tool cleaning (SP2-SP3), or as required to accept primer. Determine method of cleaning based upon adjoining materials, site conditions, and manufacturer's requirements.
 - 5. Verify surfaces to receive waterproof coatings are clean, free of efflorescence, stains, mildew, grime, dirt, tar, oil, grease, or other foreign matter and/or discoloration detrimental to application.
 - 6. Perform each cleaning method indicated in a manner which results in uniform coverage of all surfaces, including corners, moldings, interstices and which produces an even effect without streaking or damage to masonry surfaces.
 - 7. Rinse off chemical residue and soil by working upwards from bottom to top of each treated area.
- B. Water Cleaning Methods:
 - 1. Spray Applications: Spray-apply water to stone surfaces to comply with requirements indicated for location, purpose, water temperature, pressure, volume, and equipment. Unless otherwise indicated, hold spray nozzle not less than 6-inches (150mm) from surface of masonry and apply water from side to side in overlapping bands to produce uniform coverage and an even effect.
 - 2. Low Pressure Spray: 100 to 400 psi; three to six gallons per minute.
 - 3. Medium Pressure Spray: 400 to 800 psi; three to six gallons per minute.
 - 4. High Pressure Spray: 800 to 1200 psi; three to six gallons per minute.
 - 5. Steam Wash: Apply steam to stone surfaces at pressures not exceeding 80 psi. Hold nozzle no less than 6-inches (150mm) from surface of masonry and apply steam from side to side or in direction of tooling in overlapping bands to produce uniform coverage and an even effect.

C. Chemical Cleaner Application Methods:

1. Apply chemical cleaners to masonry surfaces to comply with chemical manufacturer's recommendations using brush or spray application methods, at Contractor's option, unless otherwise indicated. Do not allow chemicals to remain on surface for periods longer than that indicated or recommended by manufacturer.
2. Spray Application: Apply to pressures not exceeding 50 psi, unless otherwise indicated.
3. Reapplication of Chemical Cleaners: Do not apply chemical cleaners to same masonry surfaces more than twice. If additional cleaning is required, use steam wash.

3.04 CRACK AND CORNER JOINT REPAIR:

- A. Inspect existing mortar joints for cracked, defective, open, and/or deteriorated mortar.
- B. Rake out cracked, loose, or deteriorated mortar from joints to depths equal to 2-1/2 times their widths, but not less than 1-inch (25mm), nor less than that required to expose sound, unweathered mortar.
- C. Remove mortar from stone surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with new sealant. Brush, vacuum, or flush joints to remove dirt and loose debris.
- D. Do not spall edges of stone units or widen joints.
- E. Replace stone units which are loose, damaged, or spalled.
- F. Cut out old mortar by hand with chisel and mallet.
- G. Power operated rotary hand saws and grinders will be permitted but only on specific written acceptance of Consultant based on submission by Contractor of satisfactory quality control program and demonstrated ability of operators to use tools without damage to masonry. Quality control program shall include provisions for supervising performance and preventing damage due to worker failure.
- H. Fill prepared corner and step cracked joints with joint backing and sealant in accordance with Section 07 92 13 – Joint Sealants. "Dust" wet sealant with matching color sand or crushed stone fines to match adjacent surfaces in color and texture.

3.05 REPOINTING EXISTING STONE:

- A. Joint Raking:
 1. Rake out mortar from joints to depths equal to 2-1/2 times their widths but not less than 1-inch (25mm) nor less than that required to expose sound, unweathered mortar. Blow clean and install urethane sealant within 1/2-inch (13mm) of face.
 2. Remove mortar from stone surfaces within raked-out joints to provide reveals with square backs and to expose stone for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
 3. Do not spall edges of stone units or widen joints. Replace stone units that become damaged.

4. Cut out old mortar by hand with chisel and mallet.
 5. Power operated rotary hand saws and grinders will be permitted but only on specific written acceptance of Consultant based on submission by Contractor of satisfactory quality control program and demonstrated ability of operators to use tools without damage to masonry. Quality control program shall include provisions for supervising performance and preventing damage due to worker failure.
- B. Joint Pointing:
1. Rinse stone joint surfaces with water to remove dust and mortar particles. Time application of rinsing so that, at time of pointing, excess water has evaporated or run off and joint surfaces are dry and able to receive sealant application.
 2. Apply first layer of pointing mortar to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8-inch (9mm) until uniform depth is formed. Compact each layer thoroughly and allow to become thumbprint-hard before applying next layer.
 3. After joints have been filled to uniform depth, place remaining pointing mortar in three layers with each of first and second layers filling approximately 2/5 of joint depth and third layer the remaining 1/5. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing stone units have rounded edges, recess final layer slightly from face. Take care not to spread mortar over edges onto exposed masonry surfaces or to featheredge mortar.
 4. When mortar is thumbprint hard, tool joints to match original appearance of joints. Remove excess mortar from edge of joint by brushing.
 5. Cure mortar by maintaining in damp condition for not less than seventy-two hours.
 6. Where repointing work precedes cleaning of existing masonry, allow mortar to harden not less than thirty days before beginning cleaning work.
 7. Where mortar joints have step cracked due to lack of control joints and where sealant is applied over these cracks, cut mortar joint to depth of 1-inch (25mm) deep and fill with two component urethane sealant to depth of 1/2-inch (13mm). Allow to cure and finish off tuckpointing with mortar at depth of 1/2-inch (13mm).

3.06 FINAL CLEANING:

- A. Thoroughly clean exposed stone surfaces of excess mortar, sealant, and foreign matter using stiff nylon or bristle brushes and clean water, spray applied at low pressure.
- B. Use of metal scrapers or brushes will not be permitted.
- C. Use of acid or alkali cleaning agents will not be permitted.

3.07 APPLICATION OF WATER REPELLENT SEALER:

- A. After cleaning, sealant work, and stone repairs are complete, verify surfaces are clean and dry.
- B. Follow manufacturer's written mixing instructions. Thoroughly mix and stir material prior to application.

- C. Test Applications: Test prior to beginning application of clear sealer to assure compatibility and desired results. Test area should be a minimum 2 feet by 2 feet (.61m by .61m) area. Test using same equipment and procedures proposed for general application. Allow test application to dry for a minimum of three days before inspection.
- D. Precautions: Protect all surrounding non-masonry surfaces from exposure to the sealer. Sealer may be corrosive to many metallic surfaces and may cause stains or damage to painted surfaces, glass, and other non-masonry materials. Protect all ground foilage, pedestrians, and auto traffic from exposure to the water repellent. Cover exterior air conditioning units and air vents during application.
- E. Hot Weather Application:
 - 1. Surface and air temperatures should not exceed 95 degrees Fahrenheit (35 degrees Celsius) for proper application. Higher temperatures will cause rapid evaporation of water carrier resulting in reduced penetration and formation of surface film or crust.
 - 2. When surface temperatures exceed 95 degrees Fahrenheit (35 degrees Celsius), clear sealer may be successfully applied by cooling the surface with a water mist before applying the repellent. Mist the surface lightly with clear water - do not saturate. Allow surface to dry until surface is once again absorbent (appears dry) and immediately apply sealer.
- F. Application:
 - 1. Equipment: Apply sealer using brush, roller, or low pressure spray applicator (20 psi). When spray applying, use fan type spray tips and adjust pressure to avoid atomization of the material. Fit sprayer with stainless steel or brass fittings and gaskets suitable for handling alkaline solutions (rubber or viton). Brushes and rollers should be of nylon or other synthetic materials resistant to alkaline solutions.
 - 2. Application:
 - a. General: Apply from the "bottom up" with a 4-inch (100mm) to 8-inch (200mm) rundown to assist in a uniform distribution.
 - b. Spray Application: Apply sufficient material to provide uniform, saturating coverage. Apply only to the point of saturation, taking care not to over apply the material. Immediately brush out heavy runs or drips to avoid a buildup of material on the surface.
 - c. Brush or Roller Application: Apply sufficient material to thoroughly saturate the surface. Avoid excessive overlapping and take care to brush out runs and drips immediately to prevent a buildup of material on the surface.
 - 3. Coverage: Coverage rates will vary from 80 to 150 square feet per gallon, depending upon surface texture and porosity. Actual coverage should be determined during test applications and based on manufacturer's recommendation for warranty coverage.

3.08 ADJUSTING AND CLEANING:

- A. Correct damage to other work by cleaning, repairing or replacing as directed by Owner. Leave work in an undamaged condition.
- B. Clean spattered surfaces. Remove overspray materials by proper methods of washing and scraping, using care not to damage finished surfaces.
- C. Remove discarded materials, rubbish, cans, and rags resulting from work from project site.

END OF SECTION 04 42 00

SECTION 06 11 00

ROUGH CARPENTRY

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Installation of wood nailers at curbs, perimeters, penetrations, walls, and as necessary to install new systems.
- B. Applying plywood sheathing to inside surfaces of parapet and rise walls.
- C. Applying plywood sheathing over existing metal wall panels on penthouses walls.

1.02 RELATED SECTIONS:

- A. 02 07 20 - Minor Demolition and Renovation Work
- B. 07 22 00 - Roof and Deck Insulation
- C. 07 27 13 - Self-adhering Sheet Air Barrier
- D. 07 41 13 - Metal Wall Panels
- E. 07 52 50 - Modified Bitumen Membrane Roofing.
- F. 07 54 00 - Thermoplastic Single Ply Membrane Roof System
- G. 07 62 00 - Sheet Metal Flashing and Trim.

1.03 QUALITY ASSURANCE:

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

1.04 DELIVERY, STORAGE, AND HANDLING:

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

PART TWO - PRODUCTS

2.01 MATERIALS:

- A. Treatment for Wood Members: Pressure preservative treated in accordance with AWPA C2, C9 standards, Ground Contact using ACQ, MCQ, or other similar treatment at 0.20 pounds per cubic foot wood above ground.
- B. Lumber for Nailers and Blocking: Standard Grade Fir or No. 2 Southern Yellow Pine bearing UL label; size shall be appropriate for application, minimum 2-inch (50mm) (nominal) thickness, kiln dried after treatment.

- C. Plywood: Minimum 3/4-inch APA exterior grade sheathing, EXP 1 or "CDX", bearing APA trademark.
- D. Gypsum Sheathing: 5/8-inch thick moisture resistant gypsum core with fiberglass facer and primed top surface such as "Dens-Deck Prime" by Georgia Pacific.
- E. Fasteners:
 - 1. Wood Substrate:
 - a. Securement of metal flanged items such as flashing pans, metal edge/fascia, cleats, etc., shall be nails, No. 11 gauge, double hot-dipped galvanized, ASTM A153, steel or stainless steel wire with 3/8-inch (9mm) diameter head and ring shank fasteners for anchoring flanges of sheet metal fabrications shall be of sufficient length to achieve a minimum 1-1/4-inch embedment into solid wood substrate such as "R-103-A Stormguard Asphalt and Fiberglass Shingle Nail" by Maze Nails (800/435-5949).
 - b. Securement of wood to wood shall be nails, No. 11 gauge, double hot-dipped galvanized steel or stainless steel wire nail with ring shank and 9/32-inch (7mm) diameter head such as "Stormguard PTL Anchor-Down Nail" by Maze Nails (800/435-5949); 10d or length required to provide 1-inch (25mm) penetration minimum into substrate.
 - c. Securement of exposed items to wood substrate shall be No. 14 stainless steel screw with stainless steel washer and integral rubber seal; length required to provide 1-inch (25mm) penetration minimum into substrate.
 - d. Fasteners for securing roofing materials to wood substrate shall be a hardened steel nail with a 1-inch (25mm) diameter round head and ring shank; length to provide 1-inch (25mm) penetration into substrate, as manufactured by Simplex Nail Co.
 - e. Fasteners for securing steel to wood substrate shall be No. 10 stainless steel wood screw with stainless steel washer and integral rubber seal, length to achieve 1-inch embedment into wood.
 - f. Fasteners for securing wood nailer to wood nailer in vertical position shall be 20 gauge galvanized steel plate, 2-inches wide by 4-inches long such as "MP 24 Mending Plate" by Simpson Strong-Tie Co., Inc. and "A34 Framing Anchor" by Simpson Strong-Tie Co., Inc. for corner connections.
 - 2. Concrete Substrate:
 - a. Fasteners for securing sheet metal items such as surface-mounted counterflashings, termination/compression bars, etc., to concrete substrate shall be a pre-assembled drive anchor with a stainless steel drive screw, a lead/zinc alloy expansion anchor body (1/4-inch (6mm) diameter, 1-1/2-inch [38mm] length) and a stainless steel washer with integral rubber seal (1-1/8-inch diameter) such as "Zamac Hammer-Screw" as manufactured by Powers Fasteners, Inc.

- b. Fasteners for securing wood blocking to concrete substrate at roof perimeters shall be sleeved stud expansion bolt, 1/2-inch (13mm) diameter (minimum), with 3/4-inch diameter steel washer such as "Kwik Bolt II" by Hilti, "Tru Bolt Wedge" by ITW Ramset, or "Lok/Bolt" by Powers Fasteners, Inc. Fasteners for securing wood blocking to concrete substrate for miscellaneous applications shall be 1/4-inch diameter, 2-3/4-inch long coated screw with hex head such as "Tapcon" by ITW Buildex.
3. Masonry Substrate:
 - a. Fasteners for securing wood to solid masonry at roof perimeters shall be galvanized steel expansion anchor, 3/8-inch (9mm) diameter (minimum), with 3/4-inch diameter steel washer such as "Countersunk Kwik Bolt II" by Hilti. Fasteners for securing wood to solid masonry for miscellaneous applications shall be 1/4-inch diameter, 2-3/4-inch long coated screw with hex head such as "Tapcon" by ITW Buildex.
 - b. Fasteners for securing wood to hollow base masonry shall be 3/8-inch (9mm) diameter (minimum), threaded rod, with 3/4-inch diameter washer, nut, and screen tube such as "HIT C-20 Adhesive Anchor" by Hilti.
 - c. Fasteners for securing sheet metal items to concrete substrate shall be a pre-assembled drive anchor with a stainless steel drive screw, a lead/zinc alloy expansion anchor body (1/4-inch (6mm) diameter, 1-1/2-inch [38mm] length) and a stainless steel washer with integral rubber seal (1-1/8-inch diameter) such as "Zamac Hammer-Screw" as manufactured by Powers Fasteners, Inc.
4. Steel Substrate:
 - a. Fasteners for securing plywood to steel substrate shall be self-drilling, 1-1/2-inch long coated No. 10 screw with wafer head such as "Traxx Wood to Metal Fastener" by ITW Buildex. Fasteners for securing wood nailers/blocking to steel substrate shall be self-drilling coated heavy duty screw, 1/4-inch (6mm) diameter (minimum), with 5/8-inch (16mm) diameter washer such as "No. 14 Heavy Duty Screw" by OMG Roof Products.
 - b. Fasteners for securing steel to steel substrate shall be self-tapping No. 14, 1-1/2-inch long stainless steel screw with stainless steel washer and bonded integral rubber seal.
5. Plywood Clip: 20 gauge galvanized steel H-clip such as "PSCL Panel Sheathing Clip" by Simpson Strong-Tie Co., Inc. (800/999-5099).

PART THREE - EXECUTION

3.01 INSTALLATION:

A. Nailers:

1. Install nailers as required to install new roof system and achieve proper flashing heights.
2. Clean and prepare surfaces to receive wood nailers.
3. Install wood nailers and curbs continuously with 1/4-inch (6mm) gap between each section. Set level and true. Pre-drill nailers prior to attachment. Countersink fastener in base nailer so that washer and head of fastener or nut are recessed below top and flush with top of nailer.

4. Securely fasten to structure with appropriate fasteners to resist minimum 175 pounds per linear foot (780N per 300mm) force in any direction. Use of powder-actuated fasteners is prohibited. Place a fastener within 3-inches (75mm) of each end of each section of wood blocking.
 5. Stagger joints in subsequent layers of nailers from joints in underlying layer of nailers a minimum of 12-inches (300mm).
 6. Install nailers so that ends and sides of adjoining nailers are aligned to form right angles (nominal) at corners.
 7. Weave ends of subsequent layers of nailers at corners so that ends of layered nailers do not align.
 8. Secure nailers to metal deck with screws spaced 12-inches (300mm) on-center, 6-inches (150mm) on-center, 10 foot (3m) from each corner.
 9. Secure nailers to wood substrate using nails 24-inches (600mm) on-center, staggered. Install nails on an angle.
 10. Secure nailers with self-tapping/self-drilling steel fastener or bolt to steel angle.
 11. Reduce fastener spacing 50 percent at a distance of 10 feet (3m) from each corner.
 12. Secure nailer to curb utilizing appropriate fasteners, gusset plates, and framing anchors.
- B. Plywood/Gypsum Sheathing:**
1. Install new sheathing at penthouse walls, rise walls, parapet walls, curbs, and top of perimeter walls. Replace damaged, deteriorated, or non-salvageable sheathing.
 2. Secure sheathing to substrate with flat head fasteners (type appropriate for substrate) spaced 12-inches (300mm) on-center.
 3. Secure sheathing to wood substrate with nails spaced 6-inches (150mm) on-center.

3.02 CLEAN UP:

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

END OF SECTION 06 11 00

SECTION 07 18 13

PEDESTRIAN TRAFFIC COATINGS

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Cleaning and preparing existing concrete deck surface prior to installation of new pedestrian traffic coating.
- B. Installing new pedestrian traffic coating on rooftop stair access.

1.02 RELATED SECTIONS:

- A. 07 92 13 –Joint Sealants.

1.03 REFERENCES:

- A. ASTM C 957 - Standard Specification for High Solids Contents, Cold Liquid-Applied Elastomeric Waterproofing Membrane with Integral Wearing Surface.

1.04 SUBMITTALS:

- A. Provide submittals in accordance with Section 01 30 00 - Submittals.
- B. Pre-job Submittals:
 - 1. Submit manufacturer's literature for all products furnished, including appropriate Materials Safety Data Sheets (MSDS) and other safety requirements.
 - 2. Submit list of five projects similar in nature which have been installed by applicator within last five years, identified with project name, location, and date.
- C. Submit preliminary progress schedule indicating approximate start and completion dates and planned sequence for pedestrian traffic coating installation. Address areas which will be closed or restricted from normal use, and the approximate times the areas will be restricted.
- D. Samples: Submit samples of the coating system, applied to 1/4-inch (6mm) plywood or similar rigid base, indicating color and surface texture of the pedestrian traffic coating.
- E. Field Sample: Install field sample at project site representative of the installed pedestrian traffic coating system. Sample shall include typical surface preparation, routing and sealing of deck cracks, and typical pedestrian traffic coating installation.
- F. Post-job Submittals:
 - 1. Submit Maintenance Manual, identified with project name, location and date, type of coating system applied, and surface to which system was applied, including sketches where necessary. Include recommendations for periodic inspections, care, and maintenance. Identify common causes of damage with instructions for temporary patching until permanent repair can be made.
 - 2. Contractor's warranty and manufacturer's guarantee documents.

1.05 DELIVERY, STORAGE, AND HANDLING:

- A. Store materials within a temperature range of 40 and 90 degrees Fahrenheit (4 to 32 degrees Celsius).
- B. Deliver materials in original containers with seals unbroken and bearing labels that include manufacturer's name, product name, type of material, color, batch number, date of manufacture, shelf life, and instructions for use.
- C. Store materials in a single lockable area of project site.
- D. Protect materials from extreme temperatures and exposure. Store materials off the ground in accordance with manufacturer's recommendations.
- E. Remove damaged, deteriorated, or out-of-date material from site.

1.06 PROJECT CONDITIONS:

- A. Install materials in accordance with all safety and weather conditions required by manufacturer, or as modified by applicable rules and regulations of local, state, and federal authorities having jurisdiction.
- B. Seal doors, windows, air intakes, elevators, and other openings that allow vapors to migrate into occupied spaces.
- C. Ventilate application areas and occupied spaces adjacent to application areas during application and for eight hours minimum after application or until vapor concentrations are below Permissible Exposure Limits (PEL) listed in manufacturer's MSDS. Perform an inspection of the job site before work begins and perform periodic air monitoring during and after application in the work area and adjacent to occupied areas to document adequate ventilation.
- D. Remove open fires and spark producing equipment from application area until vapors have dissipated.

1.07 WARRANTY AND GUARANTEE:

- A. Manufacturer's Guarantee: Provide five year material guarantee.
- B. Contractor's Warranty: Provide warranty against leakage and workmanship defects for a period of two years from date of final acceptance by Owner.

PART TWO - PRODUCTS

2.01 PEDESTRIAN TRAFFIC COATING:

- A. Provide liquid-applied polyurethane deck coating with integral aggregate surface, meeting or exceeding requirements of ASTM C 957. Acceptable products include:
 - 1. "MasterSeal Traffic 1500" by BASF.
 - 2. "Sikalastic 710/735 Traffic System" by Sika.
 - 3. "Peda-Gard" by Neogard.
 - 4. Or approved equivalent.
- B. Base Coat: One-component moisture-curing polyurethane:
 - 1. "MasterSeal M200" by BASF.
 - 2. "Sikalastic 710 Base" by Sika.
 - 3. "70410" by Neogard.

- C. Top Coat: One-component aliphatic moisture-cured polyurethane.
 - 1. "MasterSeal TC 225" by BASF.
 - 2. "Sikalastic 735 AL" by Sika.
 - 3. "7430" by Neogard.

2.02 ACCESSORIES:

- A. Primers: Concrete primer and metal primer as recommended by the pedestrian traffic coating manufacturer.
 - 1. "MasterSeal P222" by BASF.
 - 2. "Sikafloor FTP" by Sika.
 - 3. "7760/7761" by Neogard.
 - 4. Or as recommended by the coating system.
- B. Sealant and Backing Materials: As specified in Section 07 92 00 –Joint Sealants, or as recommended by the pedestrian traffic coating manufacturer.
- C. Aggregate: Clean, rounded quartz sand, oven dried; 16 to 30 mesh, or size as recommended by the pedestrian traffic coating manufacturer.
- D. Cleaning Agents: Toluene or xylene, as recommended by the pedestrian coating manufacturer.

PART THREE EXECUTION

3.01 EXAMINATION:

- A. Power wash and abrade existing surface as necessary to prepare for application of pedestrian traffic coating.
- B. Before pedestrian traffic coating is applied, inspect surface to receive coating. Surface must be free of voids, laitance, loose concrete, loose material on surface, paint, grease, oil, old waterproofing materials, rust, and other contaminants which will affect bond of coating.
- C. Inspect concrete surfaces for variations in surface finish, joint offsets, and other defects that may adversely affect coating application or performance.
- D. Concrete surfaces must be visibly dry and pass a four hour rubber mat test (no condensation) prior to application of coating system.
- E. Commencement of coating installation implies acceptance of surfaces to receive coating as suitable for coating system.
- F. Curing Conditions:
 - 1. Do not apply coating if rain is anticipated within eight hours of application.
 - 2. Do not apply if air and surface air temperatures are anticipated to be lower than 40 degrees Fahrenheit (4 degrees Celsius) or higher than 110 degrees Fahrenheit (43 degrees Celsius) within twenty-four hours of application.
 - 3. Cure times specified are based on curing coating at 77 degrees Fahrenheit (25 degrees Celsius) and 50 percent relative humidity. Lower temperatures and lower humidity require extended cure.

3.02 PREPARATION:

- A. Protect adjacent surfaces with drop cloths and tape, as needed, to control dust and over-spray and to make lines as needed.
- B. Clean surfaces to receive coating materials in accordance with manufacturer's instructions and recommendations. Remove oil and grease with a commercial grade alkaline cleaner; thoroughly rinse and dry. Prepare concrete surfaces by shot blast, blast track, or other method acceptable to coating manufacturer.
- C. Sweep, blow, or vacuum clean surfaces to be coated.
- D. Route or sawcut a 1/4-inch (6mm) wide by 1/4-inch (6mm) deep groove at cracks 1/16-inch (1.6mm) or greater in width and construction joint in the deck.
- E. Sealant: Apply sealant, using backer rod or bond breaker as needed, to expansion, control, and construction joints and routed cracks to be coated. Do not coat expansion and control joints. Install a 3/4-inch (19mm) sealant cove at deck projections where projections are structurally and rigidly connected to substrate, such as curbs, posts, stanchions, railings, rigidly connected wall/slab intersections, and similar such connected items having limited movement.
- F. Primer: Clean and prime concrete, masonry, and metal following manufacturer's recommendations. Apply base coat over primer on the same working day.
- G. Apply primer at the rate of 200 square feet per gallon to 250 square feet per gallon.
- H. Do not apply primer over detail coats of base coat.
- I. Detail Coat: Apply detail coat over preparatory work, cove joints, and cracks under 1/16-inch (1.6mm) and sealed cracks 1/16-inch (1.6mm) and greater in width. Extend detail coat 3-inches (75mm) onto deck on each side of cracks and preparatory work, including inside corners, outside corners, curbs, construction joints, posts, and pipe penetrations. Extend a minimum of 3-inches (75mm), or as shown on the Drawings, onto vertical surfaces. Apply detail coat with a minimum thickness of 25 mils to 32 mils wet film thickness as recommended by the coating manufacturer.
- J. Sealants and detail coats must be cured prior to the application of the base coat.

3.03 APPLICATION:

- A. Base Coat:
 - 1. Apply pedestrian traffic coating material at an average wet film thickness of 25 mils, to 32 mils or as recommended by the pedestrian traffic coating manufacturer. Extend coating over detail coating. Apply coating using a notched squeegee, and backroll.
 - 2. Allow pedestrian traffic coating to cure for sixteen hours minimum, or as recommended by the coating manufacturer.
- B. Top Coat:
 - 1. Apply top coating material at an average dry film thickness of 11 to 20 mils wet film thickness, or as recommended by the pedestrian traffic coating manufacturer.
 - 2. While coating is still fluid, uniformly broadcast aggregate into coating at 10 to 15 pounds per 100 square feet, or as recommended by the pedestrian traffic coating manufacturer. Backroll to encapsulate aggregate.

3. Allow coating to cure overnight.
4. Remove excess aggregate from deck surface by sweeping or vacuuming, followed by air blast, or as recommended by the pedestrian traffic coating manufacturer.
5. Apply second layer of top coat at the rate of 16 mils to 20 mils wet film thickness, and backroll.
6. Allow finished installation to cure for seventy-two hours minimum before permitting traffic on surfaces.

3.04 CLEANING:

- A. Clean stains from adjacent surfaces with appropriate cleaning agents.
- B. Remove masking protection, equipment, material, and debris from deck.

END OF SECTION 07 18 13

SECTION 07 22 00

ROOF AND DECK INSULATION

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Installation of flat-stock polyisocyanurate, tapered polyisocyanurate insulation, and gypsum roof cover board as designated on the applicable roof areas.

1.02 RELATED SECTIONS:

- A. 06 11 00 - Rough Carpentry.
- B. 07 52 10 - Secondary Roof.
- C. 07 52 50 - Modified Bitumen Membrane Roofing System.
- D. 07 54 00 - Thermoplastic Single-ply Membrane Roof System.

1.03 REFERENCES:

- A. American Society for Testing and Materials (ASTM).
- B. Standards:
 - 1. FM Global Approval Guide.
 - 2. Underwriters Laboratories: Building Materials Directory.
 - 3. National Roofing Contractors Association (NRCA): The NRCA Roofing and Waterproofing Manual, latest edition.
 - 4. ASCE 7-10: "Minimum Design Loads for Buildings and Other Structures."
 - 5. Polyisocyanurate Insulation Manufacturer's Association (PIMA): Technical Bulletin 109 - "Storage and Handling Recommendations for Polyisocyanurate".

1.04 QUALITY ASSURANCE:

- A. Regulatory Requirements:
 - 1. Classified by Underwriters Laboratories Inc. as Class A rated material.
 - 2. Follow local, state, and federal regulations, safety standards, and codes. When conflict exists, the more restrictive document shall govern.
- B. Installation:
 - 1. Install in accordance with manufacturer's current published application procedures and general requirements of NRCA.
 - 2. Consider roof system manufacturer's technical specifications part of this Specification and use as reference for specific application procedures.
 - 3. Provide and install roof system to meet or exceed wind uplift resistance pressures as follows: Main Roofs; 67.5 psf in the field, 105 psf along the perimeter of the roof, and 157.5 psf in the corners; Low Roofs; 52.5 psf in the field, 90 psf along the perimeter of the roof, and 135 psf in the corners; Penthouse Roofs; 90 psf in the field, 142.5 psf along the perimeter of the roof, and 187.5 psf in the corners in accordance with ASCE 7-10 and assuming 150 mph wind speed, Exposure B, Enclosed Building, Risk Category III-IV, and a Safety Factor of 1.25.

1.05 DELIVERY, STORAGE, AND HANDLING:

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

1.06 SEQUENCING AND SCHEDULING:

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

1.07 PROJECT CONDITIONS:

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

PART TWO - PRODUCTS

2.01 ROOF INSULATION:

- A. Polyisocyanurate Insulation: Rigid, closed cell polyisocyanurate rigid board insulation utilizing non-chlorine/non-ozone depleting blowing agent, bonded to coated fiberglass facers, ASTM C 1289, Type II, Class 2, Grade 2 (20 psi), 3.5-inch thickness; maximum board size 4-feet by 4-feet for adhered applications; such as "ACFoam-III" by Atlas Roofing Corp, "ENRGY CGF" by Johns Manville, "Paratherm CG" by Siplast, or approved equal.
- B. Tapered Polyisocyanurate Insulation: Rigid, closed cell tapered polyisocyanurate rigid board insulation utilizing non-chlorine/non-ozone depleting blowing agent, bonded to coated fiberglass facers, ASTM C 1289, Type II, Class 2, Grade 2 (20 psi), to achieve ¼-inch resulting slope; such as "Tapered ACFoam-III" by Atlas Roofing Corp, "Tapered ENRGY CGF" by Johns Manville, "Tapered Paratherm CG" by Siplast, or approved equal.

- C. Cover Board: Moisture-resistant gypsum-based roof board, 1/2-inch thick X 4-feet X 4-feet size, such as "Dens Deck Prime" by Georgia Pacific or "SecuRock" by US Gypsum.
- D. Tapered Edge Strip: Tapered perlite insulation complying with ASTM C-728, to be used for tapered edge strips, size 1/2-inch (13mm) to 1-1/2-inch (37.5mm) thick by 6-inches (150mm) to 24-inches (600mm) wide, suitable for site conditions, such as "Tapered Fesco Edge Strip" by Johns Manville.
- E. Fill Insulation (Areas "E" and "F"): Rigid, closed cell polyisocyanurate rigid board insulation utilizing non-chlorine/non-ozone depleting blowing agent, bonded to fiber reinforced facers custom cut and sized to fit between metal roof panel seams; thickness (1-1/2-inch minimum) to match height at top of standing seams of metal panels such as "H-Shield Straight Cut" by Hunter Panels, or approved equal.

2.02 RELATED MATERIALS:

- A. Base Sheet: Asphalt impregnated glass fiber venting base sheet, ASTM D 4897, Type II, for lightweight insulating concrete substrate such as "Venting Base Sheet" by Firestone, "Ventsulation Felt" by Johns Manville, "Parabase FS" by Siplast, or as approved by membrane manufacturer to meet specified wind uplift resistance and warranty requirements.
- B. Heat Resistant Insulation: Molded hydrous calcium silicate-based or perlite-based heat resistant rigid pipe insulation, 2-inches in thickness and sized for installation around circular/tubular element such as "Sproule Pipe Insulation" or "Thermo-12 Gold" by Industrial Insulation Group, 800/334-7997.
- C. Compressible Fill Insulation: Foil or paper faced compressible fiberglass batten roll insulation of proper size and thickness to insert at openings at penetrations, perimeters, and curbs such as manufactured by Owens Corning.
- D. Low-Rise Foam Insulation Adhesive:
 - 1. Single-component Moisture-cured Adhesive: ASTM D-2126, dispensed from portable pressurized containers, such as "DerbiBond LR" by DerbiGum, "Insta-Stik Professional Roofing Adhesive" by Dow Chemical Co., "Para-Stick" by Siplast, or approved equal
 - 2. Dual-component Reaction-cure Adhesive: Two-part spray-applied low-rise urethane foam adhesive such as "OlyBond 500" by OMG, "JM Two-Part Urethane Insulation Adhesive" by Johns Manville, or approved equal.
- E. Insulation Fasteners – Standing Seam Metal Roof (SSMR) at Areas "E" and "F": CR-10 fluorocarbon coated, self-tapping screws of sufficient length to penetrate the steel roof a minimum of 1-inch (25mm), minimum 3-inch (75mm) diameter steel plates with recessed screw head for use with insulation, such as "#15 Heavy Duty Roofing Fastener", "#21 Extra Heavy Duty Roofing Fastener", or approved equal such as manufactured by OMG, or fastener approved by manufacturer as required to achieve the desired wind uplift resistance.
- F. Base Sheet Fasteners – Lightweight Insulating Concrete Deck: Galvanized, G-90 fastener with 1.8-inch galvalume steel tube with locking steel staple and 2.7-inch diameter galvalume steel plate such as "Twin Loc-Nail" by ES Products, "OlyLok Locking Impact Nail" by OMG, or approved equal.

PART THREE - EXECUTION

3.01 EXAMINATION:

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

3.02 PROTECTION:

- A. Provide special protection from traffic on newly installed roof.

3.03 PREPARATION:

- A. Do not install insulation until defects in roof deck and substrates are corrected in order to meet roof system manufacturer's requirements and to ensure that deck conditions will not restrict roof drainage.
- B. Broom sweep and clean areas to receive new insulation.
- C. Perform pull-out resistance tests in general accordance with ANSI/SPRI FX-1-2006 with the specified base sheet fastener on the roof areas with existing lightweight insulating concrete fill substrate and screw fastener on metal roof panels. In addition, perform bonded adhesion tests in general accordance with ANSI/SPRI IA-1-2005 of the specified polyisocyanurate insulation direct to the lightweight insulating concrete fill with proposed foam adhesive. Provide results of the tests to Consultant/Engineer for determination of method of attachment.

3.04 APPLICATION:

- A. General Insulation Installation:
 - 1. Install insulation with longitudinal joints continuous and end joints staggered.
 - 2. Install insulation layers to roof deck/substrate in accordance with manufacturer's criteria to resist designated minimum wind uplift pressures.
 - 3. Field cut and fit insulation boards at penetrations and curbs.
 - 4. Stagger all joints (side and end) between layers of insulation.

- B. Base Sheet Application: Apply one layer of base sheet beginning at low edge and lapping each course 4-inches (100mm) along sides and 6-inches (150mm) at ends. Fasten side and end laps with fasteners spaced 7-inches (175mm) on-center. Down longitudinal center of each base sheet, install two rows of fasteners spaced 7-inches (175mm) on-center with each row staggered and spaced 12-inches (300mm) apart. The number of nailers shall be increased within a minimum 6-foot (2m) wide strip at the perimeter (four rows of fasteners [one at side lap, three in field of sheet, equally spaced]) and within a 9 foot by 9 foot (3m by 3m) area in the corners (five rows of fasteners [one at side lap, four in field of sheet, equally spaced]). Install fasteners utilizing “pound sticks” specifically designed for respective fastener.
- C. Adhered Layers of Insulation:
1. Adhere flat stock and tapered insulation layers to concrete deck, base sheet, secondary roof, or previously installed layers of insulation.
 2. Butt joints tightly allowing no more than 1/4-inch (6mm) wide gaps between units. Fill joints between adjacent boards with like insulation or spray-foam adhesive.
 3. After installation of initial layer of insulation, install subsequent layers of insulation directly over preceding layer.
 4. Install tapered insulation in field of roof to achieve a resulting 1/4-inch per foot (minimum) slope on designated roof areas.
 5. Field cut tapered insulation boards to create crickets at upslope sides of curbs and along walls.
 6. Install tapered edge strips at changes in elevations, edges of crickets, and other locations to create monolithic and uniform substrate for installation of roof cover board and membrane.
 7. Adhere tapered insulation, tapered crickets, and tapered edge strips over the substrate or fill layer.
 8. Adhere cover board over the preceding layers of insulation to form the substrate to receive the roof membrane base ply.
- D. Ribbon Application (Low-rise Foam Adhesive):
1. Dispense 3/4-inch to 1-inch (19mm to 25mm) diameter continuous ribbons of adhesive on substrate to adhere insulation board.
 2. Place the initial ribbon of adhesive 3-inches (75mm) inside each edge/side of the insulation board in a picture-frame fashion. Apply additional parallel ribbons of adhesive across the remainder of the board in a serpentine fashion and spaced approximately 12-inches (300mm) on-center in the field of the roof; spaced 6-inches (150mm) on-center in a 8-foot wide area along the roof perimeter, and 3-inches (75mm) on-center in 8-foot by 8-foot areas at corners or spacing as required to achieve designated wind uplift resistance.
 3. Firmly set insulation boards in the ribbons of foam adhesive following application of the adhesive when adhesive has risen to proper height and walk-in or roll the insulation to spread the adhesive ribbons, ensuring maximum contact. Do not push or slide insulation into position. Set weighted objects on ends, sides, and corners of boards until adhesive has set and insulation is firmly attached (approximately 20 to 45 minutes).

4. On additional insulation layers, dispense ribbons of adhesive in direction perpendicular to the direction of the beads that were dispensed on the underlying layer.
 5. Fill voids or open joints in top layer of insulation with spray-foam adhesive to provide monolithic surface to receive new membrane.
 6. Adhere partial boards and tapered edge strips with adhesive ribbon positioned in picture-frame fashion along perimeter of board and remaining adhesive ribbons spaced in accordance with location on roof (field, perimeter, or corner).
 7. At end of each work day, provide staggered ends of installed boards so that proper joint stagger can be achieved on following roof installation.
- E. Mechanically Attached Insulation Layer (Areas "E" and "F"):
1. Add fasteners through existing SSMR panels to steel structure as necessary to meet wind uplift pressures.
 2. Mechanically attach insulation layers and membrane base ply to existing SSMR.
 3. Install fill insulation between existing SSMR seams.
 4. Install insulation so that insulation board ends and sides bear completely on ribs of the steel deck a minimum of 1/2-inch (13mm).
 5. Install insulation with longitudinal joints continuous and end joints staggered.
 6. Mechanically fasten insulation layers to roof deck in strict accordance with manufacturer's criteria to achieve specified wind uplift resistance.
 7. Fully engage and seat fasteners. Do not overtighten or strip threads. Bent, deformed, or unseated fasteners or plates are unacceptable.
 8. Fasteners must penetrate existing SSMR 1/2-inch (13mm), minimum. Do not overdrive fasteners. Remove and replace overdriven, stripped, or non-engaged fasteners.
 9. Properly seat mechanical fasteners and keep heads flush with plates. Cupped plates or unseated screw heads are not acceptable.
 10. Do not rupture or deform surface of the insulation by mechanical fastening.

3.05 CLEANING:

- A. Remove debris and material wrappers from roof to dumpster daily. Leave insulation clean, dry, and ready to receive new roofing.

3.06 ADJUSTING:

- A. Remove damaged insulation, components, or accessories and install acceptable new units.

3.07 PROTECTION:

- A. Provide special protection from traffic on completed work.

END OF SECTION 07 22 00

SECTION 07 27 13

SELF-ADHERING SHEET AIR BARRIER

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Furnishing and installing a complete non-permeable air barrier assembly including surface conditioner, a monolithic rubberized asphalt membrane, and flashings. To ensure total system compatibility, all products must be purchased from a single-source manufacturer.
- B. Related flashings and accessories

1.02 RELATED SECTIONS:

- A. 02 07 20 - Minor Demolition and Renovation Work.
- B. 06 11 00 - Rough Carpentry.
- C. 07 41 13 - Metal Wall Panels.
- D. 07 52 50 - Modified Bitumen Membrane Roofing.
- E. 07 54 00 - Thermoplastic Single-Ply Membrane.
- F. 07 92 00 - Joint Sealants

1.03 REFERENCES:

- A. American Society for Testing and Materials (ASTM).

1.04 SUBMITTALS:

- A. Provide submittals in accordance with Project requirements.
- B. Product Data:
 - 1. Manufacturer's literature including recommended instructions for installation and Material Safety Data Sheets (MSDS) for each material used in this Section.
 - 2. List of projects of similar nature by both manufacturer and applicator which have been installed during last five years.
 - 3. Submit sample warranty, clearly indicating compliance with warranty requirements for this Project.
- C. Shop Drawings:
 - 1. Clearly indicate details at penetrations, substrate cracks, terminations, and connections to adjacent roofing at top and base of wall.
 - 2. Show installation of air barrier membrane.
 - 3. Shop drawing shall be signed by authorized representative of air barrier membrane manufacturer stating that submittal details meet manufacturer's warranty requirements for this specific Project.
- D. Samples: Submit film samples of cured membrane.

E. Certificates:

1. Submit manufacturer's certification stating materials ordered and supplied are compatible with each other, suited for locale and purpose intended and shipped in sufficient quantity to ensure proper timely installation.
2. Submit manufacturer's project registration form indicating that manufacturer has reviewed project and will issue a warranty upon successful completion of the installation.
3. Submit manufacturer's approval of installer.
4. Submit installer's experience record.
5. Certify materials shipped to project site meet membrane manufacturer's published performance standards and requirements of this Specification.
6. Certification from an approved independent testing laboratory experienced in testing this type material, that the material meets the CGSB 37-GP-50M standard for rubberized asphalt membranes, including applicable ASTM procedures.
7. Certification showing full time quality control of production facilities and that each batch of material is tested to ensure conformance with the manufacturer's published physical properties.
8. Certification showing that all waterproofing and plaza deck system components are being supplied by a single-source manufacturer or as specified.

1.05 QUALITY ASSURANCE:

- A. If manufacturer's details vary from the details indicated on the Contract Documents, follow manufacturer's details where necessary to comply with warranty requirements. Provide changes in details at no additional cost to Owner.
- B. Manufacturer's Qualification:
 1. Membrane manufacturer must have a minimum of ten continuous years in the manufacture of the rubberized asphalt membrane for use as an air barrier membrane.
 2. Obtain primary air barrier materials from single manufacturer. Manufacturer's name shall appear on all containers.
 3. Include single-source documentation for all plaza deck system components from the manufacturer.
 4. Manufacturer's qualified technical representative is required to be at the project periodically during installation and immediately prior to installation of metal wall panels to ensure air barrier has been properly installed and warranty requirements have been met. Manufacturer shall have representative on-site during the first day of application. Written reports describing observations by the manufacturer's representative shall be submitted within one week of each site visit. Should problems arise which affect the system warranty, manufacturer shall have his representative on-site until problems are resolved. The cost for all site visits by manufacturer shall be included in the contract price.
 5. Membrane manufacturer shall have available, an in-house technical staff to assist Contractor, when necessary, in application of the products and final inspection of the assembly.

C. Applicator Qualifications:

1. Licensed, approved, or certified by waterproofing materials manufacturer, with minimum five years experience in application of specified hot applied rubberized asphalt waterproofing. Written certification from the material manufacturer is required.
2. Foreman of field crew shall have minimum of five years experience with specified hot applied rubberized asphalt waterproofing system on equivalent type of projects.
3. Foreman shall be required to be on-site during the entire time of waterproofing operations.

1.06 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials in original unopened containers of packaging clearly labeled with manufacturer's name, brand name, instruction for use, type of material, batch numbers, date of manufacture, shelf life, and all identifying numbers.
- B. Store materials in a neat, safe manner, not to exceed the allowable structural capacity of the storage area.
- C. Store materials in a clean, dry area protected from water and direct sunlight.
- D. Store materials at temperatures between 40 degrees and 110 degrees Fahrenheit.

1.07 PROJECT CONDITIONS:

- A. Install membrane materials under conditions where the following criteria can be met:
 1. Rain is not anticipated within twenty-four hours of outdoor application. Do not commence or proceed with application of the membrane during inclement weather. Ensure surfaces to receive membrane are free of water, dew, frost, snow, and ice.
 2. Substrate surface and ambient temperatures range between 50 degrees Fahrenheit and 110 degrees Fahrenheit.
 3. Open fires and spark producing equipment are not and will not be in application area until vapors have dissipated.
- B. Post "No Smoking" signs in area during and for at least eight hours following application period.
- C. Do not work or walk on exposed air barrier membrane. Install temporary or permanent protection course as necessary to protect membrane during subsequent work operations.
- D. Preparation and application of membrane must be conducted in well ventilated areas.
- E. Over its service life, do not expose membrane or accessories to a constant temperature in excess of 180 degrees Fahrenheit.
- F. Adhesives contain petroleum distillates and are extremely flammable. Do not breathe vapors or use near an open fire. Do not use in confined areas without adequate ventilation. Consult container or packaging labels and Material Safety Data Sheets (MSDS) for specific safety information.
- G. Do not allow waste products (petroleum, grease, oil, solvents, vegetable or mineral oil, animal fat, etc.) to come in contact with the waterproofing membrane. Any exposure to foreign materials or chemical discharges must be presented to membrane manufacturer for evaluation to determine any impact on the waterproofing membrane assembly performance.

H. General Contractor shall assure adequate protection during installation of the waterproofing assembly.

1.08 WARRANTY:

- A. Upon completion of the work, supply Owner with a single-source warranty of U.S. origin direct from the Manufacturer.
- B. Warranties:
 - 1. Material Warranty: Five years.
 - 2. Watertightness Warranty: Includes labor and material; five years.
 - 3. Total System Warranty: Covering all components of the air barrier assembly including penetrations, terminations, sealants, air barrier membrane, and all flashings. Warranty shall include responsibility for removal and replacement of superimposed work covering air barrier; five year watertight condition.
- C. Commence repairs within fifteen days of notification.

PART TWO - PRODUCTS

2.01 MATERIALS:

- A. Self-adhered Sheet Air Barrier Membrane:
 - 1. Acceptable Waterproofing Membrane Manufacturers:
 - a. W.R. Grace.
 - b. Henry Products
 - c. Polyguard Products, Inc.
 - d. Carlisle Coatings and Waterproofing
 - e. Or approved equivalent.
 - 2. Materials:
 - a. "Grace Ultra" by W.R. Grace.
 - b. "Blueskin SA HT" by Henry Products.
 - c. "Deckguard HT" by Polyguard Products, Inc.
 - d. "WIP 300HT" by Carlisle
 - e. Or approved equivalent.
- B. Surface Conditioner/Primer:
 - 1. Materials:
 - a. "Perm-A-Barrier Surface Conditioner" by W.R. Grace.
 - b. "Blueskin Adhesive" by Henry Products.
 - c. "Polyguard Liquid Adhesive" by Polyguard Products, Inc.
 - d. Or approved equivalent.

PART THREE - EXECUTION

3.01 EXAMINATION:

- A. Verify that plywood sheathing has been prepared and is in a condition to receive new waterproofing materials.
 - 1. Fill all voids larger than 1/8-inch.
 - 2. Fill heads of fasteners.
- B. Wood surfaces shall be dry, clean, free of dirt or other contaminants and voids which could affect bond of waterproofing membrane.

3.02 PREPARATION:

- A. All surfaces must be clean, dry, sound, smooth, free of depressions, honeycombs, voids, protrusions, spalled, or delaminated areas, and laitance.
- B. Thoroughly clean surfaces to receive membrane in accordance with manufacturer's recommendations.
 - 1. Repair or clean substrate surfaces as necessary to remove laitance, dust, dirt, loose material on surface, old waterproofing materials, sealants, and other contaminants which will affect bond of waterproofing membrane.
- C. Mask and protect substrates at locations not receiving waterproofing material.
- D. Apply test patch of primer and waterproofing membrane and verify adhesion to substrate.
- E. Apply primer as recommended by manufacturer for horizontal and vertical surfaces.
- F. Metal Surfaces: Remove contaminants which may adversely affect adhesion or performance of coating system and apply metal primer.
- G. Cracks 1/16-inch to 1/4-inch in width: Apply coat of liquid membrane over crack or joint.
- H. Protect adjacent surfaces using drop cloths or masking as required.
- I. Provide protection as necessary to prevent water infiltration to building interior before and during waterproofing operations.

3.03 APPLICATION:

- A. Apply self-adhered membrane as follows:
 - 1. Clean all substrates and blow clean of dust or debris.
 - 2. Prepare surfaces with primer/liquid adhesive to receive self-adhered membrane.
 - 3. Lap flashing 2-inches minimum in shingle fashion.
 - 4. Roll entire surface with hand-held rollers.
 - 5. Apply sealant along edges of seams with liquid membrane or approved sealant.

3.04 FIELD QUALITY CONTROL:

- A. Visually inspect surfaces for voids or ruptures and make necessary repairs.

3.05 CLEANING:

- A. Clean stains from adjacent surfaces with toluene, xylol, or other cleaning fluid recommended by waterproofing membrane manufacturer.

END OF SECTION 07 27 13

SECTION 07 41 13

METAL WALL PANELS

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Provide labor, materials, tools, and equipment for installation of metal support structure, metal wall panels, associated trim, and counterflashing on Elevator penthouses (Areas "E" and "F").
- B. Work described in this Section includes:
 - 1. Install additional new structural steel supports to the existing penthouse steel framing.
 - 2. Install additional new fasteners to adequately secure the existing metal panels to the new and existing steel supports.
 - 3. Install new plywood sheathing over existing metal wall panels securing to new and existing steel supports.
 - 4. Apply self-adhering air barrier to plywood sheathing.
 - 5. Add new Zee furring over air barrier securing to plywood sheathing.
 - 6. Adhere rigid insulation board to air barrier between Zee furring.
 - 7. Install new metal panels and secure to the Zee furring.
 - 8. Secure side joints of metal wall panels with concealed side joint fasteners or exterior gasketed fasteners.
 - 9. Install components required for complete metal wall panel assembly, including metal flashings, corner trim, closures, and sealants.

1.02 RELATED SECTIONS:

- A. 02 07 20 - Minor Demolition and Renovation Work.
- B. 06 11 00 - Rough Carpentry
- C. 07 27 13 - Self-Adhering Sheet Air Barrier.
- D. 07 62 00 - Sheet Metal Flashing and Trim.
- E. 07 92 13 - Elastomeric Joint Sealant.

1.03 REFERENCES:

- A. American Society for Testing and Materials (ASTM).
- B. Federal Specifications (FS).
- C. Sheet Metal and Air Conditioning: Contractor's National Association, Inc. (SMACNA) Architectural Sheet Metal Manual, latest Edition.
- D. National Coil Coaters Association:
- E. National Roofing Contractor's Association: NRCA Roofing and Waterproofing Manual, latest edition.

1.04 SUBMITTALS:

- A. Shop Drawings:
 - 1. Submit complete shop drawings and erection details to Architect for review. Shop drawings shall be sealed by Professional Engineer registered in the State of Texas. Do not proceed with manufacture of new metal panels or installation of existing metal panels prior to review of shop drawings.
 - 2. Shop drawings show methods of erection, elevations, and plans of wall panels, sections and details, anticipated loads, flashings, penetrations, louvers, sealants, interfaces with all materials not supplied, and proposed identification of component parts and their finishes.
- B. Samples: Submit samples and color chips for all proposed finishes.
 - 1. Submit one 12-inch (300mm) long sample of wall panel, including chips.
 - 2. Submit two 3-inch (75mm) by 5-inch (125mm) color chip samples in color selected by Owner's Representative.
- C. List of all mechanical, electrical, rigging, sheet metal, and all other subcontractors with evidence of subcontractor's insurance coverage in compliance with contract requirements.
- D. Proposed personnel resumes and project experience list for specified systems.
- E. Detailed project schedule showing work phasing and proposed daily progress schedule, if required.
- F. Permits, notices, and approvals of governing bodies or agencies.
- G. Applicator's License Certificate: Copy of the material manufacturer's agreement/contract indicating date application was approved and expiration date for the systems specified.

1.05 QUALITY ASSURANCE:

- A. Applicator: A single applicator with a minimum of five years previous successful experience in installations of similar systems.
- B. Applicator shall be approved by manufacturer of accepted wall panel system.
- C. Regulatory Requirements:
 - 1. Follow local, state, and federal requirements, safety standards, and building codes.
 - 2. Refer to applicable building codes for wall system load design requirements. When a conflict exists, the more restrictive document will govern.
- D. Installation:
 - 1. Install in general accordance with the recommendations of the American Metal Roofing Association and manufacturer's current published application procedures. Follow Underwriter's Laboratories requirements acceptable for use with specified products or systems.
 - 2. All wall panel installation shall be as described in this Section, and shall be provided and/or approved by the wall panel system manufacturer. Any materials not manufactured or provided by manufacturer shall have written approval from the manufacturer stating that the materials are acceptable and are compatible with the other materials and systems required.

- E. Perform entire work of this Section in accordance with the best standards of practice relating to trades involved.
- F. Field Measurements: Where possible, prior to fabrication of prefabricated panels, take field measurements of structural or substrate to receive panel system. Allow for trimming panel units where final dimensions cannot be established prior to fabrication.

1.06 PROJECT CONDITIONS:

- A. Protection:
 - 1. Provide protection or limit traffic on the existing roof adjacent to the penthouse.
 - 2. Facility is occupied; therefore, protect interior from sudden storms or inclement weather.

1.07 WARRANTY:

- A. Upon final acceptance for project, metal panel manufacturer to furnish a warranty covering bare metal against rupture, structural failure, and perforation due to normal atmospheric corrosion exposure for a period of twenty years.
- B. Provide warranty covering new prefinished metal finish against cracking, checking, blistering, peeling, flaking, chipping, chalking, and fading for a period of twenty years.
- C. Contractor's Warranty: Furnish written warranty which warrants sheet metal work to be free of leaks and defects in materials and workmanship for two years after date of final acceptance by Owner.

PART TWO - PRODUCTS

2.01 METAL PANEL MANUFACTURERS:

- A. Centria, Inc.
- B. Metal Building Components Inc. (MBCI).
- C. McElroy Metal.
- D. Berridge.
- E. Or approved equal.

2.02 PRIMARY MATERIALS:

- A. Wall Panels: Prefinished galvanized/galvalume panels, single skin concealed fastener metal wall panel with flush-joint profile and interconnecting side joints, raised flat pan, and two stiffener beads, 22 gauge minimum. Nominal width to be 12-inches. Nominal depth to be 1-1/2-inch. Panel typified by "IW-11A" by Centria, "FW-120" by MBCI, "FW-12" by Berridge, "FW Panel" by McElroy Metals, or approved equal.
 - 1. Finish: Premium fluorocarbon coating produced with Kynar 500 resin, twenty year warranty.
 - 2. Color: Selected from manufacturer's standard line to match existing panel color and finish.

3. Required Performances: Fabricate panels and other components of wall system for the following wind pressures: Wall Field Conditions: +67.9 psf; -72.3 psf (+3.25kPa, -3.46kPa); Wall Corner Conditions: +67.9 psf; -85.5 psf (+3.25kPa, -4.09kPa).
- B. Insulation: 1-1/2-inch extruded polystyrene insulation rigid insulation, ASTM C 578.
- C. Additional Structure: 3/16-inch x 3-inch x 3-inch steel angle with primer coating.
- D. Zee Furring: Minimum 18 gauge hot dipped galvanized sheet metal zee furring, 1-1/2-inch wide flanges by 1-1/2-inch deep.
- E. Fasteners:
 1. Exposed fasteners shall be stainless steel self drilling, self-tapping screws with steel backed neoprene washers and pre-finished heads, color to match panel.
 2. Zee Furring-to-Wood Substrate: Galvanized self-drilling steel screw, length suitable to penetrate support member 3/4-inch, as approved by manufacturer and Engineer; Wood screw suitable for penetrating through substrate minimum 3/4-inch, as approved by manufacturer.
 3. Panel-to-Zee Furring: Galvanized self-drilling steel screw, length suitable to penetrate support member 3/4-inch, as approved by manufacturer and Engineer.
- F. Sealant: Medium modulus silicone sealant.
- G. Accessories:
 1. Material used in flashing and transition parts and as furnished as standard by the manufacturer may or may not match the wall panel material. Parts shall be compatible and shall not cause a corrosive condition. Do not use copper and/or lead materials with zinc or aluminum coated panels.
 2. Perpendicular and Parallel Wall Flashings:
 - a. Fabricate flashing from material matching existing wall panel material.
 - b. Details and installation shall be in accordance with the Drawings.

2.03 FABRICATION:

- A. Roll form panels in continuous lengths, full length of detailed runs.
- B. Provide continuous maximum panel length to suit project conditions and eliminate panel end lap splices.
- C. Fabricate trim, flashing, and accessories to detailed profiles.
- D. Fabricate trim and flashing from same type material as panel.
- E. Structural Framing: Shop-fabricate framing components to indicated size and section; welded in place. Provide holes for connections shop-drilled or punched to template dimensions.

PART THREE - EXECUTION

3.01 GENERAL:

- A. Perform entire work of this Section in accordance with the best standards of practice relating to trades involved.
- B. Follow local, state, and federal regulations, safety standards, and codes. When a conflict exists, the more restrictive document shall govern.

- C. Comply with wall panel fabricator's and material manufacturer's instructions and recommendations for installation as applicable to project conditions and supporting substrates. Anchor panels and other components of the work securely in place, with provisions for thermal/structural movement.

3.02 INSTALLATION:

- A. Coordinate installation of metal wall panel system with adjacent trades/material.
- B. Steel Angle Installation: Secure each flange of the steel angle with appropriate fasteners or weld at each existing vertical structure.
- C. Plywood Sheathing Installation:
 - 1. Secure plywood sheathing to existing and new steel structure with appropriate fasteners. Attachment pattern necessary to meet required wind pressures.
 - 2. Stagger plywood sheathing joint minimum of 12-inches from adjacent sheet.
- D. Self-Adhering Air Barrier:
 - 1. Refer to specification Section 07 27 13, Self-Adhering Sheet Air Barrier.
 - 2. Install self-adhering air barrier to plywood sheathing extending to underside of eave at top of wall and over roof membrane termination at base of wall.
 - 3. Prime substrate as necessary.
 - 4. Roll entire surface with hand-held roller.
 - 5. Overlap adjoining sheets minimum of 2-inches.
 - 6. Repair fishmouths, blisters, etc. per membrane manufacturer's recommendations.
- E. Zee Furring:
 - 1. Erect Zee furring true to line, level, plumb, rigid, and secure.
 - 2. Space Zee furring as recommended by metal wall panel engineer but not less than 24-inches on center.
 - 3. Fasten Zee furring with appropriate fasteners at spacing necessary to meet required wind pressures.
- F. Rigid Insulation Installation:
 - 1. Cut insulation panels to fit snugly between Zee furring and extending to the eave and base of wall.
 - 2. Secure insulation to self-adhering air barrier with adhesive recommended by insulation and air barrier manufacturers.
 - 3. Fill voids at joints of insulation board larger than 1/8-inch with manufacturer's recommended expanding foam insulation.
- G. Wall Panel Installation:
 - 1. Secure metal panels to Zee furring with self-drilling, self-tapping screws.
 - 2. Install flashings and accessories at tops, bottoms, corners, terminations, and penetrations through panels.
 - 3. Install continuous compressible foam rubber closures to match panel configuration at ends of panels and at termination locations.
 - 4. Install continuous compressible foam rubber blocking/baffle between metal panel and Zee furring along weeped base trim.

3.03 INSTALLATION TOLERANCE:

- A. Shim and align units within installed tolerance of:
 - 1. 1/4-inch (6mm) in 20 feet (6m).
 - 2. 1/8-inch in 5 feet.
 - 3. 1/2-inch across width and height of building elevation.
- B. Within 1/16-inch (1.5mm) offset of adjoining faces and of alignment of matching profiles.

3.04 JOINT SEALERS:

- A. Install gaskets, joint fillers, and sealants where required for weatherproof performance of panel systems.

3.05 EXPANSION/CONTRACTION:

- A. Wall panels shall provide thermal expansion/contraction without detrimental effect when there is a +/- 100 degree temperature difference between the inside structural framework of the building and the temperature of the wall panels.
- B. All end wall trim and roof transition flashing shall allow the roof panel to move relative to the wall panels as the roof expands and contracts with temperature change.

3.06 CLEANING AND PROTECTION:

- A. Remove temporary protective coverings and strippable films (if any) as new panels are installed. Upon completion of panel installation, clean finish surfaces as recommended by panel manufacturer. Maintain in a clean condition throughout construction.
- B. Touch up minor scratches and abrasions.
- C. Replace all damaged panels and other components of the work which have been damaged or have deteriorated beyond successful repair by means of finish, touch up, or similar minor repair procedures.

END OF SECTION 07 41 13

SECTION 07 52 10

SECONDARY ROOF

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Installation of smooth-surfaced modified bitumen secondary roof membrane and flashings on top of existing deck on Areas "A", "B", "C", and "D".

1.02 RELATED SECTIONS:

- A. 02 07 20 - Minor Demolition and Renovation Work.
- B. 07 22 00 - Roof and Deck Insulation.
- C. 07 52 50 - Modified Bitumen Membrane Roof System.

1.03 REFERENCES:

- A. American Society for Testing and Materials (ASTM).

1.04 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.
- B. Store rolled goods on end on clean raised platforms with weather protective covering when stored outdoors.
- C. Provide continuous protection of materials against wetting and absorption; remove wet materials from project site.

1.05 PROJECT CONDITIONS:

- A. Environmental Requirements:
 - 1. Apply secondary roof in dry weather (30 percent or less chance of rain as reported by National Weather Service).
 - 2. Do not apply secondary roof when ambient temperature is below 40 degrees Fahrenheit (4 degrees Celsius), except as approved in writing by Owner.
 - 3. Do not apply secondary roof when wind speeds exceed 30 mph (48 km/h).

1.06 SEQUENCING AND SCHEDULING:

- A. Coordinate installation of secondary roof with removal of existing roofing and installation of new roofing.
- B. For each day's work, install completed secondary roof required for watertight installation, including projections, wall, and perimeter flashings.

PART TWO - PRODUCTS

2.01 MATERIALS:

- A. Secondary Roof Membrane and Flashing: Smooth surfaced polyester reinforced APP or SBS modified bitumen sheet such as Paradiene 20 PR TG” by Siplast, “DerbiBase HV” by DerbiGum, “DynaWeld PR” by Johns Manville, “ “Sopralene Flam 180” by Soprema, or approved equal.
- B. Asphalt Primer: ASTM D 41 asphalt-based primer.
- C. Plastic Cement: Elastomeric plastic roof cement such as “MBR Flashing Cement” by Johns Manville, "Matrix 201 Plastic Roof Cement" by GAF, or approved equal.
- D. Base Sheet: Asphalt impregnated glass fiber venting base sheet, ASTM D 4897, Type II, for lightweight insulating concrete substrate such as “Venting Base Sheet” by Firestone, “Ventsulation Felt” by Johns Manville, “Parabase FS” by Siplast, or as approved by membrane manufacturer to meet specified wind uplift resistance and warranty requirements.
- E. Base Sheet Fasteners – Lightweight Insulating Concrete Deck: Galvanized, G-90 fastener with 1.8-inch galvalume steel tube with locking steel staple and 2.7-inch diameter galvalume steel plate such as "Twin Loc-Nail" by ES Products, "OlyLok Locking Impact Nail" by OMG, or approved equal.

2.02 MISCELLANEOUS MATERIALS:

- A. Approved by roof system manufacturer and insulation manufacturer.

PART THREE - EXECUTION

3.01 EXAMINATION:

- A. Verify that existing roofing, flashings, and obsolete equipment have been removed and other preparatory work has been completed.
- B. Examine surfaces for defects, rough spots, ridges, depressions, foreign material, moisture, unevenness, and other conditions that would prevent proper application of secondary roof.
- C. Do not proceed until defects are corrected.
- D. Complete all demolition, remove abandoned curbs/penetrations, and repair openings in deck.

3.02 PREPARATION:

- A. Verify that debris has been completely removed.
- B. Broom clean roof decks immediately prior to application. Allow to dry.
- C. Prior to installation, seal all openings, projections, and penetrations in the substrate to prevent migration of foreign debris into building. Damage to the building or interior components caused by work shall be corrected by Contractor at his sole expense.
- D. Apply roofing in accordance with roofing system manufacturer's instructions and the following requirements.

3.03 APPLICATION:

- A. Non-Nailable Substrate/Concrete Substrate: Prime deck substrate with asphalt primer at rate of 1 gallon per 150 to 200 square feet (14m² to 19m²).
- B. Nailable Substrate: Install and secure base sheet to nailable substrate in accordance with manufacturer's requirements to meet or exceed specified wind uplift requirements or as specified herein. Apply one layer of base sheet beginning at low edge and lapping each course 4-inches (100mm) along sides and 6-inches (150mm) at ends. Install red rosin paper in conjunction with base sheet as required by manufacturer. Fasten side and end laps with fasteners spaced 7-inches (175mm) on-center. Down longitudinal center of each base sheet, install two rows of fasteners spaced 7-inches (175mm) on-center with each row staggered and spaced 12-inches (300mm) apart. The number of fasteners shall be increased within a minimum 6-foot wide strip at the perimeter and within a 6 foot by 6 foot area in the corners.
- C. Install roof materials in accordance with manufacturer's current published application instructions.
- D. Fully adhere secondary roof membrane to the substrate. Lay membrane parallel to long dimension of roof.
- E. Lay roofing free of wrinkles, creases, or fishmouths. Exert sufficient pressure on the roll during application to ensure prevention of air pockets. Lap sides and ends a minimum of 3-inches (75mm). Stagger end laps a minimum of 3 feet (1 meter) from adjacent plies.
- F. Cut out and patch fishmouths and other defects daily.
- G. Apply secondary flashing membrane at curbs, penetrations, walls, and perimeters as required to make permanent watertight secondary roof system. Extend the ply sheet to top edge of curbs or minimum 8-inches vertically up substrate or element and seal top edge with troweling of plastic cement.
- H. Check lap seams and seal unbonded or discontinuous seams using a heated steel trowel.
- I. Apply a patch over areas of secondary membrane with defects. Patch shall be the full width of ply and extend a minimum of 2-inches (50mm) beyond the defect in each direction.
- J. Daily Seal:
 - 1. Install temporary night seal at completion of each day's work and remove upon resumption of work. Tie-in water cut-off to the new temporary roof and the existing roof membrane. Prepare an area a minimum of 12-inches (300mm) wide on the existing roof membrane for application of water cut-off.
 - 2. Ensure that water does not flow beneath any completed sections of the membrane system. This will include completion of all flashings, terminations, and daily seals.
 - 3. Exercise caution to ensure that membrane is not temporarily sealed in such a way to promote water migration below the membrane or impede drainage.
- K. Maintain facility in watertight condition at all times.

3.04 ADJUSTING:

- A. Restore to original condition or replace work or materials damaged during handling of roofing materials.

3.05 CLEANING:

- A. Remove soiling due to work from surfaces other than those requiring roof coatings.

3.06 PROTECTION:

- A. Provide special protection or avoid heavy traffic on completed work when ambient temperature is above 80 degrees Fahrenheit (27 degrees Celsius).

END OF SECTION 07 52 10

SECTION 07 52 50

MODIFIED BITUMEN MEMBRANE ROOFING

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Installation of new two-ply modified bitumen roof system and related flashings on subject roofs.
- B. Installation of modified bitumen ply sheet and reinforced liquid flashing membrane on Areas "G", "H", and "I".

1.02 RELATED SECTIONS:

- A. 02 07 20 - Minor Demolition and Renovation Work.
- B. 06 11 00 - Rough Carpentry
- C. 07 22 00 - Roof and Deck Insulation.
- D. 07 27 13 - Self-Adhering Sheet Air Barrier.
- E. 07 52 10 - Secondary Roof.
- F. 07 62 00 - Sheet Metal Flashing and Trim.
- G. 07 92 13 - Joint Sealants.

1.03 REFERENCES:

- A. American Society for Testing and Materials (ASTM).
- B. Standards:
 - 1. FM Global Approval Guide.
 - 2. Underwriters Laboratories: Building Materials Directory.
 - 3. National Roofing Contractors Association (NRCA): The NRCA Roofing and Waterproofing Manual, latest edition.
 - 4. ASCE 7-10: "Minimum Design Loads for Buildings and Other Structures."
 - 5. SPRI "Application Guidelines for Modified Bitumen Roofing Systems".
 - 6. Cool Roof Rating Council (CRRC).
 - 7. FMGlobal Property Loss Prevention Data Sheets
 - a. DS 1-28 "Wind Design".
 - b. DS 1-29 "Roof Deck Securement and Above-deck Roof Components".
 - c. DS 1-33 "Safeguarding Torch-applied Roof Installations"
 - d. DS 1-49 "Perimeter Flashing".
 - e. DS 1-52 "Field Verification of Roof Wind Uplift Resistance".

1.04 QUALITY ASSURANCE:

- A. Application:
 - 1. Approved by manufacturer of accepted roofing system.
 - 2. A single applicator with a minimum of five years previous successful experience in installations of similar systems.

- B. Manufacturer Requirements:
1. Roof Membrane Assembly: Classified by Underwriters' Laboratories, Inc. as a Class A roof covering with no slope limitations.
 2. Roof Membrane Assembly: Classified by FM Global as a Class 1, approved assembly and Class 1-SH (Severe Hail) exposure.
 3. Manufacturer to have direct actual in-house experience in the manufacturing of the specified products for a period of a minimum of twenty years.
 4. Manufacturer to have documented project history of installation of the specified products in the United States for a period of a minimum of twenty years.
 5. Manufacturer to provide authorized documentation of the physical/ mechanical properties from the testing laboratory of Manufacturer of the actual materials utilized for the project indicating compliance with applicable ASTM standards D 5147 and D 6298.
 6. Manufacturer's products shall comply with the following standards:
 - a. Polyester/Fiberglass composite reinforcement SBS modified bitumen sheet, ASTM D 6162, Grade S or G, Type 1 – 3.
 - b. Fiberglass-reinforced SBS modified bitumen sheet, ASTM D 6163, Type 1 – 3, Grade S or G.
 - c. Polyester-reinforced SBS modified bitumen sheet, ASTM D 6164, Type 1 – 3, Grade S or G.
 - d. Polyester-reinforced APP modified bitumen sheet, ASTM D 6222, Type 1 or 2, Grade S or G.
- C. Regulatory Requirements:
1. Products Manufactured in the United States.
 - a. Classified by Underwriters' Laboratories, Inc. as a Class A roof covering.
 - b. Classified by FM Global as a Class 1-A approved assembly.
 - c. Provide and install roof system to meet or exceed wind uplift resistance pressures as follows: Low Roofs (Eave Heights of 24-feet): 52.5 psf in field of roof; 90 psf along perimeter of roofs; and 135 psf in corners of roof; Main Roofs (Eave Heights of 51-ft): 67.5 psf in field of roof; 105 psf along perimeter of roofs; and 157.5 psf in corners in accordance with ASCE 7-10 assuming 150 mph wind speed, Exposure B, Fully Enclosed Building, Safety Factor of 1.25; and Risk Category III-IV; Perimeter Zone is 8-feet wide. Corner Zone is 8-feet X 8-feet.
 2. Follow federal regulations, safety standards, and codes mandated in the United States related to the subject work.
- D. Laboratory Testing and Samples:
1. At Owner's request, obtain field samples of the completed roof membrane, laps, and/or assembly.
 2. Take samples at locations designated by Consultant and test for compliance with the requirements on the Contract Documents and with manufacturer's published performance criteria.
 3. Perform test in accordance with accepted ASTM methods.

4. Assume all costs for extraction and patch of all samples. Owner shall assume all costs for testing of field sample.
 5. Correct all deficiencies in accordance with the manufacturer's recommended procedures at no cost to Owner.
 6. If for any reason, areas that are tested by Owner fail to meet manufacturer's requirements, then all subsequent expense for retesting of those areas will be borne by Contractor.
- E. Installation:
1. Install in accordance with manufacturer's current published application procedures and the general recommendations of the NRCA.
 2. Upon completion of installation, an inspection shall be conducted by a technical representative of the manufacturer to certify that roofing system has been installed according to manufacturer's most current published specifications and details.
 3. Roofing as described in this Section shall be provided and/or approved by roof system manufacturer.
 4. Obtain written approval from the manufacturer for any materials not manufactured or provided by manufacturer stating that materials are acceptable and are compatible with other materials and systems required.
 5. Personnel designated to utilize propane torching equipment to install roofing materials must have current CERTA safety certification issued by MRCA.
- F. Make no deviations made from this Specification or the approved shop drawings without prior written approval of Owner's Representative and roof membrane manufacturer.
- G. Perform entire work of this Section in accordance with the best standards of practice relating to the trades involved.
- H. Upon completion of the completed roof installation, field wind uplift tests will be performed by an independent entity in accordance with FM FDS 1-52 on the subject roofs. Roofs, or portions thereof, that do not pass the respective tests shall be replaced/repared in an acceptable manner at no additional costs to Owner.

1.05 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.
- B. Store materials in accordance with manufacturer's recommendations. Store rolled goods on clean raised platforms. Store other materials in dry area, protected from water and direct sunlight, and maintain at a temperature of 16 to 27 degrees Celsius.
- C. Provide continuous protection of materials against deterioration.
- D. Materials Stored on Roof Levels for Immediate Use:
 1. Distribute to prevent concentrated loads that would impose excessive strain on deck or structural members or restrict positive drainage.
 2. Positively secure to prevent displacement by wind.

3. Tarp for protection from exposure.
4. Cut and remove manufacturer's plastic "shrink wrapping" from materials during storage.

1.06 PROJECT CONDITIONS:

- A. Existing Conditions: Examine existing building and existing roofing and decking to determine physical conditions that affect removal of existing roofing and installation of new roofing.
- B. Environmental Requirements:
 1. Apply roofing in dry weather.
 2. Do not remove existing roofing and flashing in inclement weather or when rain is predicted (30 percent or more possibility).
 3. Do not remove existing roofing and flashing when ambient temperature is below 4 degrees Celsius.
 4. Do not expose membrane and accessories to a constant temperature in excess of 82 degrees Celsius.
- C. Protection:
 1. Provide special protection or avoid heavy traffic on completed work when ambient temperature is above 26 degrees Celsius.
 2. Restore to original condition or replace work or materials damaged during handling or roofing materials.
- D. Emergency Equipment: Maintain on-site equipment necessary to apply emergency temporary protection of roof and building in the event of sudden storms or inclement weather.

1.07 SEQUENCING AND SCHEDULING:

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

1.08 WARRANTY:

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

PART TWO - PRODUCTS

2.01 MANUFACTURER:

- A. Modified Bitumen Roofing Manufacturers
 - 1. Siplast.
 - 2. DerbiGum.
 - 3. Johns Manville.
 - 4. Soprema.
 - 5. Firestone.
 - 6. Certainteed.
 - 7. Or approved equal.

2.02 SHEET MATERIALS:

- A. Roof Membrane:
 - 1. SBS Membrane:
 - a. SBS Membrane Base Ply: Smooth surfaced, polyester reinforced, SBS modified bitumen sheet, suitable for heat-welding/torching such as "Paradiene 20 PR TG" by Siplast or "or "DynaWeld 180S" or "DynaBase PR" by Johns Manville", "Sopralene Flam 180" or "Sopralene 180 PS" by Soprema, or approved equal.
 - b. SBS Membrane Top Ply: Granule-surfaced, polyester/fiberglass reinforced, SBS modified bitumen sheet, suitable for heat-welding/torching such as "Paradiene 30 CR FR BW TG" by Siplast or "Sopralene Flam 180 FR GR SG" by Soprema; "DynaWeld Cap 180 CR FR G" by Johns Manville, or approved equal.
 - c. SBS Base Flashing: One-ply of specified membrane base ply and one ply of top sheet or polyester-reinforced SBS modified bitumen flashing sheet with same finish as cap sheet.
 - 2. APP Membrane:
 - a. APP Membrane Base Ply: Smooth surfaced, polyester reinforced, torch-applied APP modified bitumen sheet such as "DerbiBase HV" by DerbiGum, "APP 160" by Firestone, "Flintlastic STA" by Certainteed, or approved equal.
 - b. APP Membrane Top Ply: Granule-surfaced, white color, polyester/fiberglass reinforced, APP modified bitumen sheet suitable for application with cold-adhesive or heat-welding/torching such as "DerbiColor P CR FR" by DerbiGum, "APP 180 FR UltraWhite" by Firestone, "Flintlastic GTA FR CoolStar" or approved equal.
 - c. APP Base Flashing System: One-ply of specified membrane base ply and one ply of specified top ply or approved equal.

2.03 RELATED MATERIALS:

- A. Asphalt Primer: ASTM D 41.
- B. Edge Sealant: Rubberized asphaltic plastic roof cement that is gun-grade version for sealing top edges of base flashings and terminations of cap sheet such as "Elastomastic 209" by Henry Co.

- C. Elastomeric Plastic Roof Cement: Rubberized plastic roof cement/adhesive such as "PA-1021" by Siplast, "PerFlash" by DerbiGum, "MBR Flashing Cement" by Johns Manville, or approved equal to be used for temporary seals of flashings, embedding sheet metal flanges, and three coursing of seams and cuts in modified bitumen sheets.
- D. Reinforcing Fabric: 6-inch wide asphalt coating fiberglass or polyester mesh.
- E. Fasteners - Steel Deck: CR-10 fluorocarbon coated, self-tapping screws of sufficient length to penetrate the steel deck a minimum of 1-inch (25mm), minimum 3-inch (75mm) diameter steel plates with recessed screw head for use with insulation, such as "#15 Heavy Duty Roofing Fastener" or "#21 Extra Heavy Duty Roofing Fastener" as manufactured by OMG, or approved fastener required to attached roof membrane to achieve the desired wind uplift resistance.
- F. Liquid Flashing System: Fluid-applied reinforced flashing system to apply around roof penetrations, low-profile flashing substrates, or other suitable locations that would be included in the warranty coverage for the roof membrane system, "Parapro" by Siplast", "DerbiFlash" by Derbigum, "SeamFree PMMA Flashing" by Johns Manville, "Alsan" by Soprema, "UltraFlash" by Firestone, "SmartFlash" by Certainteed, or approved equal.
- G. Cant Strip: 3-5/8-inches (92mm) by 1-1/2-inches (38mm) composite cant strips of perlite such as "FesCant Plus" by Johns Manville or "Energy Guard Perlite Cant Strip" by GAF with field-cut strips of gypsum cover board with chamfered ends.
- H. Walk Pads/Protection Pads: Pre-manufactured sheet or cut sections of granule surfaced polyester-reinforced modified bitumen sheet, extending minimum 2-inches (50mm) beyond edge of overlying element, with rounded corners and to have contrasting finish color from top ply such as "ParaTred" by Siplast, "DynaTred" by Johns Manville, or approved equal.
- I. Heavy-duty Protection Pad: Asphaltic composite board with mineral surfacing, 3/4-inch thick, (3' X 3') (3' X 5') size to suit application, such as "Whitewalk" by W.R. Meadows (2555 N.E. 33rd Street, Fort Worth, Texas 76111, 817/834-1969) or panel composed of recycled rubber particles such as "Roof-Gard Pads" by Humane Manufacturing, LLC (805 Moore Street, Baraboo, Wisconsin 53913, 800/369-6263), "Duo-Pad" by W.R. Meadows (1/2-inch by 30-inch by 4 foot) (3/4-inch by 33-inch by 4-foot), or "Walkway Roof Pads" by RB Rubber Products, Inc. (904 N.E. 10th Avenue, Portland, Oregon 97128, 503/472-4691)

2.04 MISCELLANEOUS MATERIALS:

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

PART THREE - EXECUTION

3.01 EXAMINATION OF SURFACES:

- A. Contractor shall examine the substrate, roof deck, and related surfaces and verify that there are no conditions such as inadequate anchorage, foreign materials, moisture, ridges, or other conditions which would prevent the satisfactory installation of the roofing system.

- B. Correct or complete any condition requiring correction or completion prior to the installation of the roofing system. Notify Owner's Representative in writing of unacceptable conditions.
- C. Verify the location of all interior ducts, electrical lines, piping, conduit, and/or similar obstructions. Perform all work in such a manner as to avoid contact with the above-mentioned items.
- D. Start of work under this Part Three constitutes acceptance of substrate and site conditions.

3.02 PREPARATION:

- A. Do not stockpile debris on roof surface.
- B. Promptly remove debris each day. Use hoist to transfer debris from roof surface to disposal container.
- C. Install plywood sheathing to inside of parapet walls and onto rise walls.
- D. Cleaning:
 - 1. Verify that debris has been completely removed.
 - 2. Broom clean and airblow substrate immediately prior to surface preparation.

3.03 APPLICATION:

- A. Prior to roof membrane installation, seal all openings, projections, and penetrations in the substrate to prevent entry of materials into the building. Correct damage to the building or interior components caused by material entry.
- B. Membrane Installation - General:
 - 1. Apply roofing in accordance with roofing system manufacturer's instructions and the following requirements.
 - 2. The overall appearance of the finished roof application is a standard requirement for this project. Make necessary preparations, utilize recommended application techniques, apply specified materials, and exercise care to ensure finished application is acceptable to Owner's Representative.
 - 3. Prime top and bottom of metal surfaces (flashing flanges, lead drain flashings, etc.), concrete surfaces, and masonry surfaces with a uniform coating of asphalt primer, at a nominal rate of 1 gallon/100 square feet (3.8 liters per 9.29 square meters).
 - 4. Place cant strips on top of substrate to form continuous monolithic substrate at walls and curbs. Secure fibrous cants by embedding in ribbons of low-rise foam adhesive or uniform troweling of plastic roof cement, nominal 1/4-inch thick, across entire bottom of cant. Miter cut cant strips to form continuous substrate at corners. Adhere cut piece of roof cover board in low-rise foam adhesive over top of fibrous cant.
 - 5. Lay all layers of roofing free of wrinkles, creases, or fishmouths. Exert sufficient pressure on the roll during application to ensure prevention of air pockets.
 - 6. Lay layers of roofing perpendicular or parallel to the slope of the deck as recommended by manufacturer.

7. Install roof system configuration and components as required to meet the requirements of the testing assembly for the respective proposed roof material manufacturer. Provide additional ply of polyester-reinforced base ply mechanically-attached with insulation board to steel deck as required to meet wind uplift criteria.
- C. Membrane Base Ply Application:
1. Install roof system configuration and components as required to meet the requirements of tested assembly for the respective proposed roof material manufacturer. Provide additional ply of polyester-reinforced base ply mechanically-attached with insulation board to steel deck as required to meet wind uplift criteria.
 2. Unroll base ply sheet and cut into 15-foot (5m) lengths. Lay cut sections of sheet down to allow sheet to relax prior to application. Prior to application, re-roll "relaxed" sheet using cardboard insert provided with roll.
 3. Beginning at the low point on the roof, fully adhere the modified bitumen sheet to the substrate. Maintain a steady torching technique to ensure that the entire bottom surface of the sheet achieves the proper temperature for adhesion. Keep the roll in close proximity to the torch technician. Exert sufficient pressure on roll during application.
 4. Apply heat evenly across the face and full width of the roll while unrolling roll uniformly with an even downward pressure. Apply torch flame to roll until the bitumen back coating reaches the design application temperature, resulting in melting of the burn-off film, a glossy appearance of the back coating, and an approximate ¼-inch to ½-inch (6 mm to 13 mm) bitumen flow from edge of sheet.
 5. Fully adhere membrane base ply to substrate and have a minimum of 3-inch (75 mm) side laps and 6-inch (150 mm) end laps. Stagger end laps of adjacent sheets of membrane base ply a minimum of 3-feet (1 m). Extend field sheet of membrane base ply to top edge of cant.
 6. Complete membrane base ply application over respective roof area prior to application of membrane top ply. Apply additional ply of membrane base ply in low areas or areas that may be subjected to ponding water. Install base ply at roof drain with side lap centered over drain opening.
 7. Apply a patch over areas of membrane with areas of physical damage or other defects. Patch shall be the full width of membrane base ply and extend a minimum of 2-inches (50 mm) beyond the defect in each direction.
 8. Check lap seams and seal unbonded or discontinuous seams using a heated steel trowel.
- D. Base Flashing Application - Base Ply:
1. Install and complete application of base ply of flashing each day the base ply of membrane is installed.
 2. Install first ply of base flashing extending horizontally 4-inches (100 mm) beyond edge of cant or flange and vertically 4-inches (100 mm), minimum above the top of the cant.

3. Length of base flashings shall be maximum 6-feet (2 m). Lap ends of base ply flashings 4-inches (100 mm), minimum. Seal top edge of base ply flashing on a daily basis with a continuous troweling of elastomeric roof cement.
 4. Check lap seams and seal unbonded or discontinuous seams of base ply flashing using a heated steel trowel.
 5. For wood substrate, mechanically attach a base sheet 8-inches (200mm) on-center in all directions and along lap seams, overlapping adjacent sheets 4-inches (100mm), minimum. Adhere modified bitumen base ply flashing to base sheet.
 6. Where existing substrate is deemed unacceptable to install new materials, attach plywood or acceptable gypsum sheathing to serve as new substrate for flashing membrane.
- E. Strip-in Flashing:
1. Prime top and bottom of metal flanges and other sheet metal components completely and allow to dry prior to installation.
 2. After membrane base ply has been applied, install metal flange flashings according to Section 07 62 00 - Sheet Metal Flashing and Trim. Strip-in flange/metal with strips of base flashing (base ply) concealing entire flange or horizontal surface of metal flashing and extending a minimum of 4-inches (100mm) beyond edge of flange/metal and heat-fusing strip-in to base ply.
- F. Membrane Application - Top Ply:
1. Unroll top ply and cut into 15 foot lengths. Lay cut sections of top ply down to allow sheet to relax prior to application. Prior to application, re-roll "relaxed" sheet using cardboard insert provided with roll.
 2. Beginning at the low point on the roof, fully adhere membrane top ply to membrane base ply and have a minimum of 3-inches (75 mm) side laps or width of selvage edge and 6-inches (150 mm) end laps. Extend membrane top ply to top edge of cant. Apply each sheet directly behind torch technician. Stagger side laps of top ply a minimum of 12-inches (300 mm) from side laps of base ply.
 3. Apply heat evenly across the face and full width of the roll while unrolling roll uniformly with an even downward pressure. Apply torch flame to roll until the bitumen back coating reaches the design application temperature, resulting in melting of the burn-off film, a glossy appearance of the back coating, and an approximate ¼-inch to ½-inch (6 mm to 13 mm) bitumen flow from edge of sheet. Apply heat to top surface of base ply to receive heated cap sheet to develop an initial softening or "tackiness" of top coating.
 4. While installing membrane top ply, provide proper protection or method during application to prevent contamination, soiling, charring, or marking the granule surfacing of previously installed sheet. Exert sufficient downward pressure on roll during application. Utilizing appropriate tool, pull the roll toward direction of application while heating bottom portion of roll and substrate. Do not stand on subject sheet during torching process.

5. During end lap application, trim the inside corner along the selvage edge of the underlying sheet at the end of the roll. The trimmed area shall be the width of the selvage edge and extend downward from the end of the roll to the outer side of the roll in a linear direction approximately 5-1/2-inches (138mm) from end of roll. Trim outside corner of membrane top ply at end laps to provide rounded finished corner.
 6. On colored-granulated sheet, embed colored granules into bituminous bleed-out along edges of cap sheet to provide monolithic surface color. On white-surfaced sheet, apply elastomeric coating or surfacing material approved/supplied by manufacturer over bituminous bleed-out along edges of cap sheet to provide monolithic surface color.
 7. Install membrane top ply so that end laps of every other sheet is aligned.
 8. Roof Drain: Install top ply centered over drain opening extending under clamping ring. Apply elastomeric plastic cement and reinforcing fabric on sheet to cover cuts made to conform sheet to sump. Install clamping ring and secure.
 9. Apply a patch over areas of membrane with displaced top bitumen coating or other defects. Patch shall be the full width of membrane top ply and extend a minimum of 2-inches (50 mm) beyond the defect in each direction.
 10. Check lap seams and seal unbonded or discontinuous seams using a heated steel trowel.
 11. At sheet metal flashings, apply membrane top ply and terminate at the rise in the metal component. Apply a continuous bead of edge sealant along edge terminations of modified bitumen sheet (i.e. flashing flanges, exhaust vents, metal edge, etc.). Bead of edge sealant shall match height of top sheet surfacing and shall be "canted" to shed water. Embed loose granules or coat with elastomeric coating, color to match top ply, into newly installed edge sealant.
- G. Base Flashing Application - Top Ply:
1. Apply top ply of flashings only after membrane top ply is in place.
 2. "Torch de-granulate" granulated surfaces of flashings to receive flashing. Pre-heat the subject area of the underlying granule-surfaced sheet so that granules can be "depressed" or sunk into the compound and the bitumen compound exudes up through the granules to result in a bituminous material-to-bituminous material contact.
 3. Cut modified bitumen flashing membrane to extend a minimum of 4-inches (100 mm) above the top of the membrane top ply covering the cant. The overall minimum height of the top of the flashing membrane above the top of the roof surface is 8-inches (200 mm). Extend flashings to full height of vertical substrate.
 4. Extend the flashing membrane horizontally 4-inches (100 mm) onto the field of the roof surface beyond the bottom edge of the cant strip.
 5. Cut flashing from roll using selvage edge as lap seam for adjacent sheets resulting in sheet lengths of nominal 3-feet (1 m). Lap ends a minimum of 4-inches (100 mm) and stagger laps from laps of underlying plies.

6. Fully adhere and conform top ply of flashing to substrate. Extend bleed-out of applied base flashing a minimum of ½-inch (13 mm) beyond the side or end lap.
 7. Mechanically attach top edge of modified bitumen membrane flashing with termination bar and appropriate fasteners spaced 6-inches (150 mm) on-center. Apply continuous troweling of elastomeric plastic roof cement and reinforcing fabric along top edge of base flashing.
 8. Walls: Mechanically attach top edge of modified bitumen membrane flashing with appropriate fasteners and termination bar. Fastener spacing shall be 6-inches (150 mm) on-center. Apply three-coursing consisting of an initial continuous troweling of elastomeric plastic roof cement, embedded reinforcing fabric, and a secondary application of elastomeric plastic roof cement along and concealing the top edge of base flashing and termination bar.
 9. Curbs: For curbs with non-removable hoods/covers/units, extend flashing to full height of curb, mechanically attach top edge of flashing with termination bar with appropriate fasteners secured 6-inches (150 mm) on-center and apply three-coursing of plastic cement and reinforcing fabric. For curbs with removable hoods/covers/units, wrap flashing sheet over top of curb, secure to top or inside of curb with sheet metal angle termination bar and appropriate fasteners spaced 6-inches (150 mm) on-center.
 10. Apply a boot or oval section of modified bitumen sheet over outside corners of curb flashings to conceal cuts in flashing material at corner laps.
 11. Install flashing sheets on adjoining perpendicular sides (outside corners) of curbs or walls so that outside corners of flashing sheet align and are rounded.
 12. Apply a three-coursing of elastomeric plastic roof cement and reinforcing fabric at vertical lap seams. Extend three-coursing under termination bar. Utilize masking or duct tape to create vertical straight edge of three-coursing. After application of three-coursing, remove tape. Embed granules into plastic cement, immediately after application, to achieve uniform base flashing color.
- H. Metal Flange Flashing:
1. Apply membrane top ply and terminate at the rise in the metal component.
 2. Apply a target around penetrations or utilize flashing method to conceal cuts in the membrane top ply.
 3. Apply a continuous bead of edge sealant along edge terminations of modified bitumen sheet (i.e. flashing flanges, exhaust vents, metal edge etc.). “Cant” bead of edge sealant to shed water. Embed loose granules in newly installed edge sealant and apply coating to match finish of top ply, where applicable.
- I. Liquid-Flashing/Membrane
1. Apply liquid flashing system around penetrations and along walls where suitable traditional ply sheet or sheet metal flashings cannot be installed. Apply liquid flashings in accordance with the manufacturer’s application guidelines at applicable select locations.
 2. Apply reinforced liquid flashing/membrane system on roof membrane after proper preparation at Roof Areas “G”, “H”, and “I”.

3. Clean penetrating element or approved substrate to receive liquid flashing system.
 4. Apply masking tape on substrate to create straight-edge terminations of the liquid flashing/membrane system.
 5. Embed reinforcing fabric in the liquid flashing/membrane system to form monolithic flashing with the finished roofing membrane.
 6. Apply reinforced liquid flashing system on top of cap sheet in an area 3-feet X 3-feet around each primary roof drain. Embed granules, color to match cap sheet, in surface of liquid flashing.
 7. Apply finish granule surfacing on the liquid flashing system to match the granule color of the finished top ply of the roof membrane.
- J. Daily Seal:
1. Install temporary night seal at completion of each day's work and remove upon resumption of work.
 2. Ensure that water does not flow beneath any completed sections of the membrane system. This will include completion of all flashings, terminations, and daily seals. When possible, install starting at the highest point of the project area, working to the lowest point.
 3. Seal membrane edge with continuous troweling of plastic roof cement. Caution must be exercised to ensure that membrane is not temporarily sealed near drainage medium in such a way to promote water migration below the membrane or impede drainage.
 4. Install primary night seal beneath daily night seal in such a manner to seal both new and existing roof system to roof deck to prevent moisture migration from either old roof or new roof.
 5. Install daily night seals by extending the new roof membrane beyond the insulation and sealing to the existing roof surface using plastic cement.
 6. When work is resumed, remove and dispose of membrane where cement or other sealants were previously applied before resuming installation.
- K. Daily Fire Watch: Contractor personnel to perform daily "Fire Watch" a minimum of two hours upon completion of heat-fusing installation methods. Contractor to utilize an infrared-sensing thermometer or similar equipment that can provide instant detection of elevated and/or different temperatures of roofing materials. If elevated or suspect temperatures or underlying conditions are detected, contractor to remove necessary materials and perform necessary actions to alleviate the noted condition.

3.04 FIELD QUALITY CONTROL:

- A. Inspections:
1. During installation, provide for on-site inspections by a technical representative of roof membrane manufacturer.
 2. Upon completion of installation, provide final inspection by a technical representative of roof membrane manufacturer.

3.05 CLEANING:

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

END OF SECTION 07 52 50

SECTION 07 54 00

THERMOPLASTIC SINGLE-PLY MEMBRANE ROOF SYSTEM

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Fully-adhered reinforced thermoplastic single-ply membrane roofing system on elevator penthouses.

1.02 RELATED SECTIONS:

- A. 02 07 20 - Minor Demolition and Renovation Work.
- B. 06 11 00 - Rough Carpentry
- C. 07 22 00 - Roof and Deck Insulation.
- D. 07 27 00 - Self-Adhering Sheet Air Barrier
- E. 07 62 00 - Sheet Metal Flashing and Trim.

1.03 REFERENCES:

- A. American Society for Testing and Materials (ASTM).
- B. National Roofing Contractors Association (NRCA): The NRCA Roofing and Waterproofing Manual.
- C. ASCE-7: "Minimum Design Loads for Buildings and Other Structures".
- D. ANSI/SPRI WD-1 "Wind Design Standard Practice" for Roofing Assemblies".
- E. Single Ply Roofing Industry: "Application Guidelines for Thermoplastic Roofing Systems".
- F. Single Ply Roofing Industry: "Guidelines for the fabrication of heat-welded Seams".

1.04 QUALITY ASSURANCE:

- A. Applicator:
 - 1. Approved by manufacturer of accepted roofing system.
 - 2. A single applicator with a minimum of five years previous successful experience in installations of similar systems.
 - 3. Minimum five years experience in single-ply roofing with two years experience seaming system same as one currently being proposed.
 - 4. Be present at job site at all times when work is being performed. Supervise workers as required to ascertain workmanship, progress, and adherence to details.
- B. Regulatory Requirements: Classified by Underwriters' Laboratories, Inc. as a UL 790 Class A roof covering.
- C. Manufacturer's membrane product shall be tested and meet the following requirements: Solar Reflectance of 0.70 (minimum) and Thermal Emittance of 0.75 (minimum).

- D. Notify Owner's Representative a minimum of forty-eight hours in advance of start of field work. In event that Owner provides a full-time Owner's Representative, do not perform work until Owner's Representative is present except as authorized in writing by Owner.
- E. Schedule manufacturer's technical representative to be on site during initial of membrane installation and periodically during project duration. Manufacturers shall provide a written report to Owner's Representative after each inspection outlining observations and any corrective procedures.
- F. Regulatory Requirements:
 - 1. Products Manufactured in the United States.
 - a. Classified by Underwriters' Laboratories, Inc. as a Class A roof covering.
 - b. Classified by FM Global as a Class 1-A approved assembly.
 - c. Provide and install roof system to meet or exceed wind uplift resistance pressures of 90.0 psf in field of roof; 142.5 psf along perimeter of roofs; and 187.5 psf in corners. of roof in accordance with ASCE 7-10 assuming 150 mph wind speed, Exposure B, Partially Enclosed Building, Safety Factor of 1.25; and Eave Heights of 63-feet.
 - d. Perimeter Zone is 4-foot wide for Penthouse roofs. Corner Zone is 4-foot X 4-feet for Penthouse roofs.
 - 2. Follow federal regulations, safety standards, and codes mandated in the United States related to the subject work

1.05 SUBMITTALS:

- A. General:
 - 1. Applicator's License Certificate: Copy of the roofing material manufacturer's agreement/ contract indicating date Contractor was approved.
 - 2. Material manufacturer's specified roof system letter indicating insulation and membrane types installation, wind system rating or uplift pressure resistance, and issuance of specified warranty for project.
 - 3. Shop drawings of details, if proposed different from project drawings.
 - 4. Manufacturer's product data sheets with Material Safety Data Sheets (MSDS) on each material proposed for usage.
 - 5. Sample of warranty that is to be issued upon project completion.
 - 6. Samples of products proposed for use.
- B. Shop Drawings:
 - 1. Original drawings which illustrate the proposed Work.
 - 2. Prepare shop drawings for those details that are proposed different than the project drawings. Indicate on a roof plan, the proposed location of detail presented on shop drawing.
 - 3. Indicate joints, types, and locations of fasteners, shapes, sizes, expansion joints, special conditions, and installation procedures for each flashing condition. Note critical dimensions, gauge, and finish of sheet metal for each flashing condition.
 - 4. Submit shop drawings showing layout, joining, profiles, and anchorages of fabricated work, including major counterflashings, trim, and fascia units, gutters, downspouts, and expansion joint systems.

- C. Product Data: Submit manufacturer's catalog sheets, providing descriptive data for each material proposed for use in construction of roof assembly and related flashings and components. Indicate on the data sheet, specific characteristic (i.e. dimensions, thickness, etc.) of the proposed item.
- D. Samples: Provide physical examples of materials/components proposed for use to comprise the specified roof system.

1.06 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.
- B. Store materials in accordance with manufacturer's recommendations. Store rolled goods on clean raised platforms. Store other materials in dry area, protected from water and direct sunlight, and maintain at a temperature of 50 to 90 degrees Fahrenheit (10 to 32 degrees Celsius).
- C. Deliver materials in sufficient quantities to allow continuity of work without delay.
- D. Store materials in weather protected environment, clear of ground, and free from moisture. Protect materials against damage. Keep all materials used in construction of the roofing free from moisture prior to and during application. Do not store in plastic bags or other protective coating which may create condensation within bags.
- E. Store roof insulation and membrane on pallets or dunnage at least 4-inches (100mm) above the ground, roof, or deck and protect as necessary to keep dry.
- F. Handle all materials so as to prevent damage to roofing system components and completed roof system.
- G. Proper storage of materials is the sole responsibility of Contractor. Protect all materials susceptible to moisture including, but not limited to, all roll goods, insulation, wood, and plywood in dry, above ground, watertight storage. Keep labels intact and legible, clearly showing the product, manufacturer, and other pertinent information.
- H. Any materials becoming wet or damaged will be rejected and shall be removed from job site immediately. Any materials found to be improperly stored at jobsite shall be considered wet at the discretion of Owner's Representative and removed from jobsite.
- I. Store products in temperature-controlled environment to prevent detrimental affects from low or elevated temperatures.

1.07 PROJECT CONDITIONS:

- A. Environmental Requirements:
 - 1. Apply roofing in dry weather.
 - 2. Do not remove existing roofing and flashing in inclement weather or when rain is predicted of 30 percent or more possibility.
 - 3. When ambient temperature is below 60 degrees Fahrenheit (16 degrees Celsius), expose only enough sensitive materials as required within a four hour period.
 - 4. Do not expose membrane and accessories to a constant temperature in excess of 180 degrees Fahrenheit (82 degrees Celsius).

- B. Protection:
 - 1. Provide special protection and avoid traffic on completed areas of membrane installation.
 - 2. Restore to original condition or replace work or materials damaged during handling of roof materials.
 - 3. Take precautions as required to protect adjacent work and structures.
- C. Emergency Equipment: Maintain equipment and materials on site as necessary to apply emergency temporary weather protection in event of sudden storms or inclement weather.
- D. Restrictions:
 - 1. Smoking is prohibited on roof areas.
 - 2. Maintain facility and all utility services in a functional condition for Owner's utilization.

1.08 SEQUENCING/SCHEDULING:

- A. Install new roof membrane system immediately after completion of cover board installation.
- B. Schedule work as required to prevent traffic and material handling over completed work.
- C. Do not expose new material to water or sun damage in quantities greater than can be weatherproofed during same day.

1.09 WARRANTY:

- A. Contractor: Provide Owner a written warranty for a period of two years after Owner's final acceptance covering all repairs required to correct all defects due to faulty materials or workmanship and to otherwise maintain the roof in a watertight condition and to correct all other defects without regard to watertightness. Make repairs promptly on notification and at no expense to Owner.
- B. Roof System Manufacturer: Manufacturer of the single-ply membrane roof system shall furnish a written guarantee that warrants and guarantees Owner with a watertight condition of roof system and all components thereof for a period of twenty years from date of Owner's final acceptance. Warranty and guarantee shall cover all labor and materials required to maintain a watertight condition and a roof system free of defects.

PART TWO - PRODUCTS

2.01 MANUFACTURERS:

- A. Acceptable Manufacturers:
 - 1. Sarnafil, Inc.
 - 2. Seamen Corp./Fibertite.
 - 3. GAF Building Materials Corp.
- B. Products furnished for roofing system shall be products of a single manufacturer or as approved by respective manufacturer.

2.02 SINGLE-PLY ROOFING MEMBRANE:

- A. Polyester or fiberglass reinforced fleece-backed thermoplastic single-ply membrane sheet compounded with PVC or KEE polymer, minimum 0.060-inch thickness, or greater thickness as required by manufacturer for system warranty. Provide color of membrane selected by Owner's Representative from available colors.
- B. Fully-Adhered System:
 - 1. Acceptable PVC Product: ASTM D 4434
 - a. "G410 60 mil Feltback" by Sarnafil.
 - 2. Acceptable KEE Product: ASTM D 6754
 - a. "60 mil FiberTite-SM-FB" by Seaman Corp.
 - 3. Acceptable PVC/KEE:
 - a. "FleeceBACK KEE PVC" by Carlisle.

2.03 RELATED MATERIAL:

- A. Membrane Fasteners and Plates: CR-10 fluorocarbon coated, self-drilling screw with 3/4-inch drill-point, 0.17-inch shank diameter, 0.21-inch thread diameter, and 0.485-inch hex-head with 3-inch diameter corrosion-resistant steel plate such as "#15 Extra Heavy-duty Roofing Fastener" as manufactured by OMG, or as approved by membrane manufacturer.
- B. Flashing: Minimum 60-mil, reinforced or unreinforced, flashing membrane as required and furnished by membrane manufacturer, color to match membrane.
- C. Bonding Adhesive: Low-solvent or water-based VOC compliant bonding adhesive furnished by membrane manufacturer for adhering flashing membrane to substrates such as "FTR-190e Bonding Adhesive" by Fibertite or approved equal.
- D. Fleece-Backed Membrane Bonding Adhesive: water-borne rubberized or polymeric bonding adhesive furnished by membrane manufacturer for adhering fleece-backed membrane to substrates such as "FTR-390" or "FTR-490" by Fibertite or approved equal.
- E. Sealants: Membrane manufacturer's approved sealant to seal penetrations through the membrane system or miscellaneous caulking applications that come in contact with roof system components.
- F. Lap/Seam Sealant: Liquid formulation sealant. As furnished by membrane manufacturer for sealing cut edges of reinforced membrane and flashing sheets.
- G. Water Cut-off Mastic: As furnished by membrane manufacturer for this system.
- H. Inside Corners and Outside Corners and Molded Pipe Flashings: White molded pipe flashings as furnished by membrane manufacturer for this system.
- I. Walkway/Protection: PVC or KEE based, reinforced walkpads, as approved by membrane manufacturer.
- J. Cover Board: Moisture-resistant, 1/2-inch thick gypsum core panel such as "Dens Deck Primed" by Georgia Pacific or "SecuRock" by U.S. Gypsum.
- K. Low-Rise Foam Insulation Adhesive:
 - 1. Single-component Moisture-cured Adhesive: ASTM D-2126, dispensed from portable pressurized containers, such as "Insta-Stik Professional Roofing Adhesive" by Dow Chemical Co.

2. Dual-component Reaction-cure Adhesive: Two-part spray-applied low-rise urethane foam adhesive such as "OlyBond 500" by OMG, "Two-part Urethane Insulation Adhesive" by Johns Manville, or as approved by membrane manufacturer.

PART THREE - EXECUTION

3.01 GENERAL:

- A. Perform entire work of this Section in accordance with the best standards of practice relating to trades involved.
- B. Follow local, state, and federal regulations, safety standards, and codes. When conflict exists, the more restrictive document shall govern.
- C. Follow insurance underwriter's requirements acceptable for use with specified products or systems.
- D. Consider roof system manufacturer's current technical specifications a part of this Specification and use as a reference for specific application procedures and recommendations.
- E. Refer to manufacturer's technical specifications for proper adhesive and/or fastener selection and spacing and/or coverage rate in accordance with specific deck types and appropriate roll width for field of roof and perimeters.

3.02 EXAMINATION OF SURFACES:

- A. Verify that preparatory work has been completed.
- B. Examine roof areas for conditions that would prevent proper application of new roofing.
- C. Verify that new wood nailers are properly installed to receive roofing system.
- D. Examine substrate, roof deck, and related surfaces, and verify that there are no conditions such as inadequate anchorage, foreign materials, moisture, ridges, or other conditions that would prevent the satisfactory installation of the roofing system.
- E. Correct or complete any conditions requiring correction or completion prior to installation of roofing system. Notify Owner's Representative in writing of unacceptable conditions.
- F. Start of work under this Section constitutes acceptance of substrate and site conditions.
- G. Verify:
 1. Deck and substrates are clean, smooth, and free from depressions, waves, projections, defects, and damage.
 2. Surfaces in contact with any single-ply material are free from grease, oil, or other foreign material.
 3. Surfaces in contact with roofing membrane are free from sharp edges, fins, or projections.
 4. Materials are completely dry and free from moisture, in any form, including substrate, deck, insulation, and roofing membrane as applicable.
 5. Roof equipment, openings, curbs, pipes, sleeves, ducts, vents, and blocking members are solidly and properly set.

6. Mechanical/electrical work to be covered has been installed, tested, and approved.
7. Work has been completed where possible for all other trades that require work or traffic on the roofing area.

3.03 PREPARATION:

- A. Verify that debris has been completely removed.
- B. Broom clean roof insulation immediately prior to roofing application. Debris under roof membrane is unacceptable.

3.04 APPLICATION:

- A. Adhered Layers of Cover Board:
 1. General:
 - a. Adhere insulation to the substrate staggering board 24-inches of adjoining board.
 - b. Butt joints tightly allowing no more than 1/4-inch (6mm) wide gaps between adjacent boards or between insulation boards and vertical element. Fill joints between adjacent boards with adhered or friction fit cut pieces of like cover board or spray-foam adhesive to match top surface of cover board.
 - B. Roofing Membrane - General:
 1. Install roof membrane in accordance with roofing manufacturer's specification and installation instructions. Cut sheets to maximum size possible in order to minimize seams.
 2. Position membrane over substrate without stretching membrane. Allow membrane to relax for one-half hour before bonding, fastening, welding, and flashing.
 3. Begin installation of new roofing system at the lowest point of the project area and work to the highest point to prevent backwater laps. This will include completion of all flashings, terminations, and seals on a daily basis.
 4. Execute work so membrane can be temporarily sealed on a down slope surface at the end of each day with nite-seal in accordance with the detail drawings.
 5. Portions of the roof membrane that have permanent creases and/or wrinkles prior to installation shall be removed and discarded.
- C. Fully-Adhered System:
 1. Install membrane so that long dimension is parallel with slope of roof and in continuous length starting at ridge extending to eave.
 2. Position membrane over substrate and fold membrane back so half the underside is exposed.
 3. Apply bonding adhesive to substrate area with a plastic core medium nap paint roller at a coverage rate of approximately 60 square feet per gallon per finished surface.
 4. Allow adhesive to dry until tacky and roll the membrane into the coated substrate while avoiding wrinkles.
 5. Brush down the bonded section of membrane immediately with a soft bristle push broom or squeegee.

6. Fold back the unbonded half of the sheet and repeat the bonding procedures.
 7. Install adjoining membrane sheets in the same manner, overlapping edges a minimum of 2-inches (50mm) to provide for a minimum of 1-1/2-inch (38mm) hot air weld.
 8. Roll adhered membrane with cushioned weighted roller to eliminate air pockets, wrinkles, voids, and other potential non-adhered portions of the membrane immediately after setting in adhesive.
 9. Secure membrane at perimeter of each roof level, roof sections, expansion joints, curbs, and other penetrations in accordance with manufacturer's requirements.
- D. Membrane Splicing:
1. Install membrane to achieve a minimum distance between the edge of the fastening plate and edge of the membrane of 1-1/2-inches (38mm). Splices at end roll overlaps (width of the membrane) shall be 6-inches (150mm) wide, minimum. Plan sheet layout so that end roll overlaps can be stripped in with a continuous membrane head lap (minimum 18-inches [450mm] wide).
 2. Allow top sheet to fall freely into place over bottom ply without wrinkling or stretching.
 3. Surfaces to be welded must be cleaned, primed and dirt-free. Remove excessive dirt by washing with a detergent. Rinse thoroughly, allow to dry, and then wipe surface with manufacturer's solvent/cleaner.
 4. Use automatic hot-air welding equipment approved by roof system manufacturer for all field seams. Perform small work and repairs using hand welders. Roof system manufacturer's representative shall be on site at start of project to supervise welding operations and to inspect and approve welded seams.
 5. Probe all laps each day to verify that welder set-up is effective. Allow membrane to cool. In addition, perform random lap test sample checks (including checks at start of each day) to verify peel strength. Perform lap seam test sample checks in presence of Engineer/Consultant. Engineer/Consultant will retain test samples for project file.
 6. Apply lap seam sealant along cut edges of the membrane and reinforced flashing material, around membrane patches, and along terminations in strip-in membrane.
 7. Apply a membrane patch over all T-joints of overlapping flashing and membrane lap seams.
- E. Flashing:
1. General:
 - a. Install flashing at all roof penetrations, interruptions, and any roof intersection including roof edges with vertical or sloped surfaces in accordance with manufacturer's recommended procedures and the detail drawings.
 - b. Raise/modify projections and risewall conditions as required to accommodate new roofing.
 - c. Apply manufacturer's bonding adhesive to both underside of flashing and surface to which it is to be bonded, at a rate of approximately one gallon (3.8 liter) per 50 square feet (4.6m²) of surface coverage.

- d. Do not apply bonding adhesive to that portion of flashing that overlaps onto itself. Use hot-air welding throughout the system where membrane overlaps itself.
 - e. Allow bonding adhesive to dry to finger touch until it does not string or stick to a dry finger. Roll the flashing into dry adhesive. Take care to assure that flashing does not bridge where there is any change of direction.
 - f. Mechanically fasten top edge of membrane flashing through appropriate termination bar with approved fasteners spaced 6-inches on-center. Install waterblock behind top edge of membrane flashing and seal top edge of flashing with sealant.
2. Polymer-coated Metal:
 - a. Install polymer-coated metal flashings at perimeters as designated.
 - b. Hot-air weld flashing membrane to coated metal and field membrane to provide monolithic seal, extending a minimum of 4-inches (100mm) beyond end of flange.
 - c. Apply sealant/water-block at fastening points under flanges.
- F. Daily Seal:
1. Ensure that water does not flow beneath any completed sections of membrane system. This will include completion of all flashings, terminations, and daily seals.
 2. Seal new membrane at the deck/substrate level.
 3. Temporarily seal any loose membrane edge with manufacturer's water cut-off sealant. Exercise caution to ensure that membrane is not temporarily sealed in such a manner as to promote water migration below the membrane or impede drainage.
 4. Install daily night seals by extending the roof membrane beyond the insulation and sealing to existing roof surface.
 5. When work is resumed, remove and dispose of membrane where asphalt or other sealants were previously applied before resuming installation.
 6. Install insulation at end of work day to allow proper staggering of insulation joints and layers.
 7. Install loose insulation at daily seal to prevent ponding and/or collection of water on temporary membrane seal.

3.05 CLEANING:

- A. Upon completion of installation of roof system, flashings, and sheet metal, clean surfaces of roof membrane and membrane flashings by power washing methods. Remove debris, dirt, adhesives, sealants, surface contaminants, or materials that cause surface discoloration from surfaces.
- B. Remove all work related dirt, debris, drippage, spills, etc. from finishes of roof surface, building, or building grounds.

END OF SECTION 07 54 00

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Shop or field-formed sheet metal work for moisture protection.
- B. Types of work specified in this Section include:
 - 1. Roof penetration sleeves and hood or bonnet.
 - 2. Counter flashing.
 - 3. Roof drains.
 - 4. Coping.
 - 5. Metal gravity vents.
 - 6. Metal heat exhaust vents.
 - 7. Sanitary vent pipes.
 - 8. Pipe box.
 - 9. Curb cap flashing.
 - 10. Metal edge flashing.
 - 11. Scupper, gutters, and downspouts.
 - 12. Equipment straps.
 - 13. Miscellaneous sheet metal accessories.
 - 14. Closure panels.

1.02 RELATED SECTIONS:

- A. 02 07 20 - Minor Demolition and Renovation Work.
- B. 06 11 00 - Rough Carpentry
- C. 07 22 00 - Roof and Deck Insulation.
- D. 07 52 50 - Modified Bitumen Membrane Roofing.

1.03 REFERENCES:

- A. American Society for Testing and Materials (ASTM).
- B. Federal Specifications (FS).
- C. National Roofing Contractor's Association (NRCA): NRCA Roofing and Waterproofing Manual, latest edition.
- D. Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA): Architectural Sheet Metal Manual, latest edition.
- E. ANSI/SPRI ES-1: Fabricate and install sheet metal edge flashings to comply with requirements of ANSI/SPRI ES-1 for 110 mph wind speed.

1.04 WARRANTY:

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

PART TWO - PRODUCTS

2.01 MANUFACTURERS:

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

2.02 SHEET METAL MATERIAL:

- A. Pre-finished Metal: "Kynar 500" or "Hylar 5000" fluoropolymer pre-finished G90 galvanized/galvalume sheet metal, minimum 24 gauge. "Kynar 500" or "Hylar 5000" finish shall consist of a two coat Polyvinyladine flouride, minimum 70 percent by weight in coatings, dry film thickness 1 mil, factory applied by metal manufacturer or supplier. Color selected by Owner from manufacturer's standard color chart.
- B. Zinc-coated (Galvanized) Sheet Metal: Commercial quality with 0.20 percent copper, in accordance with ASTM A 526 except ASTM A 527 for lock forming; coating designation G90 hot-dip galvanized, and mill phosphatized for painting in accordance with ASTM A 525 (paint-grip type), 24 gauge minimum.
- C. Sheet Lead: FS QQ-L-201, Grade B; 2-1/2 pounds per square foot (120n/m²) 0.0391-inches (1mm) thick minimum as used for sanitary vent flashing, 4 pounds per square foot (140n/m²) 0.0625-inches (1.6mm) thick minimum as used for roof drains.
- D. Stainless Steel Sheet Metal: ASTM A240, Type 304, ASTM A 480, No. 2B/2D Mill Finish, gauge as scheduled.

2.03 FASTENERS:

- A. Fasteners shall be same metal as flashing and sheet metal being joined.
- B. Exposed fasteners shall be self-sealing or gasketed for watertight installation.
- C. Heads of fasteners, including but not limited to, rivets, screws, and bolts, that are exposed or visible shall have same manufactured finishes as item being secured; color to match when applicable.
- D. Mechanical Fasteners:
 - 1. Refer to Section 02 07 20 – Minor Demolition and Renovation Work.
 - 2. Washers: Steel washers with bonded rubber sealing gasket.
 - 3. Screws: Self-tapping sheet metal type compatible with material fastened.
 - 4. Rivets: Stainless steel material for the head and stem, closed end, color to match sheet metal items being adjoined.

2.04 RELATED MATERIALS:

- A. Solder:
 - 1. ASTM B 32, alloy grade 58, 50 percent tin, 50 percent lead.
 - 2. For Use with Stainless Steel: 60-40 tin/lead solder, ASTM B 32.

- B. Flux:
 - 1. Phosphoric acid type, manufacturer's standard.
 - 2. For Use with Steel or Copper: Rosin flux.
 - 3. For Use with Stainless Steel: Acid-chloride type flux, except use rosin flux over tinned surfaces.
- C. Adhesives: Type recommended by flashing sheet manufacturer for waterproof and weather resistant seaming and adhesive application of flashing sheet.
- D. Metal Accessories: Sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gauge required for performance.
- E. Sealant:
 - 1. Type A: One component polyurethane sealant such as "Sikaflex 1a" by Sika Corp. or "Sonolastic NP1" by BASF, color to match finish of metal.
 - 2. Type B: Low/medium modulus silicone sealant for sealing metal-to-metal surface (i.e. metal edge, cover plates) such as "Sikasil WS-290" or "Sikasil WS-295" by Sika Corp., "795 Silicone Building Sealant" or "790 Silicone Building Sealant" by Dow Corning, or "GE Silpruf 2000" by Momentive Performance Technologies; color to match finish of metal.
 - 3. Type C: Self-adhering elastomeric butyl tape, 1/8-inch (3mm) by 3/8-inch (9mm), such as "Extru-Seal" by Pecora Corp.
 - 4. Type D: Type A: One component moisture cure polyether polymer sealant available in over 175 standard colors such as "Tite Bond Weather Master Sealant" by Franklin International, color to match finish/color of adjacent sheet metal.
- F. Base Material for Flashing Pans:
 - 1. Flashing Pans 12-inch by 12-inch and Smaller: Quick-setting grout formula meeting Corps of Engineers specification CRD-C-621, Type D and ASTM C-1107, Grade C, such as "Five Star Instant Grout" by Five Star Products, Inc., "Sika Grout 212" by Sika Corp., or approved equal.
 - 2. Flashing Pans Larger than 12-inch by 12-inch: Spray-foam such as "FrothPak" by InstaFoam.
- G. Pourable Sealer:
 - 1. Pourable polyurethane sealer, approved by roofing system manufacturer.
 - 2. Acceptable Products:
 - a. "Pourable Sealer S-10" by Firestone.
 - b. "1-Part Pourable Sealer" by Chem-Link.
- H. Termination Bar: 1/8-inch (3mm) thick, 1-inch (25mm) wide extruded aluminum bar with flat profile, factory punched oval holes (1/4-inch by 3/8-inch [6mm by 9mm]) spaced 6-inches (150mm) on-center, such as "TB 125" by The TruFast Corp. or "Heavy Flat Bar" by Olympic.
- I. Stainless Steel Clamp: Stainless steel banding with worm-drive tightening, sized for application such as "Make-A-Clamp Kit" by Dynamic Fastener, 800/821-5448.
- J. Screen: Stainless steel wire screen with 1/2-inch (13mm) openings.

2.05 FABRICATION - GENERAL:

- A. Fabricate work in accordance with SMACNA Architectural Sheet Metal Manual and other recognized industry practices and reviewed shop drawings.
- B. Comply with material manufacturer's instructions and recommendations for forming material.
- C. Shop fabricate work to greatest extent possible. Fabricate inside and outside corners for metal edges, counterflashing, and coping caps. Fabricate corners with equal length legs, minimum 2 feet (1.2m).
- D. Fabricate for waterproof and weather resistant performance with expansion provisions for running work sufficient to permanently prevent leakage, damage, or deterioration of work. Form work to fit substrates.
- E. Make angle bends and folds for interlocking metal with full regard for expansion and contraction to avoid buckling or fullness in metal after installation.
- F. Form materials with straight lines, sharp angles, smooth curves, and true levels. Avoid tool marks, buckling, and oil canning.
- G. Fold back edges on concealed side of exposed edge to form hem.
- H. Lap joints 1-inch (25mm) minimum. Rivet and solder joints on parts that are to be permanently and rigidly assembled for copper, stainless, aluminum, and galvanized steel sheet metal. Install rivets, spaced 1-inch (25mm) on-center and apply solder to secure and seal exposed edge of sheet metal in a uniform continuous bead with smooth top finish. Clean residue upon completion of soldering process. Fabricate sheet metal assemblies so that adjoining sections are nested to achieve continuous metal-to-metal contact.
- I. Seams:
 - 1. Fabricate non-moving seams in sheet metal with flat-lock seams.
 - 2. Pre-finished Galvanized Steel: Seal pre-finished metal seams with rivets, spaced 1-inch (25mm) on-center, and silicone sealant, color to match metal finish.
 - 3. Metal Other than Aluminum: Tin edges to be seamed, form seams, and solder.
- J. Expansion Provisions: Where lapped or bayonet type expansion provisions in work cannot be used or would not be sufficiently waterproof or weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1-inch deep, filled with mastic sealant concealed within joints.
- K. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant in compliance with SMACNA standards.

2.06 FABRICATED ITEMS:

- A. Counter flashings: Minimum 24 gauge prefinished sheet metal formed in maximum 10 foot (3m) lengths fabricate "S"-shaped receiver to engage counter flashing a minimum of 1-inch; fabricate counter flashing with broken fascia of length to extend over top edge of base flashing a minimum of 4-inches with ½-inch hemmed drip edge. Utilize two piece configuration at walls.
- B. Wind Clips: Minimum 24 gauge prefinished sheet metal, 1-inch (25mm) wide, length to engage counter flashing a minimum of 1/2-inch (13mm).

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- C. Roof Penetration Base and Umbrella/Bonnet: Minimum 24 gauge stainless steel sheet metal, two-piece construction, fabricated in accordance with project drawings.
- D. Cleats/Clips:
 - 1. Concealed Cleats/Clips: Continuous strips, 22 gauge prefinished sheet metal, same fascia profile as adjacent metal item with 3/4-inch drip edge formed at a 30 degree angle with vertical wall.
 - 2. Exposed Cleats/Clips: 24 gauge prefinished sheet metal.
- E. Vent Hoods, Sleeves, Penetration Flashings, and Accessories: Minimum 24 gauge stainless steel sheet metal with 4-inch (100mm) flanges with rounded corners.
- F. Angle Termination Bar: 1-inch by 1-inch (25mm by 25mm) 24 gauge galvanized sheet metal.
- G. Vent Pipe: 2-1/2 pound lead with 4-inch flanges. Provide proper size to fold down inside of pipe a minimum of 1-inch (25mm).
- H. Door Threshold: 24 gauge stainless steel sheet metal.
- I. Penetration Flashing Pans: 24 gauge stainless steel sheet metal. Fabricate with 1/4-inch (6mm) hem at top edge and with 4-inch (100mm) flanges with rounded corners. Fabricate to provide installed minimum clear inside perimeter dimension of 2-inches (50mm) on each side of penetrating element and 6-inch height.
- J. Roof Drain: 4 pound lead, size 30-inch by 30-inch (750mm by 750mm).
- K. Equipment Straps: 1-inch wide 24 gauge stainless sheet metal straps.
- L. Pipe Box (Base, Hood, and Face Plate): 24 gauge stainless steel sheet metal. Base shall be 8-inches in height, 4-inch wide flanges with rounded corners and sized to provide minimum 2-inch clearance between pipes and box.
- M. Curb Cap Flashings: 24 gauge stainless steel sheet metal with 4-inch fascias.
- N. Scupper: Minimum 24 gauge stainless sheet metal with 4-inch wide flashing flanges.
- O. Gutter, Brackets, Spacers, and Downspouts: 24 gauge pre-finished sheet metal. Gutter dimension shall be as follows: 10-inch (250mm) face height; 6-inch (150mm) width; 14-inch (350mm) back. Downspout shall be 5-inches (125mm) by 4-inches (100mm) with seam located on back of downspout. Bracket shall be 1-inch (25mm) wide and 1/8-inch (3mm) thick galvanized steel wrapped with 24 gauge prefinished metal cover. Downspout straps and gutter spacers shall be 1-inch wide double-hemmed prefinished sheet metal.
- P. Edge Flashing:
 - 1. Shop-fabricated Option: 24 gauge pre-finished sheet metal with 4-inch wide nailing flange and 5-inch fascia with 3/4-inch drips with 5/8-inch returns at 30-degree angle with vertical wall at bottom end formed in 10-foot lengths with 6-inch (150mm) wide back-up plates of same profile.
 - 2. Pre-manufactured Option: Metal Edge/Fascia System: Continuous 24 gauge pre-finished Kynar 500 coated galvanized sheet metal canted gravel stop with fascia extender meeting ANSI/SPRI ES-1 for 100mph wind speed such as "MBED Style G" by Hickman, "EdgeSystem One Gravel Stop" by Metal Era, or approved equal.

Q. Coping:

1. Shop-Fabricated Option: 24-gauge pre-finished sheet metal for 8-inch maximum width and 22-gauge for 8-inch to 12-inch width with 6-inch (150mm) wide back-up plates of same profile. Form 3/4-inch drips with 5/8-inch returns at 30-degree angle with vertical wall at bottom end of both interior and exterior fascias. Fabrication to meet specified ANSI/SPRI ES-1 requirements for 110 mph.
2. Pre-Manufactured Option: Pre-manufactured prefinished sheet metal coping of designated dimensions and meeting ANSI/SPRI ES-1 requirements for 110 mph with continuous cleat installed over sloped substrate such as "Sloped Formed Coping" by Hickman Engineered Systems, "One Coping" by Metal Era, or approved equal.

PART THREE - EXECUTION

3.01 EXAMINATION:

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

3.02 INSTALLATION:

- A. Install sheet metal with lines, arises, and angles sharp and true, and plane surfaces free from objectionable wave, warp, or buckle. Exposed edges of sheet metal shall be folded back to form 1/4-inch (6mm) hem on concealed side from view. Finished work shall be free from water retention and leakage under all weather conditions. Install prefabricated corners or transitions at changes in direction, elevation or plane, and at intersections. Locate field joints not less than 12-inches (300mm), nor more than 3 feet (1m) from actual corner. Laps for all metals, except for prefinished metal, shall be 1-inch (25mm) wide, fastened with rivets spaced 1-inch (25mm) on-center and soldered.
- B. Anchor units of work securely in place to prevent damage or distortion from wind or buckling. Provide for thermal expansion of metal units; conceal fasteners where possible; and set units true to line and level as indicated. Install work with laps, joints, and seams permanently watertight and weatherproof.
- C. Install fabricated sheet metal items in accordance with manufacturer's installation instructions and recommendations and with SMACNA Architectural Sheet Metal Manual.
- D. Separations: Provide for separation of metal from non-compatible metal or corrosive substrates by coating concealed surfaces with zinc chromate, bituminous coating, or other permanent separation at locations of contact as recommended by manufacturer or fabricator. Do not use materials incompatible with roofing system.

- E. Continuous Cleat: At exposed edges of gravel guards, fascias, cap flashings, and where required, attach continuous cleat at 6-inches (150mm) on-center with appropriate fasteners positioned on the vertical face and fastened into 2X blocking, and concrete/masonry substrate or metal or steel. At a distance of 10 feet (3m) from each direction of corner, install fasteners 3-inches (75mm) on-center. Install cleat so fascia extends a minimum of 1-inch (25mm) below top of exterior wall finish.
- F. Counter flashings:
1. Install new counter flashings under equipment housing flanges and new receivers along rise or parapet walls to extend a minimum of 4-inches below top edge of base flashing. Secure counter flashing at 6-inches (150mm) on-center with self-tapping screws.
 2. Secure 2-piece surface-mounted receiver and counter flashing assemblies along concrete substrates. Install sealant tape, Type C, between receiver and substrate. Secure receiver to substrate with termination bar and appropriate fasteners spaced 12-inches o.c. Install a continuous bead of sealant, Type B, along caulk trough/top edge of receiver and tool sealant to provide outward sloping finished surface. Secure counter flashing to receiver utilizing grommetted self-tapping screws spaced 6-inches (150mm) on-center. Install new receivers extending behind wall finish and secure vertical flange of receive 6-inches on-center and extend underlayment over vertical flange.
 3. Lap adjacent sections of receivers and counter flashings a minimum of 4-inches (100mm). Apply a continuous bead of sealant, Type A, in lap.
 4. Trim existing counter flashings to remain to receive new flashing.
 5. Secure new counter flashing to new receiver or trimmed existing flashing utilizing self-tapping screws spaced 6-inches (150mm) on-center.
 6. Install wind clips to termination bar spaced 24-inches (600mm) on-center.
 7. Fabricate the counter flashing to form an integral closure at terminations.
- G. Penetration Pans:
1. Install compressible fill insulation between penetrating element and deck.
 2. Prime top and bottom of flanges.
 3. Pop rivet and fully solder joints in pan and flanges.
 4. Install with flanges set in heat-softened APP membrane or uniform troweling of plastic roof cement on SBS membrane base ply, secure flange with appropriate fasteners spaced 6-inches on-center, staggered, and strip-in flanges.
 5. Fill penetration pan to within 1-inch (25mm) of top of pan with non-shrink grout. Fill remainder of pan with pourable sealer.
 6. Install umbrella/bonnet or hood.
- H. Roof Penetration Hoods and Umbrella/Bonnet:
1. Install watertight hood or umbrella/bonnet at penetration locations.
 2. Round or Pipe Penetrations:
 - a. Set umbrella/bonnet in sealant, Type A; utilize Type B sealant at heat sensitive areas.
 - b. Tighten draw band.
 - c. Seal top of umbrella/bonnet with sealant, Type A; utilize Type B sealant at heat sensitive units.

3. Square Penetration:
 - a. Secure umbrella/bonnet to penetration with termination bar and self-drilling screws.
 - b. Set umbrella/bonnet in sealant, Type C.
 - c. Seal top of umbrella/bonnet with sealant, Type B.
- I. Primary Drains:
 1. After membrane installation, prime bottom of lead flashing sheet and set in heat-softened APP membrane or uniform bed of plastic roof cement on SBS membrane at specified locations.
 2. Extend lead flashing into drain bowl or pipe a minimum of 2-inches (50mm) and over top of piping/bowl connection, if possible. Apply a continuous bead of sealant, Type A, at intersection of pipe and drain bowl.
 3. If drain bowl and pipe connection is contaminated with bituminous material, strip-in area with three-coursing of plastic roof cement and fabric.
 4. Prime top surface of lead flashing sheet to receive strip-in membrane.
- J. Pipe Box:
 1. Pop rivet and fully solder joints and seams in base and hood.
 2. Prime top and bottom of flanges of base.
 3. Install with flanges set in heat-softened APP membrane or uniform bed of plastic roof cement on SBS membrane, secure flanges with appropriate fasteners spaced 6-inches on-center, staggered, and strip-in.
 4. Fill base with grout or spray foam to a height of 3/4 of the total pan height.
 5. Fill remaining height of base with pourable sealer.
 6. Install hood over base, securing to each side with self-tapping screws.
 7. Install face plate to cover box opening around pipe penetrations and apply sealant, Type B, around pipe configuration at face plate.
- K. Sanitary Vent Stacks:
 1. Prime top and bottom flanges of lead flashing sleeve. Set flange in heat-softened APP membrane or uniform troweling of plastic roof cement on SBS membrane. Prime top side of flange to receive strip-in membrane.
 2. Fold lead sleeve down inside pipe a minimum of 1-inch (25mm). Apply a continuous bead of sealant on inside of pipe prior to folding lead sleeve.
 3. After installation of lead flashing, install screen over top of vent pipe and secure with adjustable strap.
- L. Equipment Straps:
 1. After equipment is installed on top of curbs, install sheet metal straps extending over top of equipment and secured into side of support curb with grommetted fasteners.
 2. Install one strap on each side of equipment.
- M. Metal Edge:
 1. Extend modified bitumen sheet to minimum 1-inch (25mm) below bottom edge of nailer or top of exterior wall finish.
 2. Prime bottom side of metal edge and set in bed of plastic roof cement on SBS base ply or heat softened APP membrane base ply and lock to cleat. Install adjacent sections of metal edge with approximate 1/4-inch (6mm) space between sections.

3. Secure horizontal flange of metal edge to wood nailer with appropriate fasteners spaced 3-inches (75mm) on-center, staggered.
 4. Install covers at joints, locking onto cleat. Embed flange into plastic roof cement and install continuous beads of sealant, Type B, placed on each side of joint on fascia. Fasten joint cover with appropriate fastener centered in joint.
 5. Prime top metal surface of flange to receive strip-in membrane.
- N. Scupper/Gutters/Downspout:
1. After field membrane is installed, install metal scupper insert into wall opening. Set scupper in bed of plastic roof cement or heat-softened membrane and secure flanges of scupper to wall and deck with appropriate fasteners.
 2. Strip-in flanges of scupper with appropriate flashing plies.
 3. Install sealant, Type A, around exterior opening of scupper between metal insert and wall.
 4. Support gutter with brackets spaced 3 feet (1m) on-center. Secure bracket to substrate with appropriate fastener, two per bracket.
 5. Install gutter spacer spaced 3 feet (1m) on-center attached to front and back of gutter with pop rivets. Stagger spacer from location of brackets.
 6. Lap joints in gutters 2-inches (50mm). Apply a continuous bead of sealant, Type B, between lap and install two rows of rivets spaced on 1-inch (25mm) centers, staggered. Lap joints in direction of flow of water within gutter.
 7. Install downspouts at designated locations or locations matching existing. Install downspouts within 50 linear feet of gutter length, within expansion joints, or within section of gutter installed along each roof edge length of less than 50 feet.
 8. Install new downspouts plumb and level, attached to columns or wall with straps located at top and bottom of downspout and 10 feet (3m) on-center, located at joints in downspouts. Install downspouts to conform to wall or substrate configuration.
 9. Extend downspouts into inlet or pipe. Install splash block under downspouts that discharge onto the ground or roof surface. Install splash block over a protection pad for downspouts located at roof level.
 10. Install gutter screen over installed gutter. Secure screen to spacer with self-tapping screw.
 11. Provide expansion joints on ends of gutters spaced at 50 feet (16m) on-center, maximum. Install snapped-on cover over expansion joint.
- O. Equipment Curb Caps:
1. Install new wood nailers on top of curb to provide substrate to receive cap flashing.
 2. Install and adhere underlayment/modified bitumen flashing over top of curb extending a minimum 4-inches below top of curb and overlapping top edge of base flashing.
 3. Install metal cap flashing over curb. Install appropriate fasteners through the fascia spaced 12-inches on-center.
 4. Reinstall equipment on top of cap flashing on top of vibration isolator pads.

P. Door Threshold: At existing roof access doors, install sheet metal threshold over substrate and secure with flat-head countersunk screws.

Q. Coping:

1. Install new 2X wood nailers and/or 2X wood nailers and plywood to provide substrate on top of wall to have a resulting positive slope (minimum 1-inch per foot) toward roof.
2. Install and adhere underlayment or flashing membrane over the wood substrate extending a minimum of 1-inch below top of wall system. Lap ends minimum of 3-inches (75mm) and secure membrane in place on exterior vertical face.
3. Install metal coping segments allowing 1/2-inch (13mm) spaces between segments. Lock coping onto cleat and install appropriate fasteners through the interior fascia spaced 24-inches (600mm) on-center in enlarged holes.
4. Install back-up plates centered under butt joints at adjoining sections of coping and set in continuous beads of sealant, Type B, placed approximately 1-inch (25mm) from cover edges.
5. Install appropriate fastener through neoprene washer and back-up plate between coping segments. Apply bead of sealant, color to match sheet metal, in butt joint tooled to match surface of adjacent coping sections.
6. Install cap bead of sealant, Type B, over sealed/riveted lap seam in coping at corners. Apply tape on coping to provide straight edges of tooled cap bead. Remove tape upon completion of tooling.
7. Install pre-manufactured/pre-engineered coping systems in accordance with manufacturer's installation guidelines. Provide and install pre-fabricated corners and end caps/terminations.

3.03 CLEANING:

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

END OF SECTION 07 62 00

SECTION 07 92 13

JOINT SEALANTS

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Installing sealants and joint backing.
- B. Routing and sealing of cracks in mortar joints.
- C. Replacing sealants in control joints.
- D. Wet sealing existing glazing.
- E. Replacing sealants at perimeters of windows, doors, louvers, and penetrations.
- F. Installing sealant and expansion joints around concrete stairs and landing on West elevation.

1.02 RELATED SECTIONS:

- A. 02 07 20 - Minor Demolition and Renovation Work.
- B. 04 42 00 - Stone Restoration and Cleaning.
- C. 07 62 00 - Sheet Metal Flashing and Trim

1.03 REFERENCES:

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

1.04 SUBMITTALS:

- A. Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer's product data, joint preparation and installation instructions, color charts, and MSDS for each product required.
- C. Submit manufacturer's certification that products meet specified requirements and are appropriate for project applications.
- D. Samples for Initial Selection Purposes: Submit manufacturer's standard bead samples consisting of strips of actual products showing full range of colors available for each product exposed to view.
- E. Submit proposed joint backer rod and bond breaker material samples to be used with each type of sealant.

1.05 QUALITY ASSURANCE:

- A. Product Labels: Include manufacturer's name, type of sealant, and color on labels of containers.
- B. Single Source Responsibility for Joint Sealer Materials:
 - 1. Obtain joint sealer materials from single manufacturer for each different product required.
 - 2. Provide primers, joint sealers, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by testing and field experience as supplied and warranted by one manufacturer.

3. Provide joint sealants that have been produced and installed to establish and maintain watertight and airtight continuous seals.
- C. Installer Qualifications: Installer having not less than five years successful experience in comparable projects and employing personnel skilled in operations required for project.
- D. Field Sample: Upon directions of Owner, prepare 12-inch (300mm) samples in presence of Owner demonstrating removal and cleaning process and application of sealant on all substrate and application conditions affected by the Work of this Section.
- E. Use test methods standard with manufacturer to determine if priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion and compatibility of joint sealants to joint substrates under environmental conditions that will exist during actual installation.
- F. Installer to perform field adhesion using a modified ASTM C794-15a peel adhesion test. Perform a minimum of one test on every type of substrate and joint condition.
 1. Test Method: Test joint sealers by hand pull method described below:
 - a. Install joint sealants in 4 feet joint lengths using same materials and methods for joint preparation and joint sealant installation required for complete work. Allow sealants to cure fully before testing.
 - b. Make knife cuts as follows: A horizontal cut from one side of joint to the other followed by two vertical cuts approximately 2-inches (50mm) long at side of joint and meeting horizontal cut at top of 2-inch (50mm) cuts. Place a mark 1-inch (25mm) from top of 2-inch (50mm) piece.
 - c. Use fingers to grasp 2-inch (50mm) piece of sealant just above 1-inch (25mm) mark; pull firmly down at a 90 degree angle or more while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for ten seconds.
 2. Report whether or not sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate.
 3. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of non-compliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrate during testing.
 4. Repair test cut areas immediately after completion of testing work.
 5. Notify in advance and conduct adhesion testing in presence of Consultant.
- G. Provide documentation of compatibility testing using ASTM C1087-87 for each different product required.
- H. Owner reserves the right to perform testing of the installed work. Contractor shall repair all installed work found to be deficient and pay for repairs and additional testing as necessary until satisfactory test results are achieved.

1.06 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials in original containers with seals unbroken and bearing labels that include manufacturer's name, type of sealant or material, color, batch number, date of manufacture, shelf life, and instructions for use.
- B. Store materials in a single lockable area of project site.
- C. Protect materials from extreme temperatures and exposure. Store in accordance with manufacturer's recommendations.
- D. Remove damaged, deteriorated, or out-of-date material from site.
- E. Store materials within temperature range of 40 degrees and 90 degrees Fahrenheit.

1.07 PROJECT CONDITIONS:

- A. Environment: Comply with sealant manufacturer's recommended minimum and maximum installation temperatures and other weather protection.
- B. Do not install sealant when surface and ambient temperature are below 40 degrees Fahrenheit.

1.08 SEQUENCING AND SCHEDULING:

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

1.09 WARRANTY:

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

PART TWO - PRODUCTS

2.01 SEALANT:

- A. Sealant:
 - 1. Type A: One component polyurethane sealant such as "Sikaflex 1a" by Sika Corp. or "MasterSeal NP1" by BASF, color to match finish of metal.
 - 2. Type B: Low/medium modulus silicone sealant for sealing metal-to-metal surface (i.e. metal edge, cover plates) such as "Sikasil WS-295" by Sika Corp., "795 Silicone Building Sealant" by Dow Corning, or "GE Silpruf SCS2000" by Momentive Performance Technologies.; color to match finish of metal.
 - 3. Type C: Self-adhering elastomeric butyl tape, 1/8-inch (3mm) by 3/8-inch (9mm), such as "Extru-Seal" by Pecora Corp.
 - 4. Type D: One-part gun grade butyl rubber sealant such as "BC-158" by Pecora.
 - 5. Type E: Impregnated pre-compressed foam expansion joint with traffic-grade silicone facer such as "DSM System" by Emseal.
 - 6. Type F: Double-sided adhesive foam tape, 1/16-inch (1.5mm) / 1/8-inch (3mm) by 3/8-inch (9mm), such as "VHB" by 3M.

2.02 RELATED MATERIALS:

- A. Cleaner: Noncorrosive, nonstaining type, compatible with joint forming materials as recommended by sealant manufacturer.
- B. Joint Backing:
 - 1. Closed cell non-gassing polyethylene foam rod, compatible with sealant, sized and shaped to provide proper compression upon insertion in accordance with manufacturer's recommendations.
 - 2. Acceptable Products:
 - a. "Sonolastic Soft Backer-Rod" by BASF.
 - b. "SofRod" by Construction Foam Products, a Division of Namaco.
 - c. Or approved equal products.
- C. Bond Breaker Tape: Low-density polyethylene strip with pressure sensitive adhesive such as "Pecora 531 Bond Breaker Tape" by Pecora Corp.
- D. Primer: Nonstaining type as recommended by sealant manufacturer to suit application.
- E. Masking Tape: Nonstaining, nonabsorbent type compatible with sealant and surfaces adjacent to joints.

PART THREE - EXECUTION

3.01 PREPARATION:

- A. Removing Existing Materials:
 - 1. Remove foreign matter from substrates that could interfere with adhesion of joint sealant. Remove existing dust, oil, grease, waterproofing, water repellent, surface dirt, and paints, except for permanent protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer.
 - 2. Remove debris from jobsite.
 - 3. Solvent wipe existing substrates with the "Two-Cloth" Cleaning Method.
 - 4. Solvent wipe prepared surfaces and glass prior to applying sealant.
- B. Cleaning:
 - 1. Clean joints receiving sealant and adjacent surfaces in manner not to damage existing materials. Perform cleaning of joints the same day sealant is to be installed in cleaned joint.
 - 2. Remove dust and debris by blowing clean with high-pressure air.
 - 3. Wipe nonporous surfaces clean with solvent such as MEK, toluene, xylene, or isopropyl alcohol (IPA) and clean, lint free, and 100 percent cotton cloths.
 - 4. Wipe non-porous surfaces with a second clean, lint free, 100 percent cotton cloth before solvent evaporates.
- C. Cleaning Metal Substrates:
 - 1. All corrosion, scale, old sealant, and existing paint coatings must be removed to clean, bright metal.
 - 2. Solvent clean contact surfaces with clean cloth and solvent such as MEK, or as required by sealant manufacturer.
 - 3. Wipe clean with a second clean, lint free cloth before solvent evaporates.
 - 4. Prime substrate if required by the sealant manufacturer.

- D. Priming:
 - 1. Prime masonry and metal substrates and other substrate materials where recommended by sealant manufacturer based upon preconstruction sealant substrate tests or prior experience.
 - 2. Apply primer to comply with joint sealer manufacturer's recommendations. Apply primer to surfaces the same day sealant is to be installed onto primed surfaces.
 - 3. Confine primers to area of joint sealer bond. Do not allow spillage or migration onto adjoining surfaces.
- E. Masking: Mask areas adjacent to joints to prevent sealant contact with surfaces that would be permanently stained or damaged by sealant or by cleaning methods required to remove excess sealant.
- F. Mix sealants in accordance with manufacturer's instructions.
- G. Equipment:
 - 1. Air compressors and abrasive grinding tools may be used at this project, but strict attention must be given to the muffler, noise baffles, placement of equipment, and operating hours.
 - 2. Air compressors shall not spew contaminants or any oil from the compressor, which are mixed with the expelled air. Control dust and air-quality from grinding procedures as required to prevent intrusion into the building or discomfort to building occupants.
 - 3. These conditions must be coordinated and approved by the Consultant prior to commencement of any work.

3.02 APPLICATION:

- A. Joint Backing:
 - 1. To achieve required joint depths and profiles, restrict depth of joints by use of joint backer rod.
 - a. Provide joint width-to-depth ratio equal to approximately 2-to-1 where practical.
 - b. Provide joint depth equal to 1/4-inch minimum of 3/8-inch maximum.
 - c. Punctured or torn backer rod shall be removed and replaced with new backer rod.
 - d. Wet or damp backer rod shall be removed and replaced with new backer rod.
 - e. Provide a minimum sealant joint width of 1/4-inch to all substrates.
 - f. Provide 1/4-inch minimum adhesion on all sealant joint and wet seal joint substrates.
 - 2. Size backer rod to allow for 30 percent minimum compression of the backer rod when installed.
 - 3. Where joint backing material is not feasible due to insufficient clearance or depth, install bond preventive material in joint.
 - 4. Three-sided adhesion of sealant is not permitted.
- B. Sealant:
 - 1. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates.
 - 2. Apply sealant in uniform continuous bead without gaps or air pockets, following manufacturer's instructions for each specific type of sealant.

3. Provide uniform cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.
 - a. Provide for minimum sealant thickness of ¼-inch.
 - b. Provide for minimum sealant adhesion to substrate of ¼-inch.
 - c. Provide for minimum width-to-thickness ratio of 2:1.
- C. Tooling:
 1. Tool or strike joints to a slight concave profile with a light pressure to spread the material against the back-up material, as well as the joint surface. Finished appearance should be smooth, straight, and even. Rough, unevenly tooled sealant finishes with sloppy edges will not be acceptable at this project.
 2. Complete tooling in one continuous stroke within ten minutes of sealant application and before a surface-skin forms. Do not use soaps, oils and/or alcohol as tooling aids. Such materials should not be allowed on the stage platform.
 3. Remove excess sealant from surfaces adjacent to joint.
 4. Remove masking immediately after tooling without disturbing joint sealant.
 5. Embed sand and/or masonry fines into the top surface of newly tooled “wet” sealant to match the texture and color of existing adjacent mortar or stone.
- D. Wet Sealing:
 1. Tool or strike fillet-shaped joints to a sharp chisel profile with a light pressure to spread the material against each shoulder. Finished appearance should be smooth, straight, and even. Rough, unevenly tooled sealant finishes with sloppy edges will not be acceptable at this project.
 2. Mask and tool as noted above.
 3. Extend sealant onto each glass and metal surface not less than ¼-inch and not more than ½-inch.
 4. Complete tooling in one continuous stroke within ten minutes of sealant application and before a surface-skin forms. Do not use soaps, oils and/or alcohol as tooling aids. Such materials should not be allowed on the stage platform.
 5. Remove masking immediately after tooling without disturbing joint sealant.
- E. Expansion Joint:
 1. Clean and prep adjacent substrates.
 2. Install expansion joint between substrates.
 3. Allow expansion joint to expand.
 4. Seal new expansion joint to existing material.
 5. Apply bond-breaker to top of expansion joint material.
 6. Apply bead of sealant type “B” over top of expansion joint material.

3.03 ADJUSTING:

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

3.04 CLEANING:

- A. Remove excess sealant from adjacent surfaces immediately after contact with xylene, toluene, or sealant recommended by the sealant manufacturer.
- B. Remove debris and containers from jobsite.
- C. Clean adjacent surfaces of other soiling due to sealant application.

3.05 PROTECTION:

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

3.06 SCHEDULE:

- A. Sealant A: Single component urethane sealant:
 - 1. Sealant work in conjunction with roofing.
- B. Sealant B: Medium Modulus Silicone:
 - 1. Window, door, and louver perimeter joints.
 - 2. Window wet seal.
 - 3. Stone control joints.
 - 4. Plaster control joints.
 - 5. Route and seal cracks in stone.
 - 6. Metal-to-metal joints (coping cover plates, counterflashing lap joints, etc.).
 - 7. Heat sensitive applications.
 - 8. Counterflashings.
 - 9. Penetration bonnet caulk troughs.
 - 10. Perimeter of expansion joint material.
- C. Sealant C:
 - 1. Between bonnet and penetrating element.
 - 2. Surface-mounted counterflashings
- D. Sealant D:
 - 1. Between concealed metal-to-metal lap joints.
- E. Sealant E:
 - 1. Between wall-to-wall expansion joints.
- F. Sealant F:
 - 1. Between glass and aluminum framing.

END OF SECTION 07 92 13

SECTION 08 81 00

GLASS AND GLAZING

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Installation of non-vision spandrel glazing to existing aluminum-framed windows.
- B. Glazing compounds and accessories.

1.02 RELATED SECTIONS:

- A. 02 41 00 - Selective Demolition and Renovation Work
- B. 07 92 00 - Joint Sealants.

1.03 REFERENCES:

- A. American National Standard for Glazing Material (ANSI).
- B. American Society for Testing and Materials (ASTM).
- C. Glass Association of North America (GANA).

1.04 QUALITY ASSURANCE:

- A. Glazing Standards: Comply with recommendations of Glass Association of North America (GANA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this Section or other referenced standards.
- B. Installation Qualifications: Work must be performed by a firm having not less than five years successful experience in comparable masonry restoration projects and employing personnel skilled in the restoration processes and operations indicated.
- C. Single Source Responsibility: Provide materials obtained from one source for each type of glass and glazing indicated.

1.05 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical data for each glazing material product required, including installation and maintenance instructions.
- B. Submit 12-inch square samples of each type of glass indicated.
- C. Glazing contractor will obtain compatibility and adhesion test reports from the sealant manufacturer, indicating that glazing materials were tested for compatibility and adhesion with glazing sealant, as well as other glazing materials.
- D. Provide submittals in accordance with Section 01 30 00 – Submittals.
- E. Mock-up: Install one window assembly for review by Owner and Consultant prior to start of production work.

1.06 DELIVERY, STORAGE, AND HANDLING:

- A. Protect glazing materials during delivery, storage, and handling to comply with manufacturer's directions and as required to prevent damage to glazing materials.
- B. Exercise exceptional care to prevent edge damage to glass, and damage/deterioration to coating on glass.

1.07 PROJECT CONDITIONS:

- A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation, or other causes. Install glazing sealants only when temperatures are in the middle third of manufacturer's recommended installation temperature range. Install sealant when ambient and substrate temperatures are above 40 degrees Fahrenheit (4 degrees Celsius).
- B. Field Measurements: Verify field measurements with drawing dimensions prior to fabrication of glass products.

1.08 WARRANTY:

- A. Provide a written limited warranty from the date of manufacture that the opacifying coating will not lose adhesion, flake, peel, chip, or develop any noticeable color change for a period of ten years from date of installation.
- B. Contractor shall provide a 2-year limited warranty for labor and materials required for replacement of glazing from seal failure, interpane dusting or misting, and workmanship defects.

PART TWO - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

- A. Available Manufacturers:
 - 1. PPG Industries, Inc.
 - 2. Guardian Industries.
 - 3. Oldcastle Building Envelope.
 - 4. Or approved equal.

2.02 MATERIALS:

- A. Opacifying Coating: Basis of design to be "Opaci-Coat-300" silicone spandrel by ICD High Performance Coatings.
- B. Compatibility: Select sealants with proven compatibility with surfaces contacted in the installation and under service conditions indicated, as demonstrated by testing and field experience.

2.03 GLAZING TYPES:

- A. Type 1 – Single Non-Vision Spandrel Glass:
 - 1. Application: Existing exterior aluminum windows.
 - 2. Fully tempered glass: 1/4-inch (6mm) thick, minimum.
 - 3. Tint: Clear.
 - 4. Opacifying Coating: 6.5 dry mils, minimum, on surface #2.
 - 5. Glazing Method: Pressure glazing stops with tape and sealant.

PART THREE - EXECUTION

3.01 PREPARATION:

- A. Remove and discard existing vision lites from existing aluminum frames.
- B. Verify aluminum framing and glazing stops in good condition.
- C. Field measure glazing.
- D. Clean and prepare existing aluminum framing, glazing stops, and surrounding trim to receive glass.

3.02 GLAZING - GENERAL:

- A. Comply with combined printed recommendations of manufacturers of sealants, tapes, and other glazing materials except where more stringent requirements are indicated, including those of referenced glazing standards.

3.03 TAPE AND SEALANT INSTALLATION:

- A. Prime surfaces scheduled to receive sealant.
- B. Apply continuous foam glazing tape to exterior surface of interior steel glazing stop. Maintain flush edge with inside edge of steel glazing stop. Wet seal butt joints of foam glazing tape with Type "B" silicone sealant.
- C. Apply "back-bed" of Type "B" silicone sealant. Apply around perimeter of previously apply foam glazing tape.
- D. Seal joints in steel glazing stops or recesses with Type "B" silicone sealant.

3.04 GLASS INSTALLATION:

- A. Place silicone setting blocks at 1/4 points with edge of block no more than 6-inches from corners.
- B. Rest glazing on setting blocks and push against foam glazing tape and sealant with sufficient pressure to attain full contact.
- C. Apply foam glazing tape to glazing stops. Maintain flush edge with inside edge of glazing stop.
- D. Install glazing stops without displacing glazing; exert pressure for full continuous contact.
- E. Mechanically fasten glazing stops to aluminum framing. Add fasteners as necessary at minimum of 12-inches on center.

3.05 PROTECTION AND CLEANING:

- A. Protect glass from contact with contaminating substances resulting from vertical wall coating operations. If, despite such protection, contaminating substances do come into contact with glass, remove immediately by method recommended by material manufacturer.
- B. Remove and replace glass which is broken, chipped, cracked, abraded, or damaged in any other way during construction period, including natural causes, accidents, and vandalism.
- C. Wash glass not more than four days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Wash glass by method recommended by glass manufacturer.

END OF SECTION 08 81 00

SECTION 09 24 33

PORTLAND CEMENT STUCCO REPAIR

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Installation of plaster repairs on exterior walls.

1.02 RELATED DOCUMENTS:

- A. 02 07 20 - Minor Demolition and Renovation Work.
- B. 07 62 00 - Sheet Metal Flashing and Trim.
- C. 07 92 13 - Joint Sealants.
- D. 09 96 53 - Elastomeric Coating

1.03 REFERENCES:

- A. Codes and Standards: Comply with applicable codes, regulations, references, and standards of current editions in effect thirty days prior to bid due date.
 - 1. Federal Specifications: SS-L-351B, Lime: Hydrated (for) Structural Purposes.
 - 2. American National Standards Institute (ANSI) Publications: A42.3-1971, Specifications for Lathing and Furring for Portland Cement and Portland Cement-Lime and Plastering, Exterior (Stucco) and Interior.
 - 3. American Society for Testing and Materials (ASTM) Publications:
 - a. C 926, Standard Specification for Application of Portland Cement-Based Plaster.
 - b. C 932, Standard Specification for Surface-Applied Bonding Compounds for Exterior Plastering.
 - 4. Texas Lathing and Plastering Contractors Association.

1.04 SUBMITTALS:

- A. Provide submittals in accordance with Section 01 30 00 - Submittals.
- B. Product Data: Submit manufacturer's technical information, including label analysis, application instructions, and Material Safety Data Sheets (MSDS) for each material and accessory proposed for use. Do not proceed with sample applications or with work until technical information is approved by Consultant.
- C. Plaster Mix Ratios: Submit proposed plaster mix ratios of Portland cement, aggregate, and lime (if used), for all plaster applications.
- D. Shop Drawings: Submit shop drawings of proposed plaster repair details. Include potential repair conditions (minor surface repair, partial excavation and repair, and full excavation and repair), and typical installation details all accessories. Include fastener type and spacing for all anticipated substrate conditions.
- E. Sample Panels: Submit two 2-foot square sample panels of applied plaster installed on metal plaster base, weather resistive barrier, and plywood substrate. Samples to be indicative of application thickness, texture, and color.

1.05 QUALITY ASSURANCE:

- A. Installer Qualifications: Plasterer or Contractor shall have successfully completed at least five first class restoration projects, at least two of which are similar to the type, complexity, and size of this project, and shall assign mechanics to this project that are experienced in restoration projects of this quality and workmanship.

1.06 DESIGN REQUIREMENTS:

- A. Structural (Wind and Axial Loads):
1. Design for maximum allowable deflection, normal to the plane of the wall of L/360. For reduced risk of cracking in stucco on frame walls, stiffen deflection criteria.
 2. Design for wind load in conformance with code requirements. Consult applicable code compliance report.

1.07 QUALITY ASSURANCE:

- A. Manufacturer Requirements:
1. Stucco products manufacturer for a minimum of twenty years.
 2. Stucco finish products manufactured under ISO 9001:2008 Quality System and 14001:2004 Environmental Management System.
- B. Contractor Requirements:
1. Licensed, insured and engaged in application of Portland cement stucco for a minimum of three years.
 2. Knowledgeable in the proper use and handling of materials.
 3. Employ skilled mechanics who are experienced and knowledgeable in Portland cement stucco application, and familiar with the requirements of the specified work.
 4. Successful completion of minimum of three projects of similar size and complexity to the specified project.
 5. Provide the proper equipment, manpower and supervision on the job site to install the system in compliance with manufacturers published specifications and details and the project plans and specifications.
- C. Inspections
1. Provide manufacture inspection at commencement of work and 50% completion of work.
 2. Conduct inspections in accordance with code requirements and contract documents.

1.08 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials in original unopened packages, containers, or bundles bearing brand name and identification of the manufacturer.
- B. Consultant reserves the right to inspect the containers prior to their being opened, to review accompanying bills of lading, and to reject materials in opened containers or that do not conform to approved submittals.
- C. Store materials inside waterproof enclosures, under cover, and in dry condition protected from weather, surface contamination, and damage from construction traffic and other causes.

- D. Stack materials off the ground, taking care to avoid damage to edges, ends, and surfaces.
- E. Store bulk materials in the area of intended use. Prevent contamination and segregation of bulk materials prior to use.
- F. Protect temperature-sensitive material from freezing.
- G. Consultant shall have access to storage areas at all times and shall reject materials that have become damaged by any of the above causes. Promptly remove rejected materials from the job site and replace with new approved materials at no additional cost to Owner.

1.09 PROJECT CONDITIONS:

- A. Coordinate with Owner's Representative before blocking or obstructing any entrances, drives, loading docks, or other pedestrian or vehicular access.
- B. Existing Conditions: Examine the building and site to become aware of existing conditions that affect the work and immediately report any conditions to Consultant that conflict with the design, character, or extent of the work. No additional compensation will be considered or granted due to lack of knowledge or because of unusual difficulties which may be encountered in the execution or maintenance of the work.
- C. Protection: Protect contiguous or adjacent work from soiling, spattering, moisture deterioration, and other harmful effects which might result from plaster work.

1.10 ENVIRONMENTAL CONDITIONS:

- A. Minimum ambient and substrate temperature is 40 degrees Fahrenheit during plaster installation and drying and maintained for twenty-four hours after set of stucco.
- B. Protect plaster from direct sunlight and temperatures exceeding 85 degrees Fahrenheit.
- C. Hot Weather:
 - 1. Protect cement plaster from uneven and excessive evaporation during hot, windy, and dry weather.
 - 2. Moist cure after each coat of cement plaster with water if ambient temperature is more than 75 degrees Fahrenheit (24 degrees Celsius). Moist cure for forty-eight hours after application of coats.
 - 3. Moisten down cement plaster during hot, dry, or windy weather.
 - 4. Moist curing not required when humidity is higher than 75%.

1.11 WARRANTIES:

- A. Provide manufacturer's standard ten-year system warranty against defects of the materials.
- B. Provide written warranty against defects in materials or workmanship for a period of two years from date of substantial completion. Contractor shall replace any defective materials or workmanship at no cost to Owner.

PART TWO - PRODUCTS

2.01 MATERIALS:

- A. Stucco Patching Mortar: One component polymer modified, factory proportioned, fiber-reinforced Portland cement based stucco patching mortar such as "Sto Skim Coat" by StoCorp, or approved equal.
- B. Primer: Acrylic based primer such as "Sto Bonding and Anti-Corrosion Agent", or approved equal.
- C. Finish Coat: Elastomeric finish (reference section 09 96 53 Elastomeric Coating).

2.02 PLASTER PROPORTIONS AND MIXING:

- A. Proportions: Only factory proportioned material.
- B. Mix as recommended by manufacturer.

PART THREE - EXECUTION

3.01 PREPARATION:

- A. Comply with manufacturer's recommendations for installation procedures.
- B. Protect doors, roofing, adjacent concrete, and other finishes from contact with stucco by covering them with polyethylene film and waterproof masking tape firmly fixed and sealed to the surfaces to be protected.
- C. Coordinate necessary closure of walkways, and roof areas with the Consultant and Owner. Required emergency exits must remain open at all times. Furnish barricades and warning signs and erect as required.
- D. Verify existing precast panels are prepared to provide suitable substrate for stucco.

3.02 MIXING:

- A. Factory proportioned materials.
- B. Mechanically mix stucco patching mortar in accordance with manufacturer's recommendations. Do not use lumped, caked, frozen, or retempered materials. Discard plaster mixes which have begun to stiffen.

3.03 PLASTER APPLICATION:

- A. General:
 - 1. Stucco patching mortar shall be applied by hand. Prime substrate as necessary. Apply stucco patching mortar as follows:
 - a. Stucco Patching Mortar: 1/8-inch to 1/2-inch.
 - b. Additional Thickness: Apply in lifts for deeper application.
 - 2. Apply stucco patching mortar to a thickness necessary to flush with adjoining existing stucco surface.
 - 3. Permit each lift to set per manufacturer's recommendations before the next coat is applied.
- B. Finish Installation: Finish exterior surface of stucco patching mortar to match adjacent and adjoining texture.
- C. Provide joints in stucco to align vertically and horizontally with adjacent joints.
- D. Provide appropriate terminations at control joints or expansion joints.

3.04 FINAL CLEANING AND PROTECTION:

- A. Remove temporary protection and enclosures.
- B. Promptly remove stucco patching mortar from surfaces which are not to be plastered.
- C. Repair exposed surfaces which have been stained, marred, or otherwise damaged during the stucco repair work.
- D. When stucco repair work is completed, remove unused materials, containers, and equipment and clean surfaces of plaster debris.

END OF SECTION 09 24 33

SECTION 09 91 00

PAINTING

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Preparing and painting existing metal components.
- B. Preparing and painting existing sheet metal accessories.
- C. Preparing and painting HM steel doors and frames.
- D. Preparing and painting aluminum window frames.

1.02 RELATED SECTIONS:

- A. 07 92 00 - Joint Sealants.

1.03 DESCRIPTION OF WORK:

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

1.04 SUBMITTALS:

- A. Color Samples: Prior to beginning work, submit samples for Owners Representative review of color and texture only. Provide a listing of material and application for each coat of each finish sample. Sample to match existing paint color and texture.
 - 1. On 12-inch (300mm) section of siding, provide two samples of each color and material with texture to simulate actual conditions. Resubmit samples as requested by Consultant until acceptable sheen, color, and texture is achieved.
 - 2. Final acceptance of colors will be from samples applied on the job.

1.05 QUALITY ASSURANCE:

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

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

1.06 DELIVERY, STORAGE, AND HANDLING:

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

1.07 WARRANTY:

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

PART TWO - PRODUCTS

2.01 MANUFACTURERS:

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

2.02 MATERIALS:

- A. Select products from Material List below. Select primary products of a single manufacturer for each coating or paint system, unless otherwise specified.
- B. Match existing color as approved by Owner's Representative.
- C. Paint Material List
 - 1. Ferrous Metal:
 - a. Urethane: Two finish coats over primer
 - 1) Primer:
 - a) SW - Kem Bond HS Universal Metal Primer," B50AZ8.
 - 2) Finish Coats:
 - a) SW - "Industrial Urethane Alkyd Enamel," B54-150.
 - 2. Non-ferrous Metal:
 - a. Urethane: Two finish coats over primer
 - 1) Primer:
 - a) SW - "DTM Wash Primer," B50AZ8.
 - 2) Finish Coats:
 - a) SW - "Industrial Urethane Alkyd Enamel," B54-150.

PART THREE - EXECUTION

3.01 PREPARATION OF SURFACES:

- A. Do not apply finishing materials to surfaces that are not physically tight and in first class condition. Remove all foreign matter, corrosion, rough spots, prime coat paint runs, etc., and clean surfaces of dirt, rust, grease, etc. Wire brush miscellaneous steel and iron surfaces and, if necessary, sand smooth metal surfaces to have an enameled finish. Prepare surface in accordance with SSPC-SP1 solvent cleaning preparation.
- B. If surfaces are not in suitable condition for painting and finishing and cannot be put in such condition by customary preparatory methods, promptly notify Owner's Representative or assume responsibility for and rectify any resulting unsatisfactory finish.
- C. The proper preparation of surfaces to be finished will be strictly enforced. Remove defects and refinish wherever finished surfaces show defects due to improper preparation, workmanship, etc.

3.02 WORKMANSHIP:

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

3.03 PROTECTION AND CLEANING:

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

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

END OF SECTION 09 91 00

SECTION 09 96 53

ELASTOMERIC COATING

PART ONE - GENERAL

1.01 SECTION INCLUDES:

- A. Application of vapor permeable elastomeric coating to exterior stucco on precast concrete walls, including crack repair, surface preparation, priming, and top coats.

1.02 RELATED SECTIONS:

- A. 07 92 00 - Joint Sealants.
- B. 09 24 33 - Portland Cement Stucco Repair.

1.03 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical information including basic material analysis, installation instructions, Material Safety Data Sheets (MSDS), and color chart for each material specified. List each material and cross-reference to the specific coating and finish system and application. Identify by manufacturer's catalog number and general classification.
- B. Samples: Use representative colors when preparing samples for review. Submit 12-inch by 12-inch (300mm by 300mm) samples on hardboard for Owner and Consultant's review of color and texture only. Provide a listing of material and application for each coat of each finish sample.
- C. On wall surfaces, duplicate coating finishes of prepared samples. Provide two color samples minimum 1 square foot (25cm by 25cm) each of full-coat finish sample of surface as directed until required sheen, color, and texture is obtained. Sample to be representative of surface preparation, primer application, and elastomeric coating application to be used in the completed Work. Simulate finished lighting conditions for review of in-place Work.
- D. Final acceptance of colors will be from samples applied on job. Accepted sample may not remain as part of Work.

1.04 QUALITY ASSURANCE:

- A. Single Source Responsibility: Provide primers and other undercoat material produced by same manufacturer as finish coats. Use only thinners approved by coating manufacturer, and use only within recommended limits.
- B. Installer: Firm having not less than five years successful experience in comparable projects and employing personnel skilled in restoration processes and operations specified.
- C. Perform adhesion tests on existing coating and newly installed cured sample prior to beginning elastomeric coating installation in accordance with ASTM D 4541 "Pull-off Strength of Coatings Using Portable Adhesion Tester".

1.05 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials in original, new, unopened packages and containers bearing manufacturer's name and label, and following information:
 - 1. Manufacturer's name.
 - 2. Name or title of material and type of coating.
 - 3. Federal Specification number, if applicable.
 - 4. Manufacturer's stock number, date of manufacture, and batch number.
 - 5. Contents by volume, for major pigment and vehicle constituents.
 - 6. Thinning and mixing instructions.
 - 7. Application instructions.
 - 8. Color name and number.
- B. Store materials not in actual use in tightly covered containers outside of building. Maintain containers used in storage of coatings in a clean and dry condition, free of foreign materials and residue. Store rags, solvent, and coatings in closed metal container, located in designated areas.
- C. Keep storage area neat and orderly. Remove rags and waste daily.
- D. Protect from freezing where necessary.
- E. Take precautions to ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing, and application of special coatings. Take all precautions required to prevent fires.

1.06 PROJECT CONDITIONS:

- A. Do not apply coatings when the temperature of surfaces to be coated and the surrounding air temperatures are below 45 degrees Fahrenheit (7 degrees Celsius), unless otherwise permitted by coating manufacturer's printed instructions.
- B. Do not apply coatings in snow, rain, fog, or mist or when relative humidity exceeds 85 percent or to damp or wet surfaces unless otherwise permitted by coating manufacturer's printed instructions.
- C. Coating work may be continued during inclement weather only if areas and surfaces to be coated are enclosed and heated within temperature limits specified by coating manufacturer during application and curing periods.
- D. Protect persons, motor vehicles, surfaces adjacent to areas being restored, building site, and surrounding buildings from injury, contamination, soiling, and damage resulting from the coating work.
- E. Furnish and erect temporary barricades and protection at pedestrian walkways and at points of entrance and exit.

1.07 SEQUENCING AND SCHEDULING:

- A. Coordinate coating application with roofing and stucco repair work to prevent damage, staining, or discoloration of new coating and other building systems. Repair damage at no additional cost to Owner.

1.08 WARRANTY:

- A. Manufacturer's Guarantee: Provide written five year manufacturer's labor and material guarantee against leakage and defects in workmanship and material from date of Substantial Completion.
- B. Contractor's Warranty: Provide Owner a written one year Contractor's labor and material warranty against leakage and defects in workmanship and material from date of Substantial Completion.

1.09 ADDITIONAL STOCK:

- A. Provide one gallon container each of primer and finish coat to Owner.
- B. Label each container with material name and type, color, texture, and application location, in addition to manufacturer's label.

PART TWO - PRODUCTS

2.01 ELASTOMERIC COATING:

- A. Elastomeric Coating: Waterproof elastomeric acrylic-based elastomer coating designed to retain its elasticity and flexibility on above-grade exterior concrete and brick surfaces.
- B. Acceptable Products:
 - 1. "StoCoat Lotusan" by Sto.
 - 2. "Sikagard 550 W Elastocolor" by Sika.
 - 3. "MasterProtect EL 750" by BASF.
 - 4. or Approved Alternate
- C. Application dry film thickness shall be in accordance with manufacturer's written application instructions.

2.02 RELATED MATERIALS:

- A. Silicone Sealant: Refer to Section 07 92 00 – Joint Sealants, Sealant Type B. Cured sealant shall be compatible with elastomeric coating.
- B. Patching Compound: As recommended by coating manufacturer.
- C. Primer: As recommended by coating manufacturer.

2.03 MIXING:

- A. Carefully mix and prepare materials in accordance with manufacturer's directions.
- B. Maintain containers used in mixing and application of coating in a clean condition, free of foreign materials and residue.
- C. Stir materials before application to produce mixture of uniform density. Stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.
- D. Tinting:
 - 1. Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of same material are to be applied.
 - 2. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
 - 3. Finish Color: To be selected by Owner.

PART THREE - EXECUTION

3.01 PROTECTION:

- A. Protect work of other trades, whether to be coated or not, against damage.
- B. Protect or remove and replace existing decorative signage on exterior plaster surface.

3.02 PREPARATION:

- A. Clean surfaces, repair delaminated or unsound concrete surfaces, and repair cracks with sealant and patching compound in accordance with coating manufacturer's written recommendations.
- B. Power wash entire surface of existing coating and precast concrete panels.
- C. Remove all loose particles, loose or delaminated coating, oil, grease, laitance, efflorescence, mold, mildew, and other foreign material. Substrate shall be dry. Upon commencement of work, inform owner or owners reprehensive if a substantial amount of the existing coating is loose or delaminated.
- D. Primer application is required if substrate is chalky after cleaning and proper surface preparation.
- E. Crack Preparation:
 - 1. Cracks Less Than 1/16-inch (1.6mm): Patch in accordance with elastomeric coating manufacturer's written instructions.
 - 2. Cracks in Excess of 1/16-inch (1.6mm):
 - a. Grind or rout cracks to 1/4-inch by 1/4-inch (6mm by 6mm) and remove dust.
 - b. Fill cracks until flush with surface with patching compound or Sealant Type A in accordance with manufacturer's recommendations.
 - 3. Apply light coat of sand to patching compound or sealant before repair material cures. Sand to match size, texture, and appearance of adjacent substrate.
 - 4. Perform adhesion testing of sealant or patching compound used to repair exterior plaster.
 - 5. Prepare substrate area to be coated in accordance with coating manufacturer's recommendations.

3.03 APPLICATION:

- A. Prime Coats:
 - 1. Before application of finish coats, apply prime coat in a thin spray or roll coat to surface to be coated.
 - 2. Recoat primed and sealed substrates where there is evidence of suction spots or unsealed areas in first coat to assure a finish coat with no burn-through or other defects due to insufficient sealing.
- B. Apply coating by brush, roller, airless spray, or other application method in accordance with coating manufacturer's directions. Use brushes best suited for type of material being applied. Use rollers as recommended by manufacturer for material and texture required.

- C. Apply coating system with a minimum of two coats or more if required to prevent bleed through of substrate color. Apply additional coats when topcoats or other conditions show through final coat until cured film is of uniform finish, color, and appearance. Apply finish in pinhole free, continuous membrane.
- D. Minimum Coating Thickness:
 - 1. Number of coats and finished coating film thickness required is same regardless of application method.
 - 2. Do not apply succeeding coats until previous coat has cured as recommended by coating manufacturer.
 - 3. Apply each material no thinner than manufacturer's recommended spreading rate.
 - 4. Provide total dry film thickness of entire coating system as required by manufacturer unless otherwise indicated.
- E. Brush Applications:
 - 1. Brush-out and work brush coats onto surfaces in an even film.
 - 2. Eliminate cloudiness, spotting, pin holes, laps, brush marks, runs, sags, ropiness, or other surface imperfections.
 - 3. Neatly draw glass lines and color breaks.
- F. Roller Applications: On porous substrates, backroll to eliminate pinholing. Do not dry roll.
- G. Mechanical Applications:
 - 1. Use mechanical methods for coating application when permitted by coating material manufacturer's recommendations, governing ordinances, and trade union regulations.
 - 2. Wherever spray application is used, apply each coat to provide equivalent hiding of brush-applied coats. Do not use spray application on concrete block surfaces.
 - 3. Do not double-back with spray equipment, building-up film thickness of two coats in one pass, unless recommended by coating material manufacturer.
- H. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or recoat work not in compliance with specified requirements.

3.04 FIELD QUALITY CONTROL:

- A. Owner reserves right to invoke following material testing procedures at any time and any number of times during period of field application:
 - 1. Owner will engage services of independent testing laboratory to sample materials being used. Samples of materials delivered to project site will be taken, identified and sealed, and certified in presence of Contractor.
 - 2. Testing laboratory will perform appropriate tests for any of following characteristics: adhesion, abrasion resistance, apparent reflectivity, flexibility, washability, absorption, accelerated weathering, dry opacity, accelerated yellowness, recoating, skinning, color retention, alkali resistance, and quantitative materials and analysis.

3. If test results show materials being used do not comply with specified requirements, Contractor may be directed to stop work and remove non-complying materials, pay for testing, recoat surfaces coated with rejected materials, and remove rejected materials from previously coated surfaces if, upon recoating with specified materials, the two coatings are incompatible.

3.05 ADJUSTING:

- A. Correct damage by cleaning, repairing or replacing, and recoating as directed by Consultant. Leave work in undamaged condition. Replace any material or surfaces damaged, or restore if possible, to original condition.

3.06 CLEANING:

- A. During progress of work, remove discarded materials, rubbish, cans, and rags resulting from work from project site daily.
- B. Furnish and lay drop cloths in areas where coating and finishing is being done. Protect floors and other surfaces from dripping materials. Where it becomes necessary to remove temporary coverings protecting material in place in order to proceed with work, replace or provide other satisfactory means of protection.
- C. Promptly clean off spots of coating, oil, and stains from floors, walls, roof areas, sidewalks, hardware, and other surfaces. Do not allow them to accumulate, dry, or harden. Upon completion of the work, check finished surfaces, clean off previously undetected spots and stains used in coating and finishing from the building, and leave entire building in clean condition insofar as coating and finishing work is concerned.
- D. Upon completion of work, clean coating-spattered surfaces. Remove spattered materials by proper methods of washing and scraping, using care not to damage finished surfaces.
- E. Maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.

3.07 PROTECTION:

- A. Protect work of other trades against injury or damage during and because of coating and finishing operations.
- B. Provide "Wet Paint" signs and barricades as required to protect finishes. After coating application, remove temporary protective wrappings provided by others for protection of their work during coatings operation.

END OF SECTION 09 96 53

SECTION 26 41 00

LIGHTNING PROTECTION SYSTEM

PART ONE - GENERAL

1.01 SECTION INCLUDES:

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

1.02 RELATED SECTIONS:

- A. 02 07 20 - Minor Demolition and Renovation Work.
- B. 07 52 50 - Modified Bitumen Membrane Roofing
- C. 07 62 00 - Sheet Metal Flashing and Trim

1.03 STANDARDS:

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

1.04 SUBMITTALS:

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

1.05 QUALITY ASSURANCE:

- A. Applicator:
 - 1. Employees Certified Master Installers.
 - 2. Company is UL listed.
 - 3. Member of Lightning Protection Institute.

- B. Regulatory Requirements: The lightning protection system shall conform to the requirements of the LPI, UL, NFPA, and NEC.
- C. Inspection: Contractor shall apply to Underwriters Laboratories Inc. for inspection and certification.

PART TWO - PRODUCTS

2.01 MATERIALS:

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

PART THREE - EXECUTION

3.01 GENERAL INSTALLATION:

- A. The installation shall be accomplished by an experienced installation company that is UL listed, a member of the Lightning Protection Institute, United Lightning Protection Association qualified, and an employer of Certified Master Installers of lightning protection systems.
- B. A Certified Master Installer shall directly supervise the work.
- C. All equipment shall be installed in a neat, workmanlike manner.
- D. The system shall consist of a complete conductor network at the roof and include air terminals, connectors, splicers, bonds, copper downleads, and proper ground terminals.
- E. Lightning Protection System:
 - 1. Temporarily disconnect, remove, and salvage the lightning protection system including, but not limited to, cables, holders, clamps, and clips.
 - 2. Reinstall the lightning protection system so that, upon completion, system can be re-certified by UL.
 - 3. Install equipment in a neat, workmanlike manner.
 - 4. System shall consist of a complete conductor network at the roof and include air terminals, connectors, splicers, bonds, and other associated hardware.
 - 5. Secure bases of air terminals and cable holders to inside vertical face of coping or parapet walls with grommetted screws. Install cut section of EPDM rubber or rubber gasket between coping and secured hardware.
 - 6. Set air terminal bases and metal cable holders in bed of sealant adhesive on top of cut section of modified bitumen protection pad installed on top of capsheet.
 - 7. Install aluminum cables where cable is to be in full contact with roof membrane.

3.02 COORDINATION:

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

3.03 CLEANING:

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

END OF SECTION 26 41 00

UT HEALTH
THE UNIVERSITY OF TEXAS
HEALTH SCIENCE CENTER OF HOUSTON

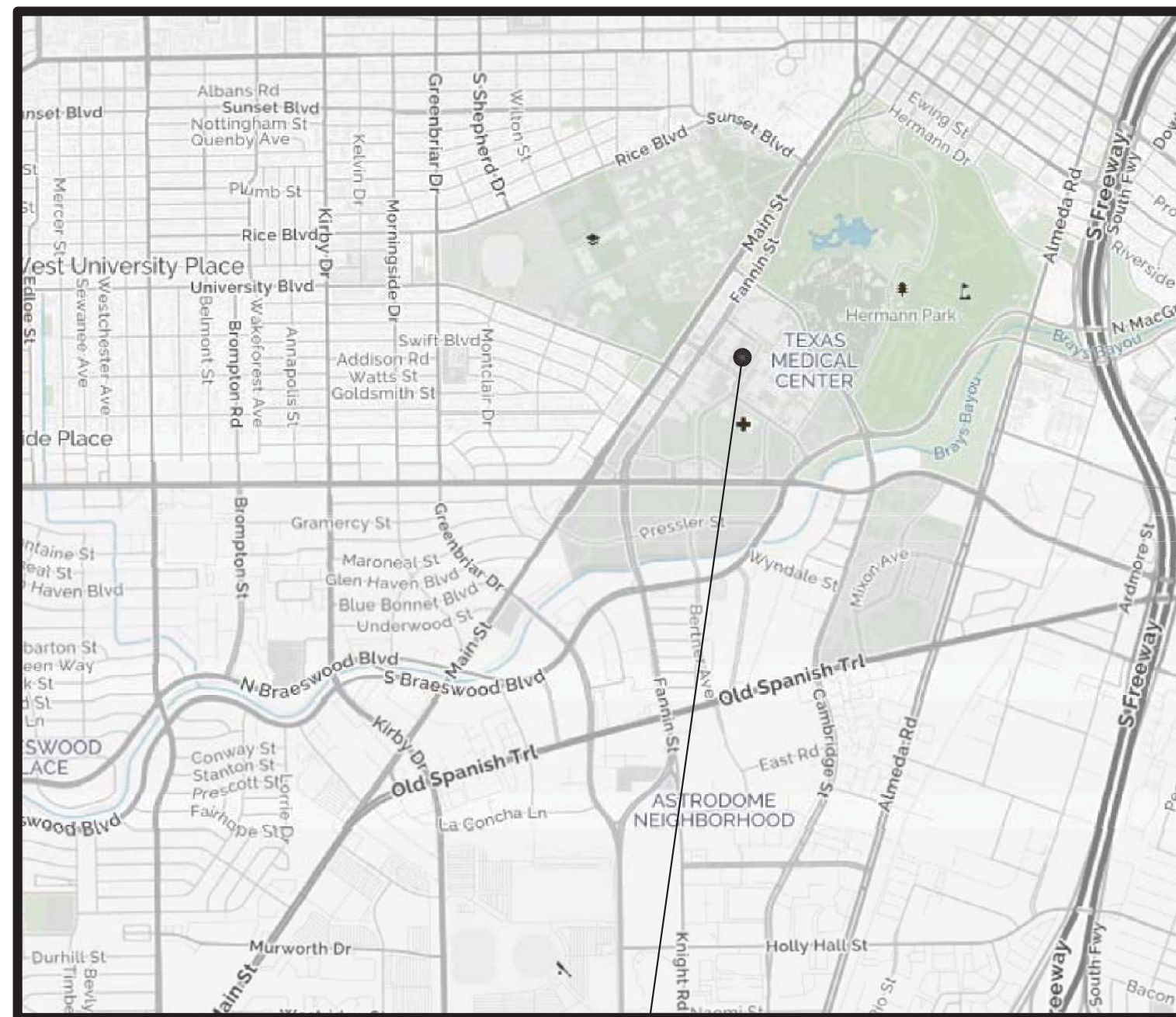


ROOF REPLACEMENT
& EXTERIOR WALL REPAIR/RESTORATION

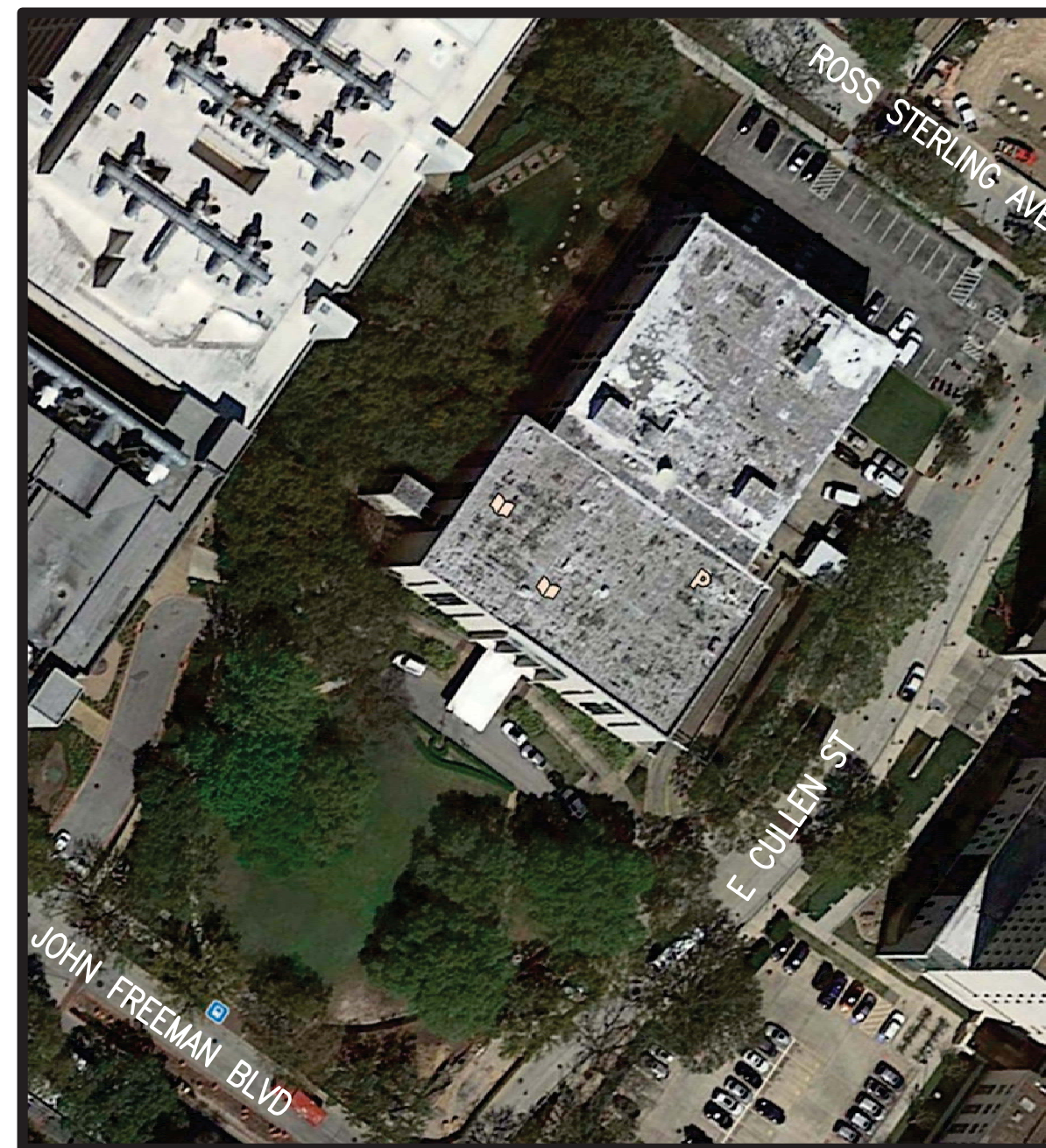
for

JESSE JONES LIBRARY
1133 JOHN FREEMAN BLVD
HOUSTON, TX

PREPARED BY
PRICE CONSULTING, INCORPORATED
211 HIGHLAND CROSS, SUITE 220
HOUSTON, TEXAS 77073
(281) 209-1724
TX P.E. FIRM F-3814



PROJECT SITE



SITE PLAN

INDEX TO DRAWINGS

- R1.00 COVER SHEET
- R1.01 GENERAL NOTES
- R2.00 EXISTING ROOF PLAN
- R2.01 NEW ROOF PLAN
- R2.02 ROOF LAYOUT PLAN
- R3.00 ELEVATIONS
- R3.01 ELEVATIONS
- R3.02 EXISTING PENTHOUSE ELEVATIONS
- R3.03 NEW PENTHOUSE ELEVATIONS
- R3.04 EXISTING PENTHOUSE STRUCTURAL ELEVATIONS
- R3.05 NEW PENTHOUSE STRUCTURAL ELEVATIONS
- R5.00 DETAILS
- R5.01 DETAILS
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- R5.05 DETAILS



F-3814 1/20/17

PRICE CONSULTING, INC.
PRICE CONSULTING, INC.
211 HIGHLAND CROSS, SUITE 220
HOUSTON, TEXAS 77073
PHONE: (281)209-1724 FAX: (281)209-2724

PROJECT:
JESSE JONES LIBRARY
1133 JOHN FREEMAN BLVD.
HOUSTON, TEXAS

OWNER/CLIENT:
UT HEALTH SCIENCE CENTER AT HOUSTON
7000 FANNIN, UCT M125
HOUSTON, TEXAS 77030

REVISIONS		
NO.	DATE	BY

COVER SHEET
PCI PROJECT NO.: 11212.15
PCI FILE NAME: R1.00
SCALE: AS NOTED



DWN.BY: DATE:
ESG 01/20/17
SHEET:
R1.00

GENERAL NOTES: ROOF REPLACEMENT - AND EXTERIOR WALL REPAIR/RESTORATION

- 1) ALL DIMENSIONS, EQUIPMENT, AND PENETRATION LOCATIONS PRESENTED ON THE DRAWINGS ARE CONSIDERED APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS.
- 2) THESE DRAWINGS AND DETAILS ACCOMPANY SPECIFICATIONS AND DOCUMENTS THAT COMPRISE A PROJECT MANUAL.
- 3) DETAILS ARE DESIGNATED AT REPRESENTATIVE LOCATIONS. EACH LOCATION AND SIMILAR CONDITIONS ARE TO BE TREATED ACCORDINGLY.

TYPICAL DETAIL DESIGNATION: 

- 4) UNLESS INDICATED BY THE TERM "EXISTING", ITEMS PRESENTED ON DETAIL DRAWINGS ARE CONSIDERED TO BE NEW AND FURNISHED BY CONTRACTOR.
- 5) EXISTING ROOF CONSTRUCTION OBSERVED AT PCI CORE LOCATIONS CONSISTS OF THE FOLLOWING:

- 1) AREAS "A" AND "B": SPRAY-APPLIED POLYURETHANE FOAM (SPUF) WITH ELASTOMERIC COATING OVER GRAVEL-SURFACED BUR OVER CONCRETE DECK.
- 2) AREAS "C" AND "D": SPUF (1"-3"+ THICK); GRAVEL-SURFACED BUR OVER FIBERGLASS INSULATION OVER TAPERED LIGHTWEIGHT INSULATING CONCRETE AND CONCRETE DECK.
- 3) AREAS "G", "H", AND "I": SPUF (1/2" THICK) OVER CONCRETE DECK.
- 4) AREAS "E" AND "F": STANDING SEAM METAL ROOF PANELS OVER STEEL FRAMING.
- 5) AREAS "K": GRANULE-SURFACED MODIFIED BITUMEN OVER LIGHTWEIGHT INSULATING CONCRETE ON CONCRETE DECK.


- 6) REMOVE EXISTING ROOFING, INSULATION, AND SHEET METAL FLASHINGS DOWN TO DECK AT ROOF AREAS "A", "B", "C", "D", "G", "H", "I" AND "K".
- 7) EQUIPMENT SITTING ON WOOD SLEEPERS OR EQUIPMENT PADS TO BE TEMPORARILY DISCONNECTED AND LIFTED AND RE-SET ON NEW CURBS ANCHORED TO DECK WITH STRAPS INSTALLED OVER EQUIPMENT AND ANCHORED TO CURBS.
- 8) INSTALL STAINLESS STEEL SHEET METAL STRAPS, ONE PER SIDE, TO SECURE EQUIPMENT HOODS TO CURBS.
- 9) TYPICAL NEW ROOF CONSTRUCTION IS AS FOLLOWS:

APPLY SECONDARY ROOF ON CONCRETE DECK; ADHERE TAPERED POLYISOCYANURATE INSULATION COMPLYING WITH IBC 2012 SECTION 1508 AND TABLE 1508.2.; TO ACHIEVE MINIMUM TOTAL R-VALUE OF R-25, ADHERE COVER BOARD IN LOW-RISE FOAM ADHESIVE, AND FULLY ADHERE TWO-PLY MODIFIED BITUMEN ROOF MEMBRANE CONSISTING OF ONE PLY OF SMOOTH SURFACED BASE PLY & ONE PLY OF CAP SHEET WITH WHITE REFLECTIVE SURFACING COMPLYING WITH IBC 2012 SECTION 1507.11; SECTION 1505.2: CLASS "A" FIRE CLASSIFICATION AND TO HAVE MINIMUM SOLAR REFLECTANCE OF 0.70 AS TESTED PER ASTM C1549; E903, E1175, OR E1918 AND A MINIMUM THERMAL EMITTANCE OF 0.75 AS TESTED PER ASTM C835, C1371, OR E408.

- 10) RAISE OR LOWER ALL EQUIPMENT, UTILITY LINES, PENETRATIONS, PIPING, ETC. AS REQUIRED FOR INSTALLATION OF THE NEW ROOF SYSTEM. PROVIDE NECESSARY DISCONNECT/RECONNECT, EXTENSIONS AND MISC. COMPONENTS.

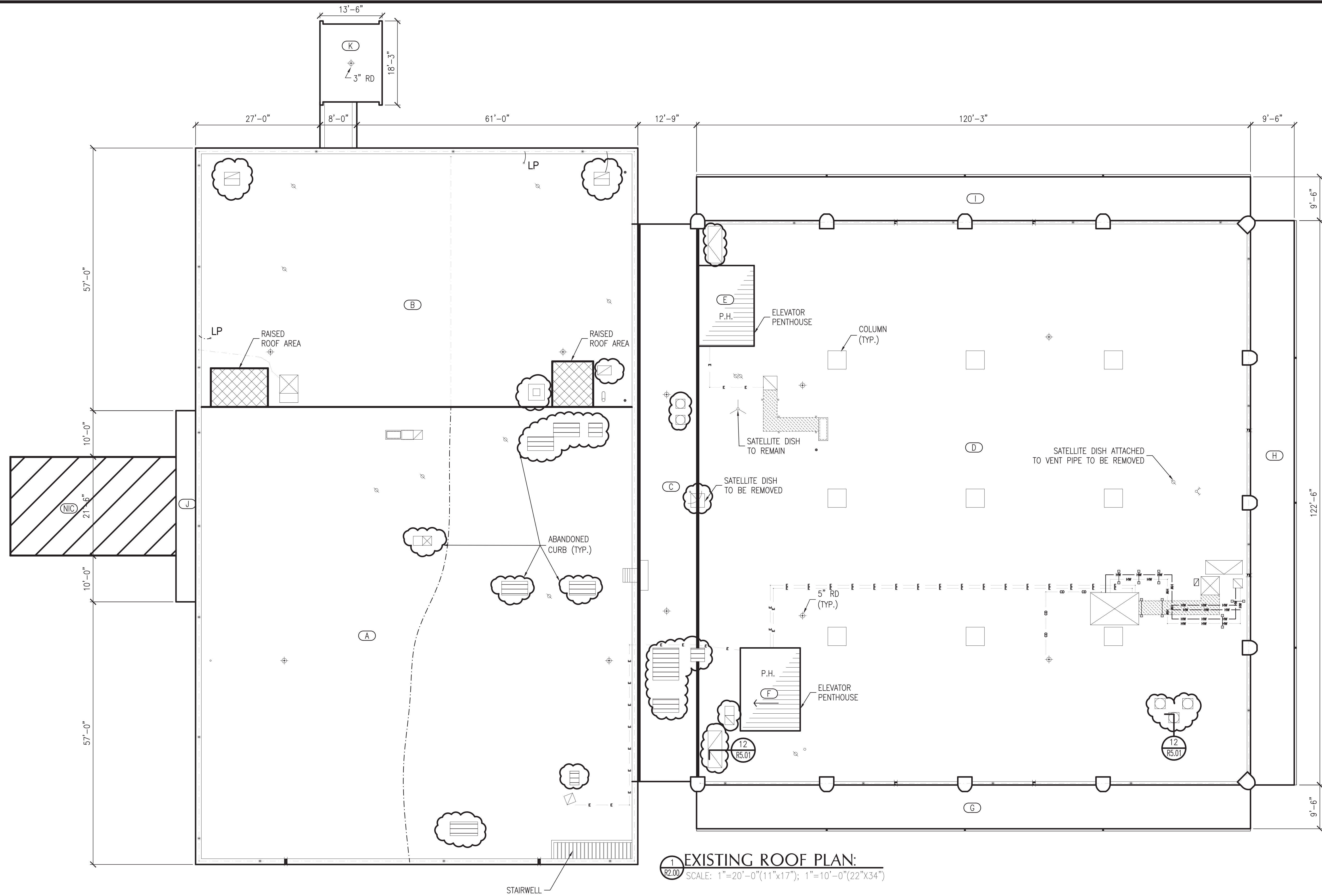
- 11) REMOVE EXISTING LIGHTNING PROTECTION SYSTEM ON ROOF TO PERFORM WORK AND REINSTALL NEW COMPONENTS IN ACCORDANCE WITH APPLICABLE CODES; INSTALL BLUNT TIP AIR TERMINALS; ADHERE CABLE HOLDERS AND TERMINALS TO PROTECTION PADS WITH SEALANT.
- 12) INSTALL WALK PADS AT ROOF ACCESS POINTS, AROUND SERVICEABLE EQUIPMENT AND OTHER HIGHLY TRAFFICKED AREAS.
- 13) PROVIDE NEW WOOD BLOCKING/NAILERS AS DESIGNATED ON DRAWINGS. BLOCKING/NAILERS, &/OR COMBINATION WITH PLYWOOD SHEATHING TO MATCH THICKNESS OF INSULATION AT RESPECTIVE LOCATIONS, AND WIDTH TO EXTEND BEYOND EDGE OF METAL FLANGE (MIN. 1-INCH) WHERE APPLICABLE.
- 14) WATER TEST ROOF DRAINS; WIRE BRUSH; & PAINT CLAMP RINGS & STRAINERS; SECURE CLAMP RINGS W/SS BOLTS, WASHERS, NUTS; REPLACE BROKEN/DAMAGED COMPONENTS.
- 15) INSTALL NEW ROOF SYSTEM TESTED TO MEET SPECIFIED WIND UPLIFT PRESSURES AS FOLLOWS:

ROOF SYSTEM WIND UPLIFT CRITERIA:		WIND SPEED: 150 MPH RISK CATEGORY II EXPOSURE: B BUILDING CATEGORY: ENCLOSED SAFETY FACTOR: 1.25
MAIN ROOFS		
FIELD	67.5 PSF	
PERIMETER (8' WIDE)	105 PSF	
CORNER (8'X8')	157.5 PSF	
LOW ROOFS		
FIELD	52.5 PSF	
PERIMETER (8' WIDE)	90 PSF	
CORNER (8'X8')	135 PSF	
PENTHOUSE ROOFS		
FIELD	90 PSF	
PERIMETER (8' WIDE)	142.5 PSF	
CORNER (8'X8')	187.5 PSF	

- 16) ENLARGE EXISTING THROUGH-WALL SCUPPERS ON AREA "A".
- 17) APPLY TRAFFIC COATING TO STAIR TREADS AND BOTTOM OF LANDING AT ROOF ACCESS STAIRWELL. APPLY ELASTOMERIC COATING TO WALLS AT ROOF ACCESS STAIRWELL.
- 18) APPLY PLYWOOD SHEATHING TO INSIDE SURFACES OF PARAPET WALLS AND RISE WALLS.
- 19) INSTALL NEW GUTTERS AT PERIMETERS OF (ROOF AREAS "G", "H", AND "I").
- 20) POWER WASH, REPAIR HOLES, AND APPLY LIQUID MEMBRANE COATING TO ROOF AREA "J".
- 21) REMOVE ABANDONED PENETRATIONS, EQUIPMENT, AND CURBS DENOTED BY  AND REPAIR OPENINGS IN DECK.

- 22) REPLACE SEALANTS AT WINDOW AND DOOR PERIMETERS AND "WET-SEAL" WINDOWS AT GLASS-TO-FRAME JOINTS.
- 23) REPAIR SPALLS AND CRACKS IN PLASTER AND CONCRETE ON EXTERIOR WALLS.
- 24) REPLACE SEALANT BETWEEN ADJACENT PRECAST PANELS.
- 25) PREPARE AND PAINT EXPOSED STEEL, STEEL DOORS, AND FRAMES.
- 26) PERFORM MISC. TUCKPOINTING OF MORTAR JOINTS BETWEEN ADJACENT STONE PANELS.
- 27) REPLACE DOOR WEATHER STRIPPING.
- 28) POWER WASH AND PAINT UNDERSIDE OF FLOOR SLABS ABOVE LOWER LEVEL WALKWAYS.
- 29) REPLACE CLEAR GLASS WITH OBSCURE GLASS IN WASHROOM WINDOWS AT NOTED LOCATIONS.
- 30) INSTALL EXPANSION JOINT BETWEEN WEST STAIRS AND BUILDING.
- 31) POWER WASH PLASTER ON EXTERIOR WALLS. (ALT. NO 1)
- 32) APPLY ELASTOMERIC COATING ON PLASTER ON EXTERIOR WALLS. (ALT. NO 2)
- 33) PREPARE AND PAINT MILL-FINISH ALUMINUM-FRAMED WINDOWS. (ALT. NO. 3)
- 34) APPLY WATER REPELLENT SEALER ON STONE PANELS (ALT. NO. 4)
- 35) REMOVE EXISTING LIGHTWEIGHT INSULATING CONCRETE FILL ON ROOF AREAS "C" AND "D". (ALT. NO. 5)
- 36) INSTALL HAND RAIL SYSTEM AROUND PERIMETERS OF ROOF AREAS "B" [SOUTH, WEST AND WEST END OF NORTH SIDES], "C" [EAST AND WEST SIDES], AND "D" [EAST, WEST AND NORTH SIDES] (ALT. NO. 6)

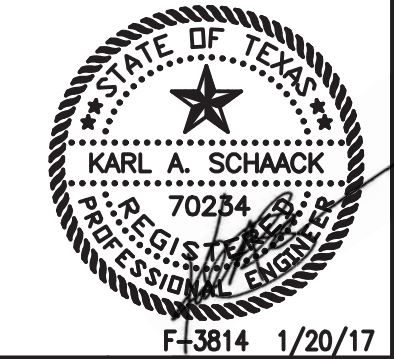




LEGEND

OVERFLOW DRAIN	WALL DRAIN
ROOF DRAIN	SUMPED DRAIN
PLUMBING VENT	HEAT EXHAUST
POWER VENT	CLOSED HEAT EXHAUST
CLOSED VENT STACK	GRAVITY VENT
TURBINE VENT	GRAVITY VENT
CLOSED TURBINE VENT	MOISTURE RELIEF VENT
ROOF PENETRATION	ROOF PENETRATION
ABANDONED PENETRATION	PIPE BOX
PIPE ON HANGERS	EXPANSION JOINT
PIPE ON WOOD BLOCCING	ROOF-TO-WALL EXPANSION JOINT
PIPE ON SURFACES	METAL EDGE
PARAPET	DOWNSPOUT AND SUTTER
CONDENSATION DRAIN LINE	MECHANICAL SCREEN
ELECTRICAL CONDUIT	CHIMNEY
GAS LINE	AIR TERMINAL
PITCH PAN	THROUGH-ROOF PENETRATION
DUCT PENETRATION	CLOSED DUCT PENETRATION
EQUIPMENT CURB	DUCT WITH SUPPORT
VENT / INTAKE	THROUGH-WALL SCUPPER
GRAVITY VENT	THROUGH-EDGE SCUPPER
SCUPPER WITH COLLECTOR HEAD	EQUIPMENT ON SLEEPERS
EQUIPMENT ON SUPPORTS	EQUIPMENT ON COURSE
EQUIPMENT ON PITCH PAN	ROOF HATCH
SMOKE HATCH	SKYLIGHT
SATELLITE DISH	STRUCTURAL SKYLIGHT
ROOF-MOUNTED LADDER	STRUCTURAL EDGE
GAGED LADDER	CHIMNEY
WALL-MOUNTED LADDER	ROUND GOOSENECK
WALAPAD	SQUARE GOOSENECK
SPLASHBLOCK	RISE-WALL
WALL THICKNESS INDICATOR	DIRECTION OF SLOPE
WALL HEIGHT INDICATOR	RIDGE / VALLEY
DOOR ACCESS	GUY WIRE ANCHOR
LIGHT	TILE ROOF
SHINGLE ROOF	METAL ROOF
ANTENNA	COLUMN
AREA IDENTIFICATION	SUSPECTED REF AREA
CORE LOCATION	PHOTO LOCATION
LEAK LOCATION	TO PROBE LOCATION
INFURRED I.D.	TI-BACK
TEST LOCATION	TRI-POD BASE
REMOVE/REPAIR	WATER HYDRANT
RAISED ROOF AREA	
LIGHTNING CABLE	

1 EXISTING ROOF PLAN:
 R2.00 SCALE: 1"=20'-0"(11"x17"); 1"=10'-0"(22"x34")



PRICE CONSULTING, INC.
 PRICE CONSULTING, INC.
 211 HIGHLAND CROSS, SUITE 220
 HOUSTON, TEXAS 77073
 PHONE: (281)209-1724 FAX: (281)209-2724

PROJECT:
 JESSE JONES LIBRARY
 1133 JOHN FREEMAN BLVD.
 HOUSTON, TEXAS

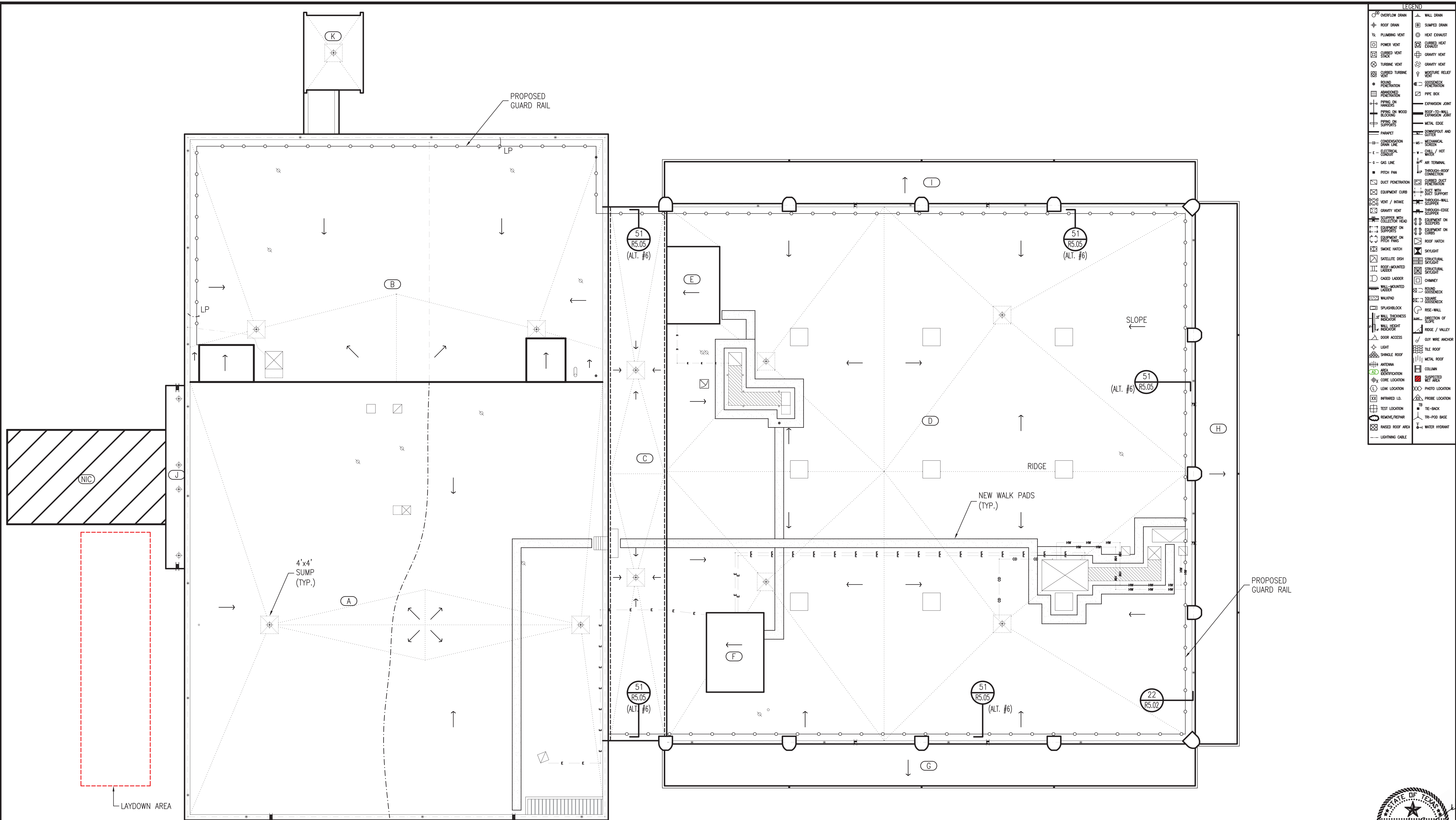
OWNER/CLIENT:
 UT HEALTH SCIENCE CENTER AT HOUSTON
 7000 FANNIN, UCT M125
 HOUSTON, TEXAS 77030

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NO.	DATE	BY

EXISTING ROOF PLAN
 PCI PROJECT NO.: 11212.15
 PCI FILE NAME: R2.00-R2.02
 SCALE: AS NOTED



DWN.BY: ESG
DATE: 01/20/17
SHEET: R2.00



LEGEND

OVERFLOW DRAIN	WALL DRAIN
ROOF DRAIN	SUMPED DRAIN
PLUMBING VENT	HEAT EXHAUST
POWER VENT	CLOSED HEAT EXHAUST
CLOSED VENT STACK	GRAVITY VENT
TURBINE VENT	GRAVITY VENT
CLOSED TURBINE VENT	MOISTURE RELIEF VENT
ROOF PENETRATION	ROOF PENETRATION
ABANDONED PENETRATION	PIPE BOX
PIPING ON HANGERS	EXPANSION JOINT
PIPING ON WOOD BLOCCING	ROOF-TO-WALL EXPANSION JOINT
PIPING ON SURFACES	METAL EDGE
PARAPET	DOWNSPOUT AND GUTTER
CONDENSATION DRAIN LINE	MECHANICAL SCREEN
ELECTRICAL CONDUIT	CHILE WATER / HOT WATER
GAS LINE	AIR TERMINAL
PITCH PAN	THROUGH-ROOF PENETRATION
DUCT PENETRATION	CLOSED DUCT PENETRATION
EQUIPMENT CURB	DUCT WITH SUPPORT
VENT / INTAKE	THROUGH-WALL SCUPPER
GRAVITY VENT	THROUGH-EDGE SCUPPER
SCUPPER WITH COLLECTOR HEAD	EQUIPMENT ON SLEEPERS
EQUIPMENT ON SUPPORTS	EQUIPMENT ON COURSE
EQUIPMENT ON ROOF PANEL	ROOF HATCH
SMOKE HATCH	SKYLIGHT
SATELLITE DISH	STRUCTURAL SKYLIGHT
ROOF-MOUNTED LADDER	STRUCTURAL EDGE
GAGED LADDER	CHIMNEY
WALL-MOUNTED LADDER	ROUND GOOSENECK
WALKPAD	SQUARE GOOSENECK
SPLASHBLOCK	RISE-WALL
WALL THICKNESS INDICATOR	DIRECTION OF SLOPE
WALL HEIGHT INDICATOR	RIDGE / VALLEY
DOOR ACCESS	GUY WIRE ANCHOR
LIGHT	TILE ROOF
SHINGLE ROOF	METAL ROOF
ANTENNA	COLUMN
ASSIGNATION CORE LOCATION	SUSPECTED REF AREA
LEAK LOCATION	PHOTO LOCATION
INFERRED I.D.	PROBE LOCATION
TEST LOCATION	TI-BACK
REMOVE/REPAIR	TRI-POD BASE
PAVED ROOF AREA	WATER HYDRANT
LIGHTNING CABLE	

1 ROOF TAPERED/SLOPE, WALK-PAD LAYOUT, LAY-DOWN AREAS, GUARD RAIL, PROPOSED GUARDRAIL AND ROOF ACCESS PLAN:
 SCALE: 1"=20'-0" (11"x17"); 1"=10'-0" (22"x34")

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 PRICE CONSULTING, INC.
 211 HIGHLAND CROSS, SUITE 220
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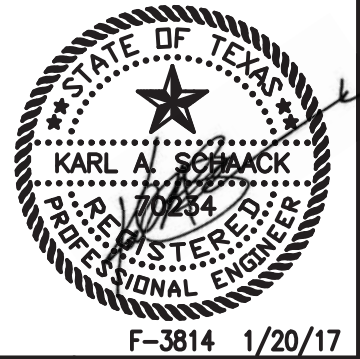
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 UT HEALTH SCIENCE CENTER AT HOUSTON
 7000 FANNIN, UCT M125
 HOUSTON, TEXAS 77030

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NO.	DATE	BY

ROOF LAYOUT PLAN
 PCI PROJECT NO.: 11212.15
 PCI FILE NAME: R2.00-R2.02
 SCALE: AS NOTED

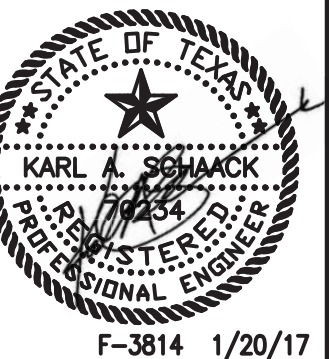
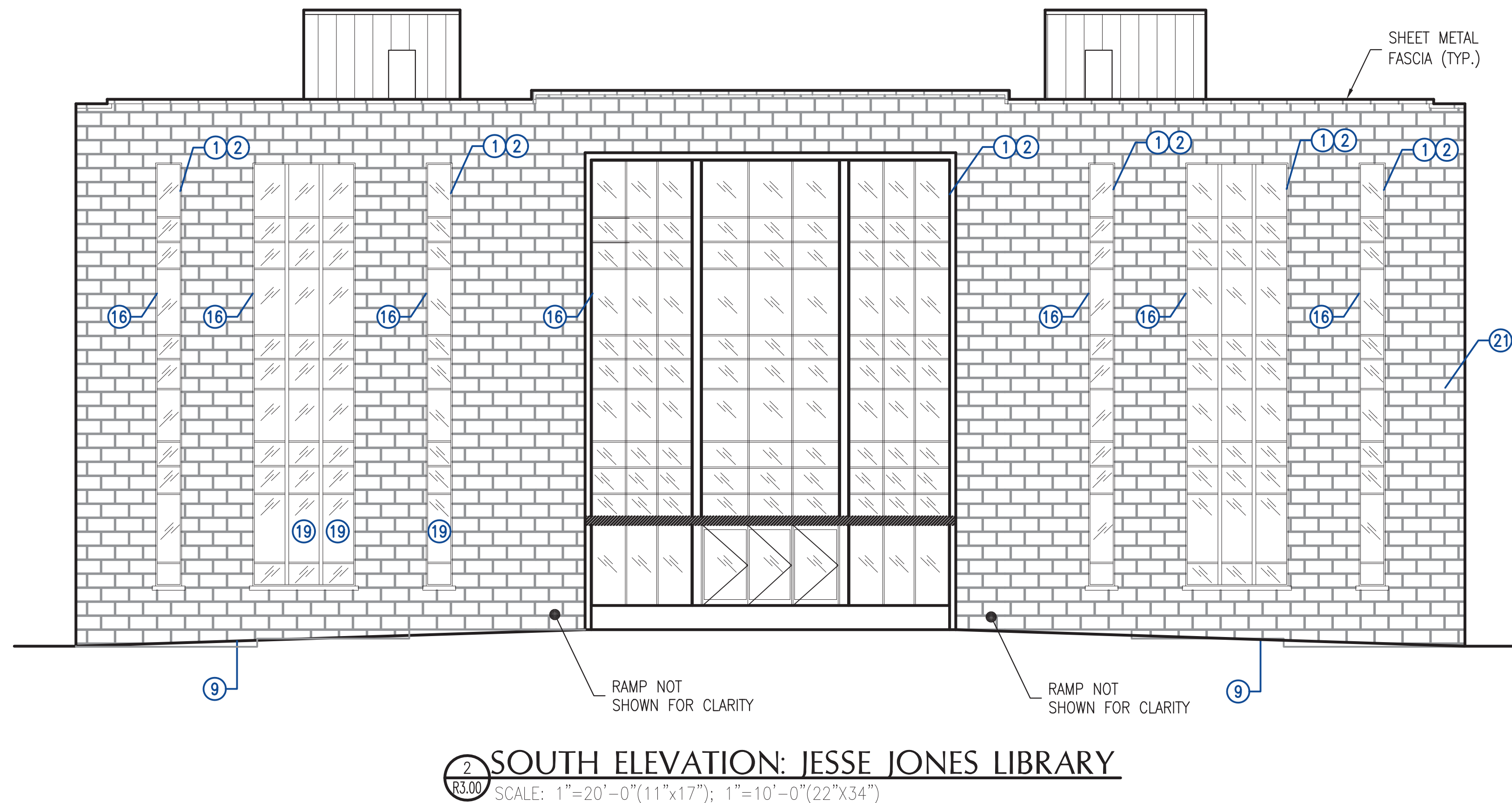
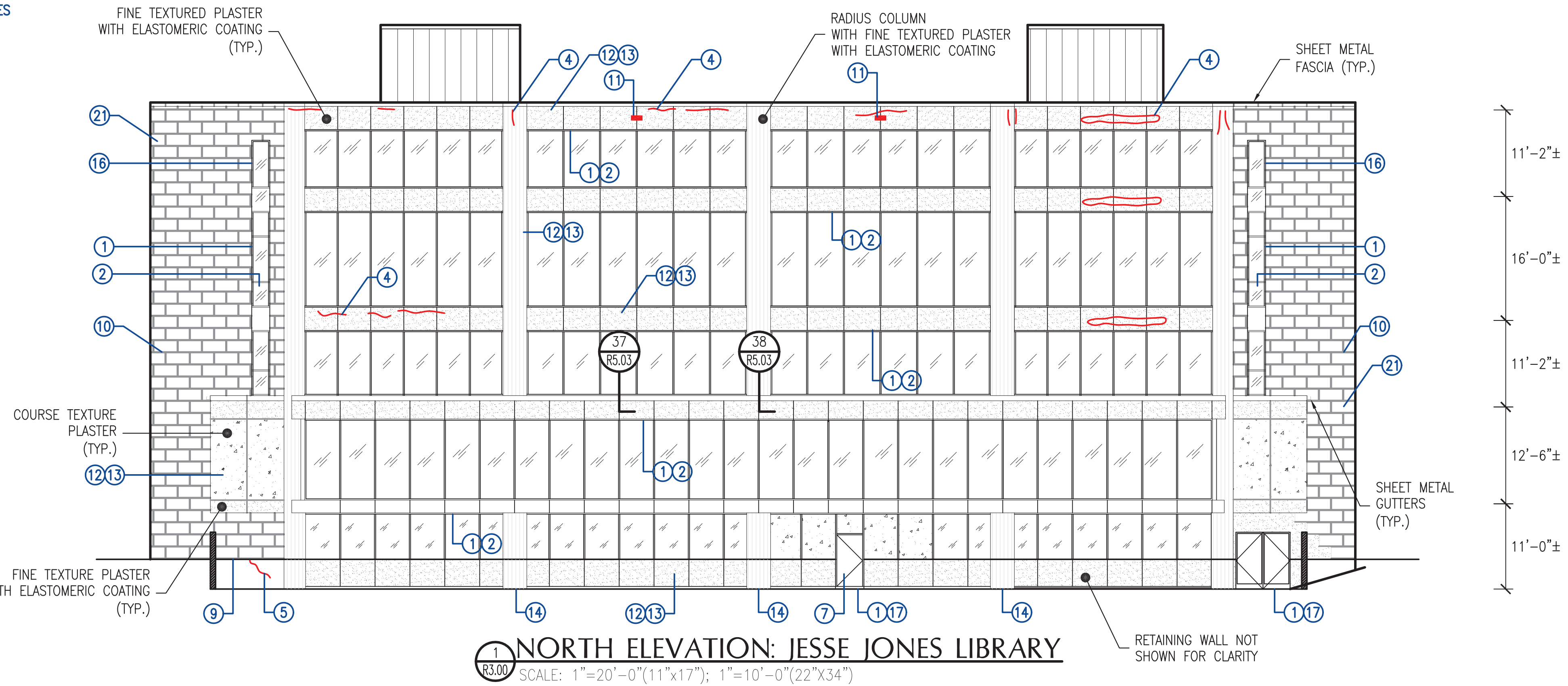


DWN. BY: ESG
DATE: 01/20/17
SHEET: R2.02



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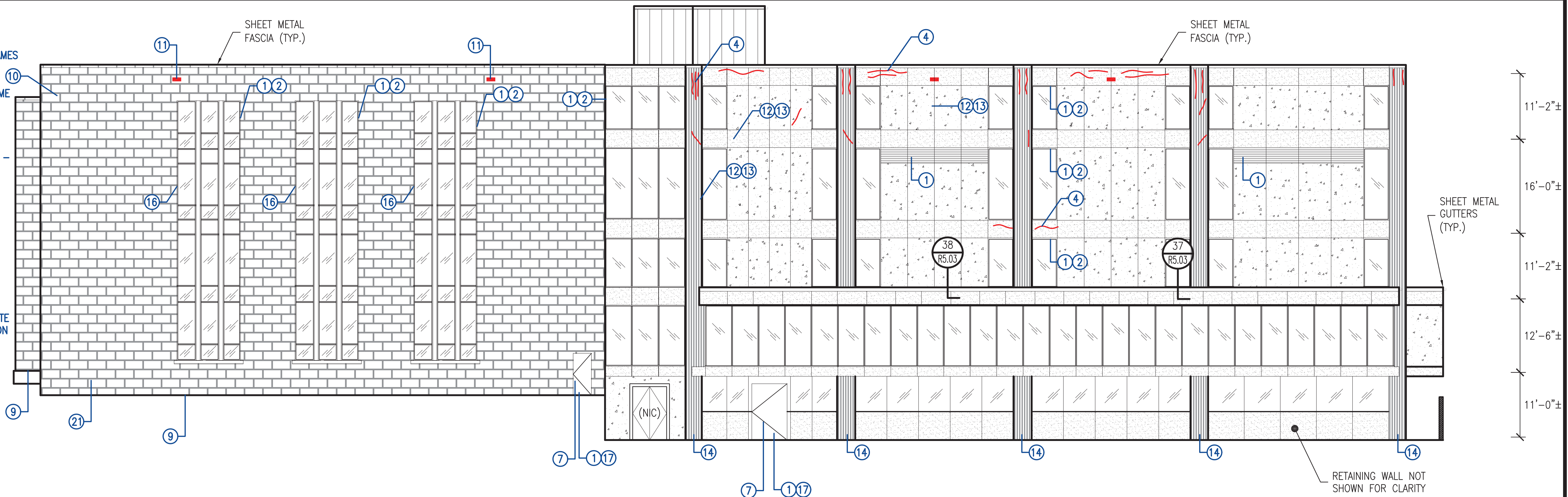
- ① REPLACE SEALANT BETWEEN WINDOW/LOUVER FRAMES AND DOOR FRAMES AND WALL - ALL SIMILAR LOCATIONS.
- ② APPLY SEALANT BETWEEN GLASS/SPANDREL STONE AND WINDOW FRAME (WET SEAL) - ALL SIMILAR LOCATIONS.
- ③ REPAIR DAMAGED/SPALLED/DISBONDED PLASTER.
- ④ REPLACE SEALANT BETWEEN PRECAST CONCRETE PANEL BUTT JOINTS - ALL SIMILAR LOCATIONS.
- ⑤ REPAIR DAMAGED/CRACKED CONCRETE.
- ⑥ PREPARE AND PAINT EXPOSED STEEL.
- ⑦ PREPARE AND PAINT HOLLOW METAL DOORS AND FRAMES.
- ⑧ SEAL WALL PENETRATIONS.
- ⑨ EXCAVATE SOIL TO ELEVATION 4-INCHES BELOW BOTTOM COURSE OF STONE VENEER; CLEAN STONE VENEER AT AREAS PREVIOUSLY BELOW GRADE; TUCKPOINT MORTAR JOINTS AS NECESSARY; INSTALL COMPOSITE WEEPS IN VERTICAL MORTAR JOINTS AT APPROXIMATELY 30-INCHES ON CENTER.
- ⑩ PERFORM MISCELLANEOUS TUCKPOINTING AT STONE MORTAR JOINTS.
- ⑪ REPLACE THROUGH WALL SCUPPERS
- ⑫ POWER WASH EXTERIOR PLASTER (ALTERNATE NO. 1)
- ⑬ APPLY ELASTOMERIC COATING TO PLASTER (ALTERNATE NO. 2)
- ⑭ REPLACE EXISTING GUTTERS AND DOWN SPOUTS.
- ⑮ REPLACE METAL PANELS.
- ⑯ PREPARE AND PAINT MILL FINISHED ALUMINUM WINDOW FRAMES. (ALTERNATE NO. 3)
- ⑰ REPLACE DOOR WEATHER STRIPPING.
- ⑱ POWER WASH, PREPARE AND PAINT CEILING (UNDERSIDE OF FLOOR SLAB) AT LOWER LEVEL WALKWAY.
- ⑲ REPLACE CLEAR GLASS WITH OBSCURE GLASS AT NOTED LOCATIONS.
- ⑳ REPLACE EXPANSION JOINT NATIONAL BETWEEN WEST STAIRS AND ADJACENT STRUCTURE.
- ㉑ APPLY WATER REPELLENT SEALER ON STONE (ALT. NO. 4)



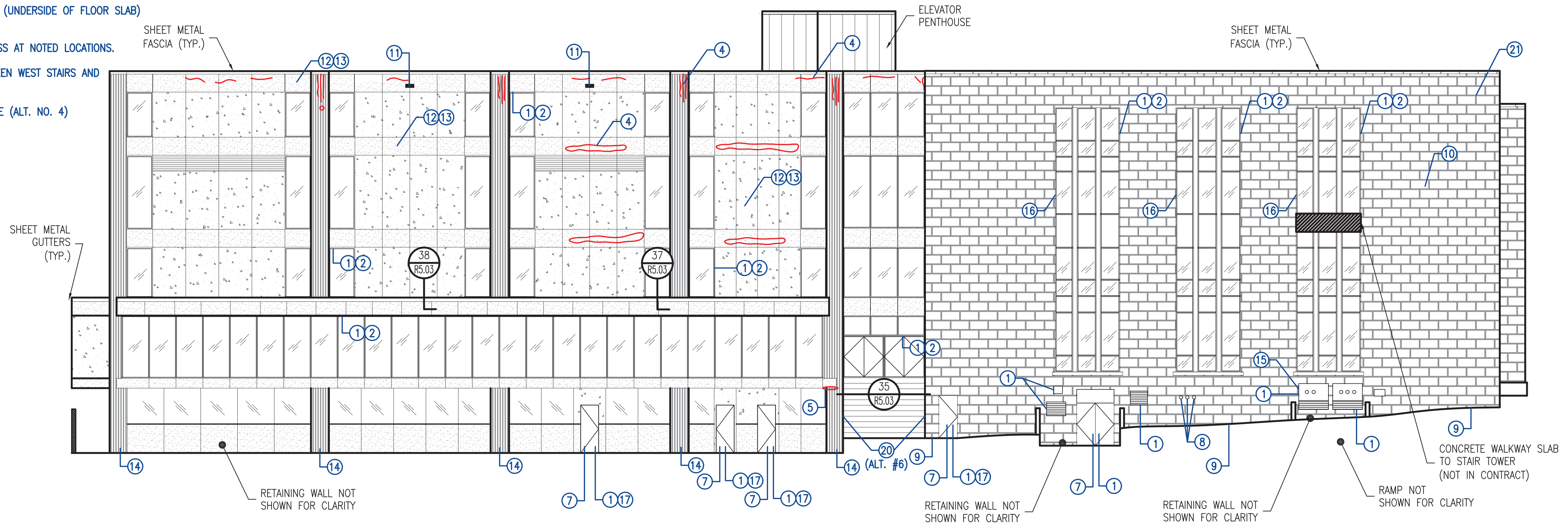
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NO.	DATE	BY

REPAIR NOTES:

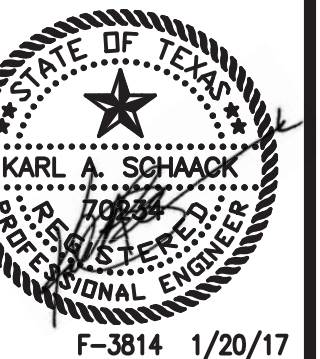
- ① REPLACE SEALANT BETWEEN WINDOW/LOUVER FRAMES AND DOOR FRAMES AND WALL - ALL SIMILAR LOCATIONS.
- ② APPLY SEALANT BETWEEN GLASS/SPANDREL STONE AND WINDOW FRAME (WET SEAL) - ALL SIMILAR LOCATIONS.
- ③ REPAIR DAMAGED/SPALLED/DISBONDED PLASTER.
- ④ REPLACE SEALANT BETWEEN PRECAST CONCRETE PANEL BUTT JOINTS - ALL SIMILAR LOCATIONS.
- ⑤ REPAIR DAMAGED/CRACKED CONCRETE.
- ⑥ PREPARE AND PAINT EXPOSED STEEL.
- ⑦ PREPARE AND PAINT HOLLOW METAL DOORS AND FRAMES.
- ⑧ SEAL WALL PENETRATIONS.
- ⑨ EXCAVATE SOIL TO ELEVATION 4-INCHES BELOW BOTTOM COURSE OF STONE VENEER; CLEAN STONE VENEER AT AREAS PREVIOUSLY BELOW GRADE; TUCKPOINT MORTAR JOINTS AS NECESSARY; INSTALL COMPOSITE WEEPS IN VERTICAL MORTAR JOINTS AT APPROXIMATELY 30-INCHES ON CENTER.
- ⑩ PERFORM MISCELLANEOUS TUCKPOINTING AT STONE MORTAR JOINTS.
- ⑪ REPLACE THROUGH WALL SCUPPERS
- ⑫ POWER WASH EXTERIOR PLASTER (ALTERNATE)
- ⑬ APPLY ELASTOMERIC COATING TO PLASTER (ALTERNATE)
- ⑭ REPLACE EXISTING GUTTERS AND DOWN SPOUTS.
- ⑮ REPLACE METAL PANELS.
- ⑯ PREPARE AND PAINT MILL FINISHED ALUMINUM WINDOW FRAMES. (ALTERNATE)
- ⑰ REPLACE DOOR WEATHER STRIPPING.
- ⑱ POWER WASH, PREPARE AND PAINT CEILING (UNDERSIDE OF FLOOR SLAB) AT LOWER LEVEL WALKWAY.
- ⑲ REPLACE CLEAR GLASS WITH OBSCURE GLASS AT NOTED LOCATIONS.
- ⑳ REPLACE EXPANSION JOINT NATIONAL BETWEEN WEST STAIRS AND ADJACENT STRUCTURE.
- ㉑ APPLY WATER REPELLENT SEALER ON STONE (ALT. NO. 4)



1 EAST ELEVATION: JESSE JONES LIBRARY
 SCALE: 1"=20'-0"(11"x17"); 1"=10'-0"(22"x34")



2 WEST ELEVATION: JESSE JONES LIBRARY
 SCALE: 1"=20'-0"(11"x17"); 1"=10'-0"(22"x34")



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 211 HIGHLAND CROSS, SUITE 220
 HOUSTON, TEXAS 77073
 PHONE: (281)209-1724 FAX: (281)209-2724

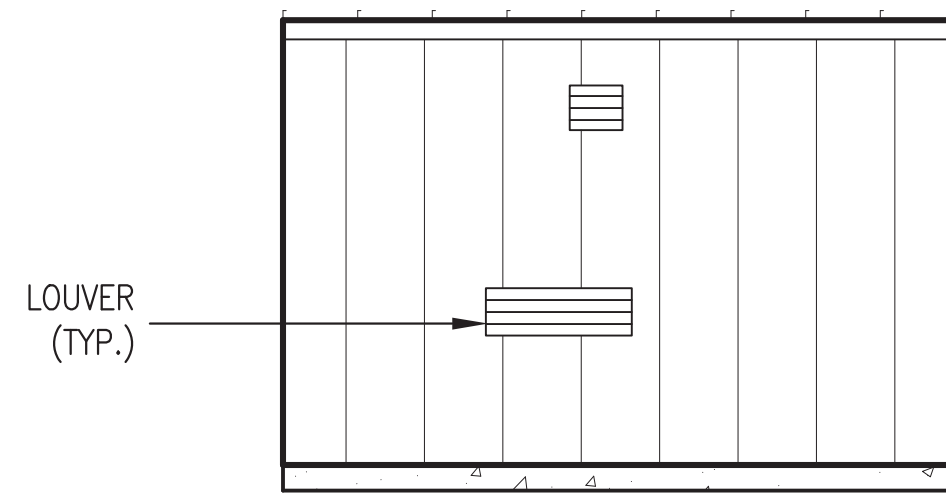
PROJECT:
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 HOUSTON, TEXAS

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 7000 FANNIN, UCT M125
 HOUSTON, TEXAS 77030

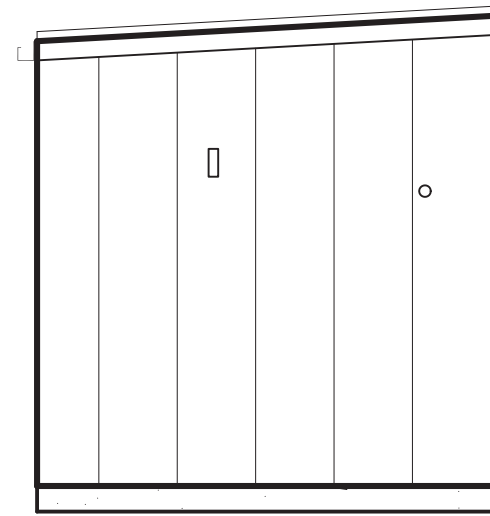
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NO.	DATE	BY

ELEVATIONS
 PCI PROJECT NO.: 11212.15
 PCI FILE NAME: R3.00-R3.05
 SCALE: AS NOTED

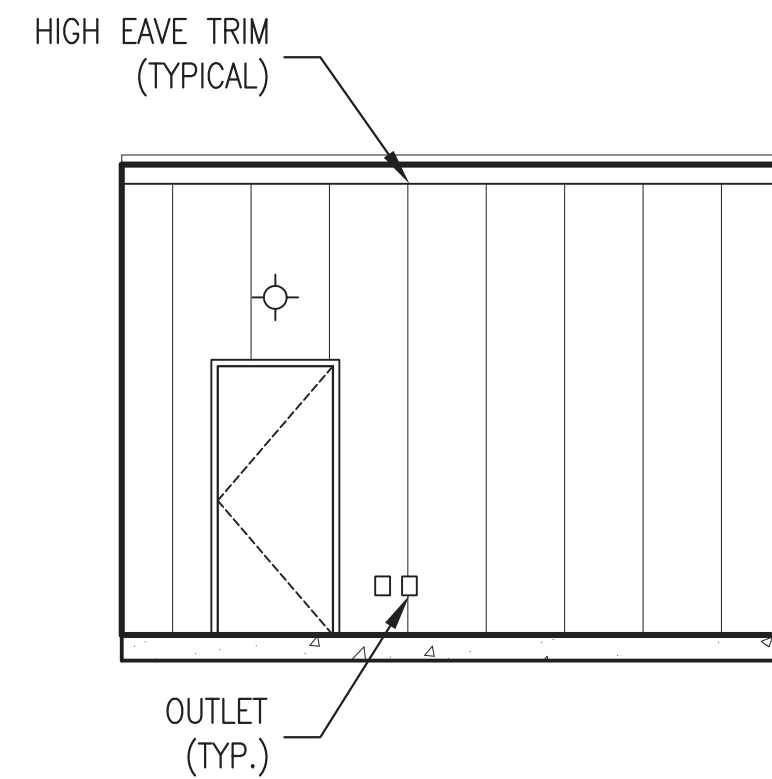
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 ESG 01/20/17
 SHEET:
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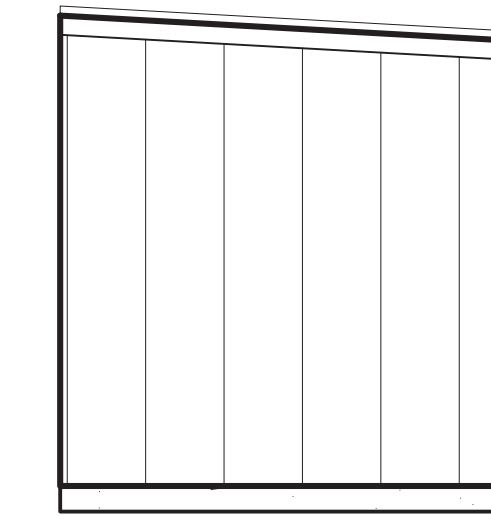
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EXISTING SOUTH ELEVATION
R3.02 SCALE: 1"=10'-0"(11"x17"); 1"=5'-0"(22"x34")



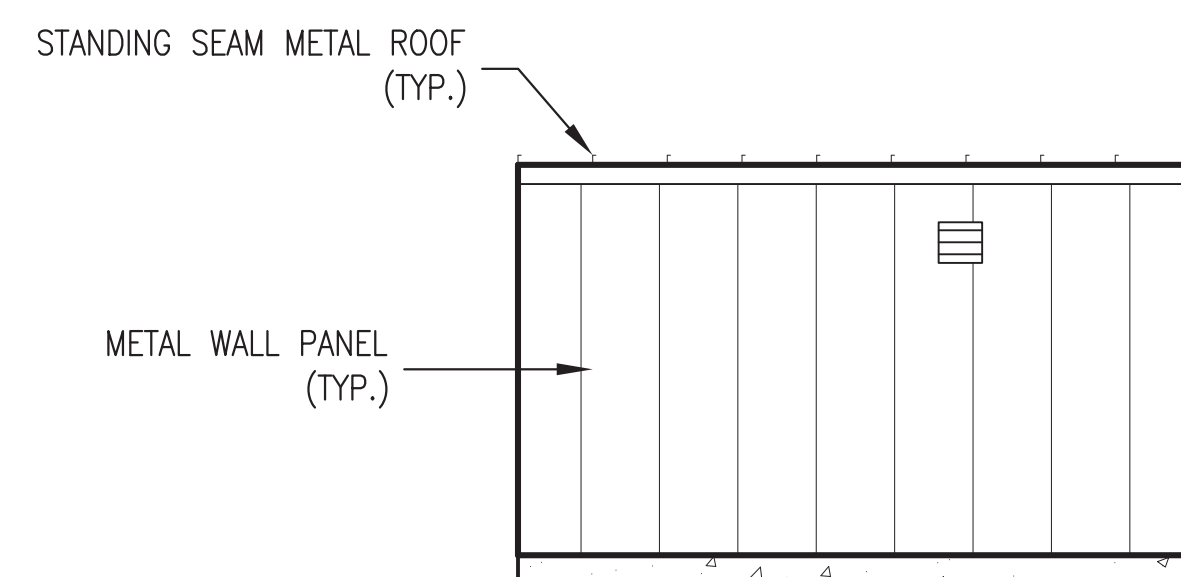
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EXISTING EAST ELEVATION
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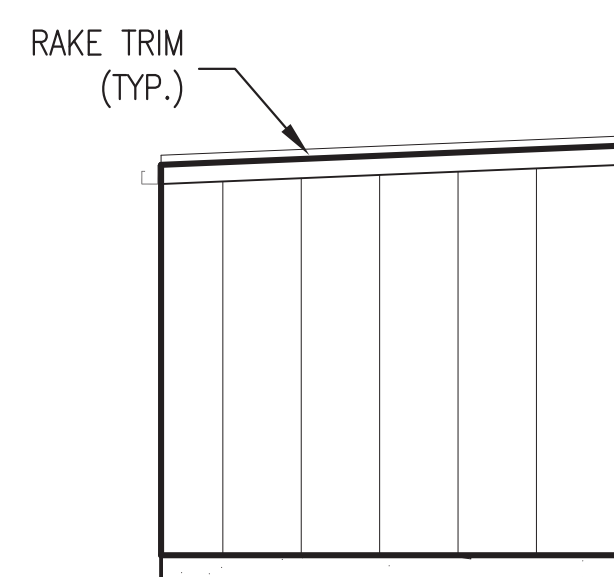
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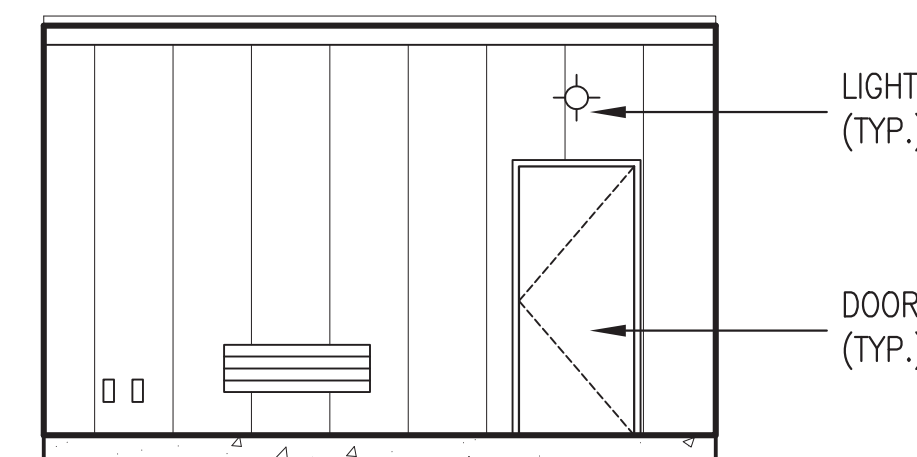
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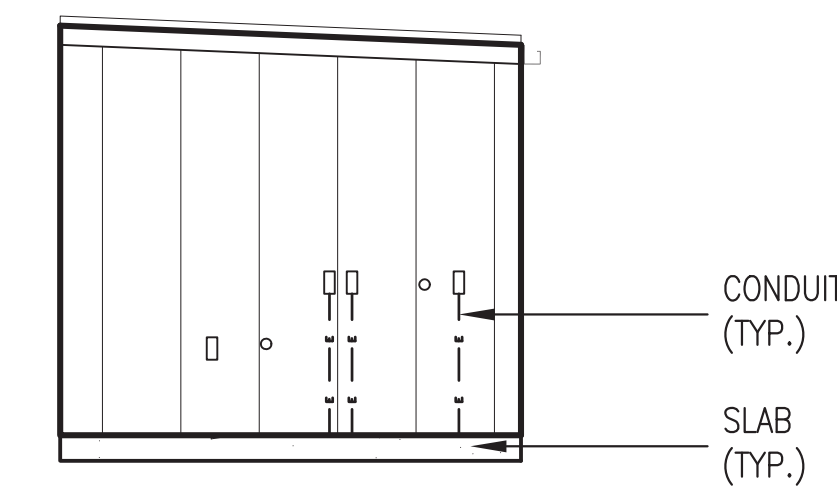
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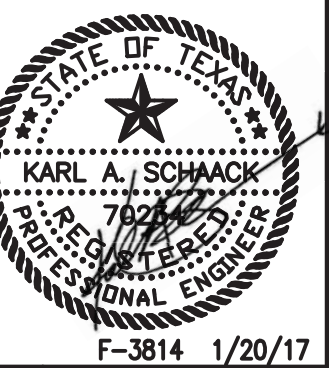
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EXISTING EAST ELEVATION
R3.02 SCALE: 1"=10'-0"(11"x17"); 1"=5'-0"(22"x34")



7 EAST PENTHOUSE:
EXISTING NORTH ELEVATION
R3.02 SCALE: 1"=10'-0"(11"x17"); 1"=5'-0"(22"x34")



8 EAST PENTHOUSE:
EXISTING WEST ELEVATION
R3.02 SCALE: 1"=10'-0"(11"x17"); 1"=5'-0"(22"x34")



PRICE CONSULTING, INC.
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211 HIGHLAND CROSS, SUITE 220
HOUSTON, TEXAS 77073
PHONE: (281)209-1724 FAX: (281)209-2724

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JESSE JONES LIBRARY
1133 JOHN FREEMAN BLVD.
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OWNER/CLIENT:
UT HEALTH SCIENCE CENTER AT HOUSTON
7000 FANNIN, UCT M125
HOUSTON, TEXAS 77030

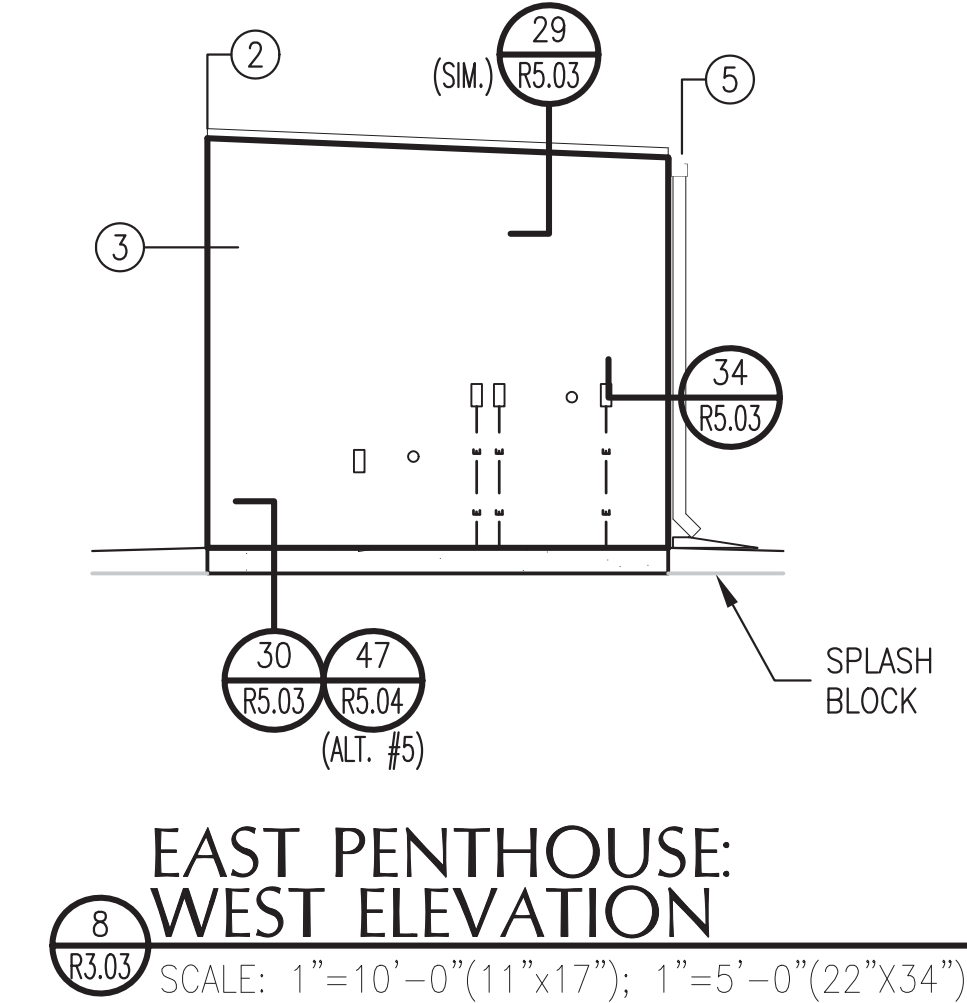
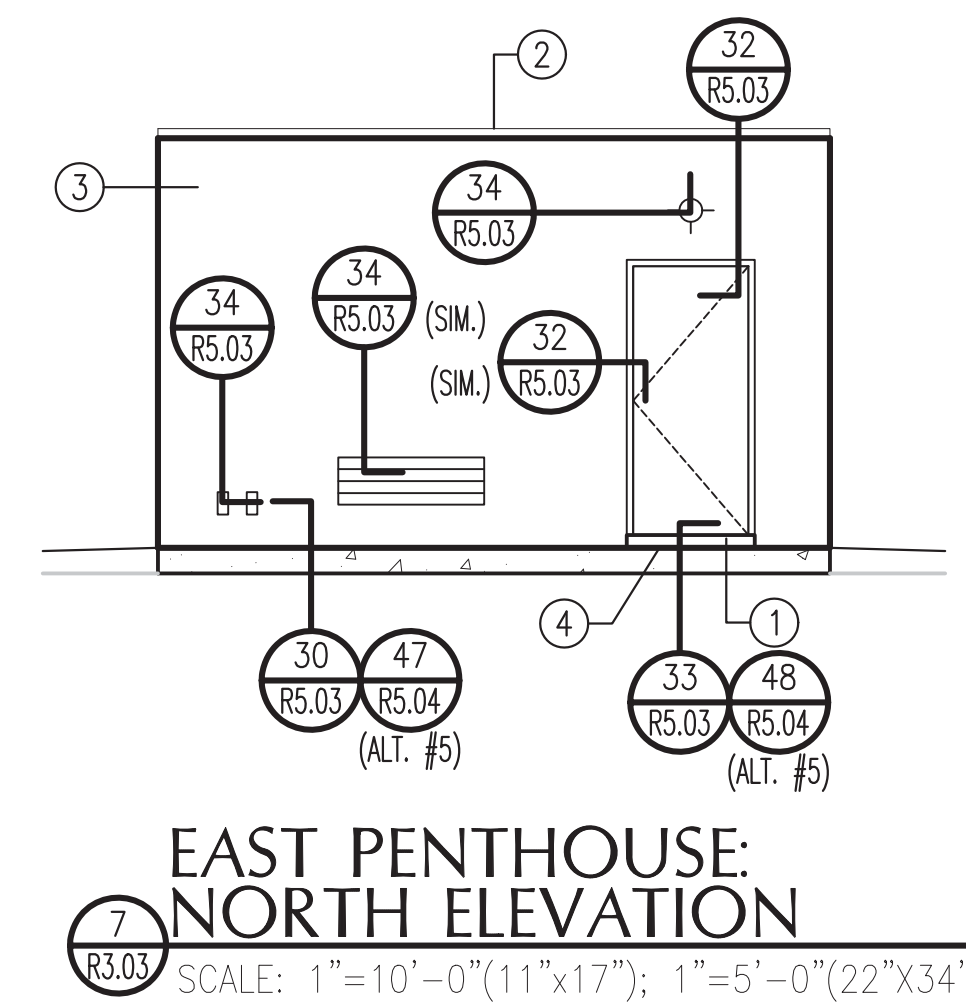
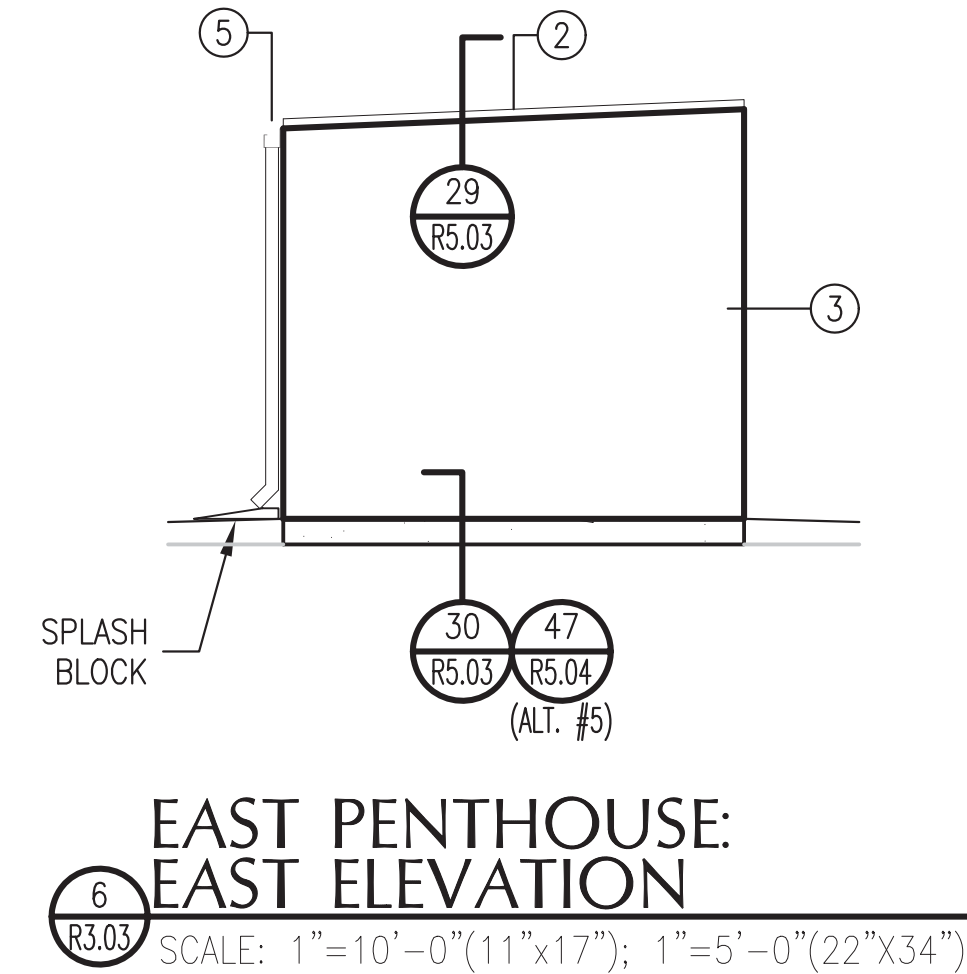
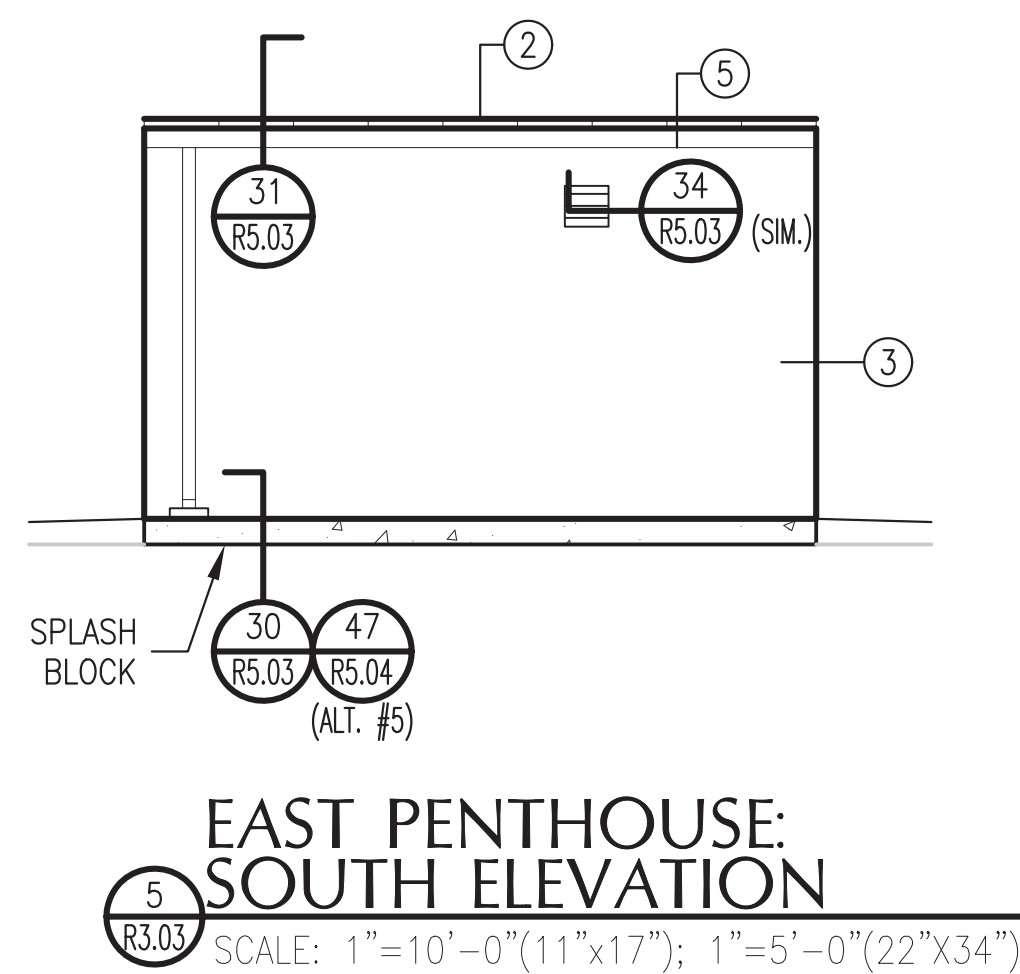
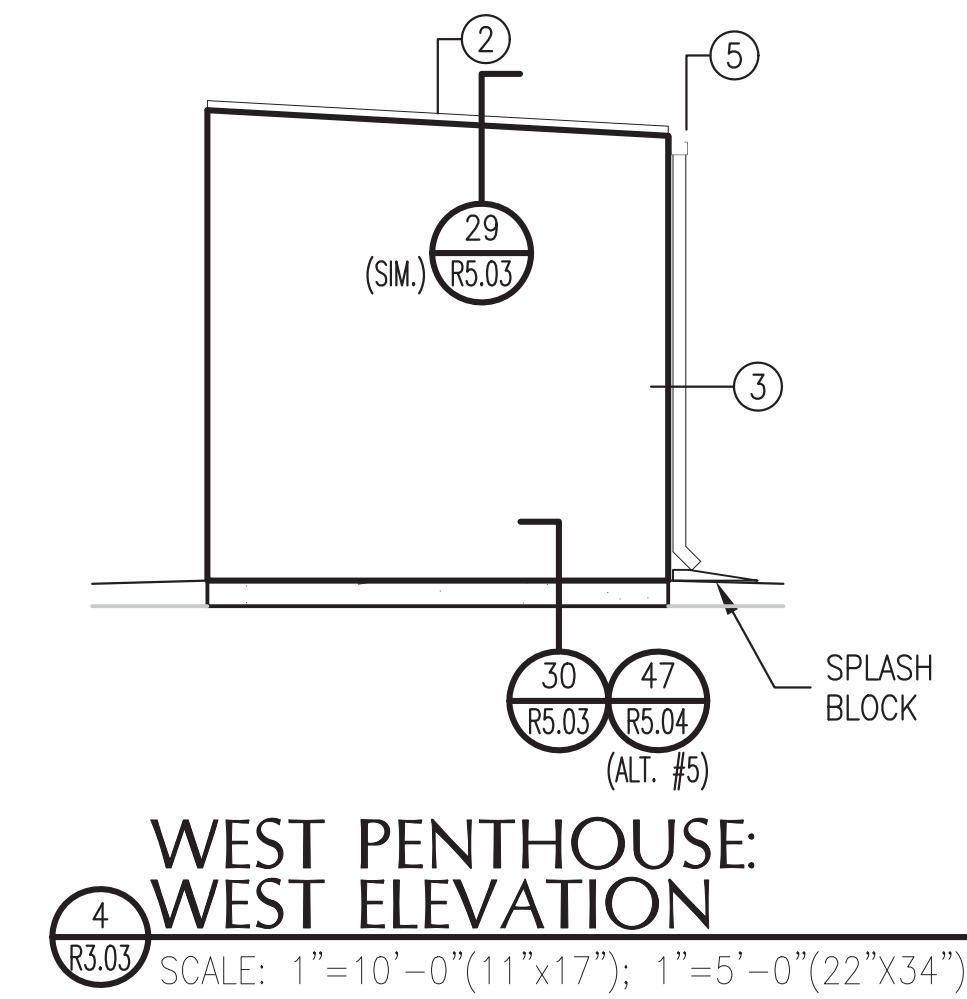
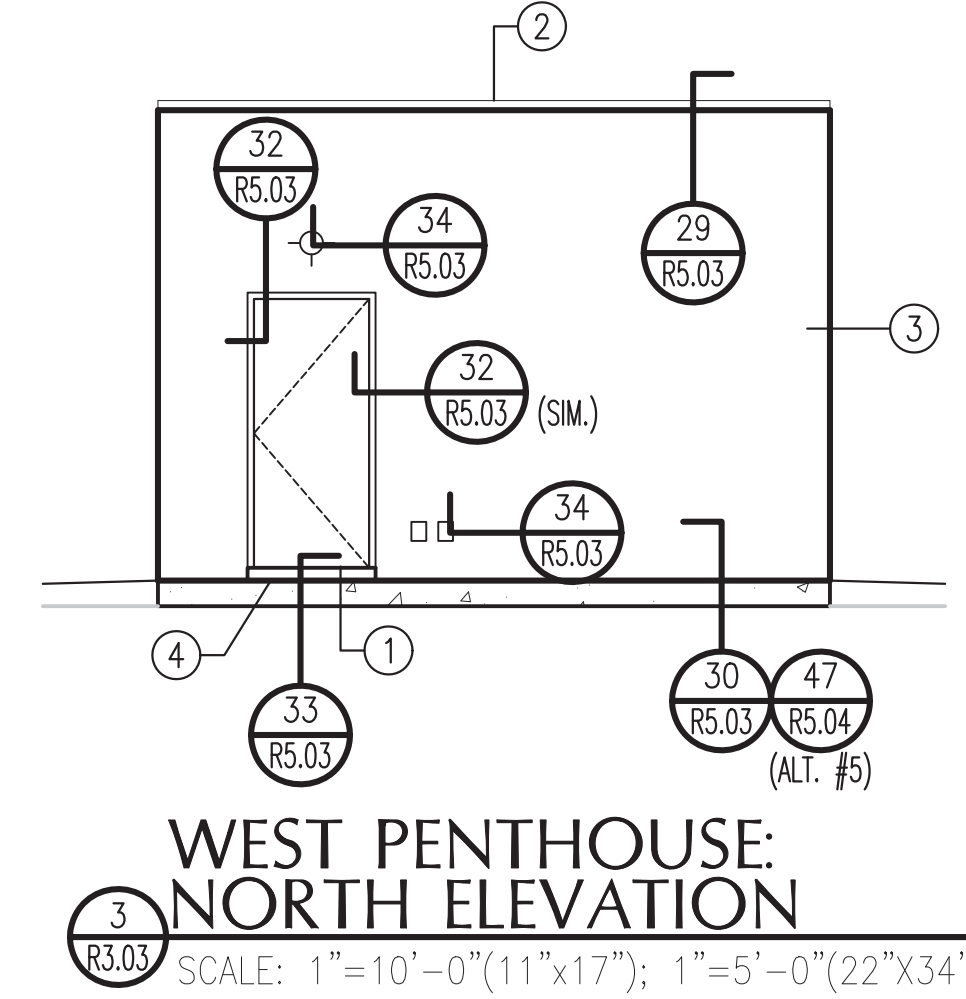
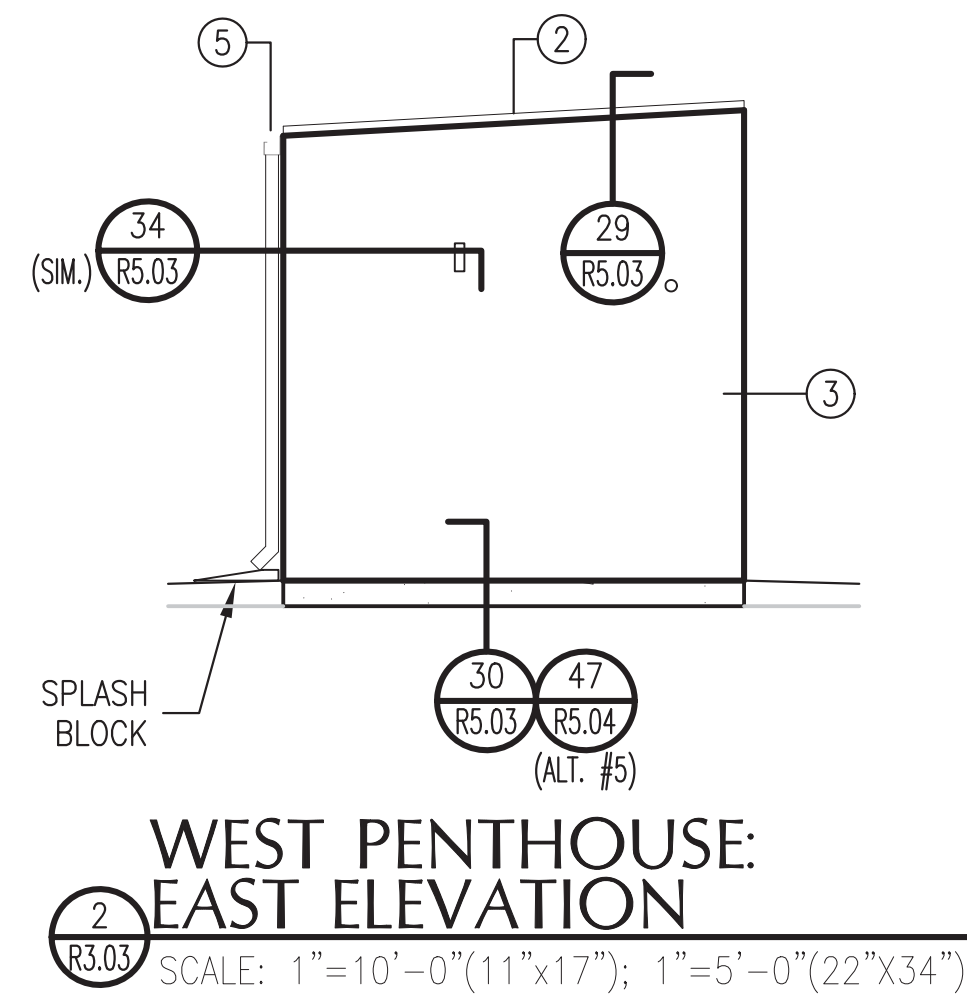
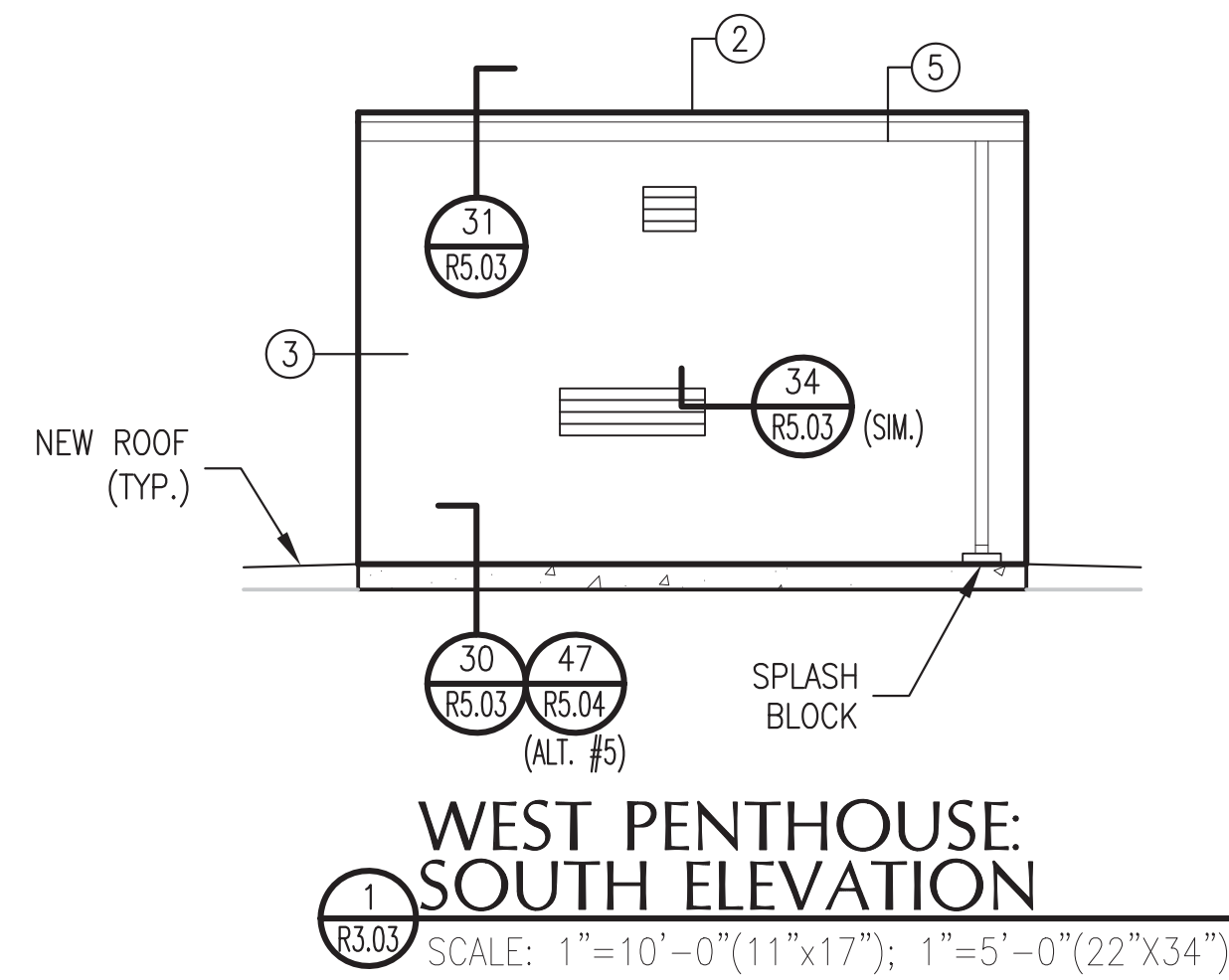
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NO.	DATE	BY

ELEVATIONS
PCI PROJECT NO.: 11212.15
PCI FILE NAME: R3.00-R3.05
SCALE: AS NOTED

DWN.BY: DATE:
ESG 01/20/17
SHEET:
R3.02

PENTHOUSE GENERAL NOTES:

- ① MODIFY HEIGHTS OF EXISTING DOORS AND FRAMES.
- ② INSTALL INSULATION AND SINGLE-PLY OVERLAY ON STANDING SEAM METAL ROOFS.
- ③ INSTALL AIR-BARRIER, FURRING, INSULATION, AND NEW METAL WALL PANELS.
- ④ INSTALL CONCRETE CURB AT DOOR THRESHOLDS.
- ⑤ INSTALL NEW GUTTERS AND DOWNSPOUTS.



F-3814 1/20/17

PRICE CONSULTING, INC.
 PRICE CONSULTING, INC.
 211 HIGHLAND CROSS, SUITE 220
 HOUSTON, TEXAS 77073
 PHONE: (281)209-1724 FAX: (281)209-2724

PROJECT:
 JESSE JONES LIBRARY
 1133 JOHN FREEMAN BLVD.
 HOUSTON, TEXAS

OWNER/CLIENT:
 UT HEALTH SCIENCE CENTER AT HOUSTON
 7000 FANNIN, UCT M125
 HOUSTON, TEXAS 77030

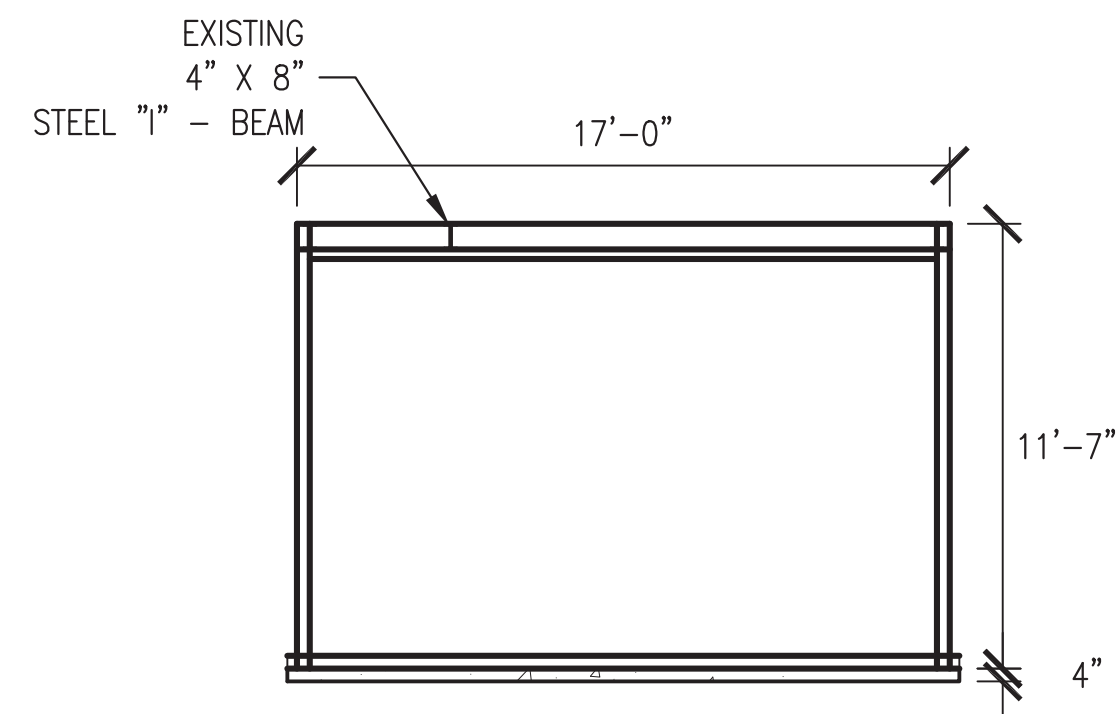
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ELEVATIONS
 PCI PROJECT NO.: 11212.15
 PCI FILE NAME: R3.00-R3.05
 SCALE: AS NOTED

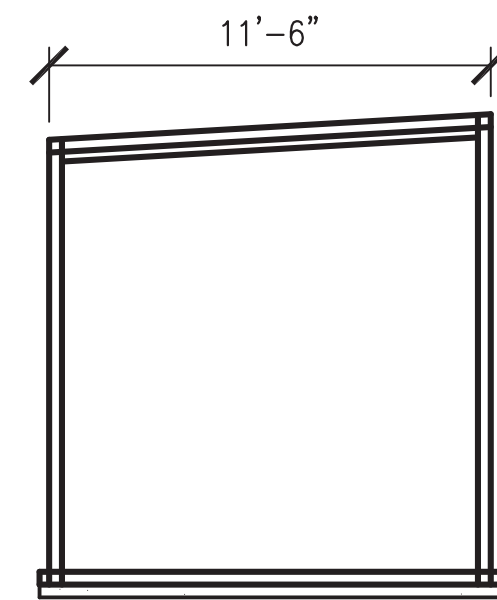
DWN.BY: DATE:
 ESG 01/20/17
 SHEET:
 R3.03

PENTHOUSE GENERAL NOTES:

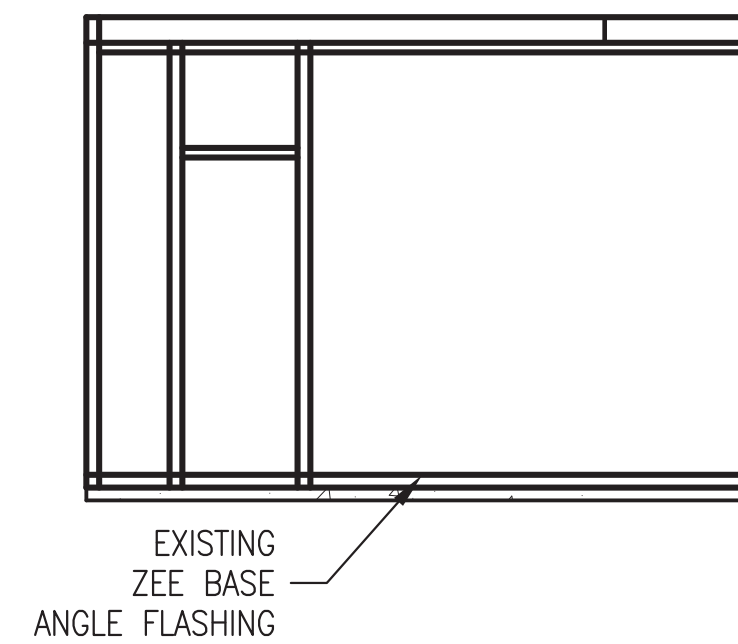
- ① ADD STEEL ANGLE TO PENTHOUSE STRUCTURES.
- ② MODIFY EXISTING HEIGHT AT DOOR LOCATIONS.
- ③ INSTALL NEW GUTTERS AND DOWNSPOUTS.
- ④ INSTALL CONCRETE CURB BENEATH DOORS.



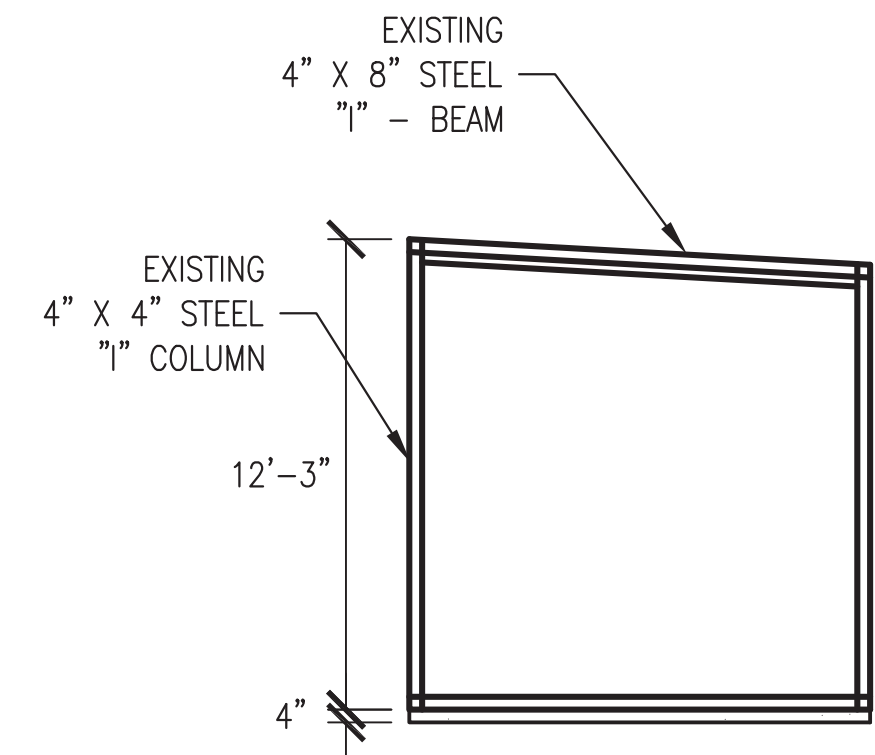
① EXISTING WEST PENTHOUSE: SOUTH ELEVATION: STRUCTURAL STEEL
R3.04 SCALE: 1"=10'-0"(11"x17"); 1"=5'-0"(22"x34")



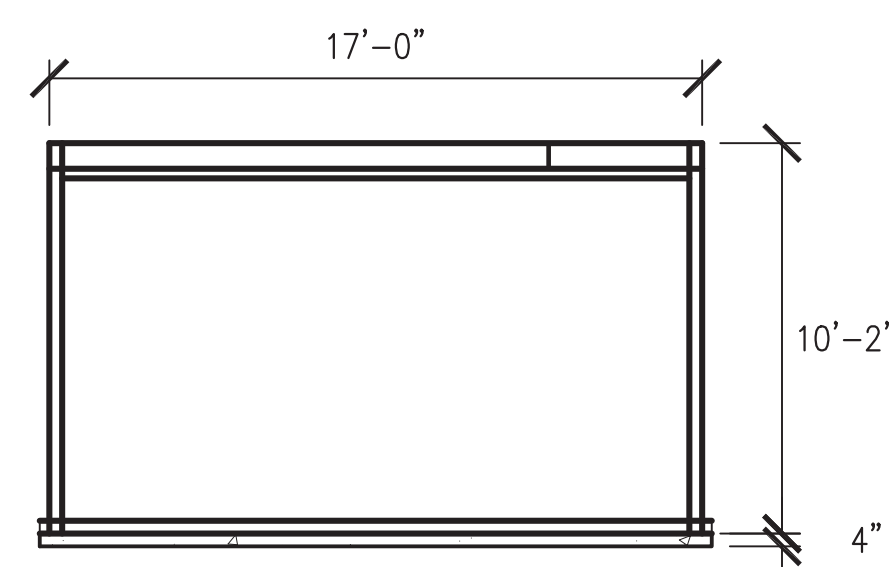
② EXISTING WEST PENTHOUSE: EAST ELEVATION: STRUCTURAL STEEL
R3.04 SCALE: 1"=10'-0"(11"x17"); 1"=5'-0"(22"x34")



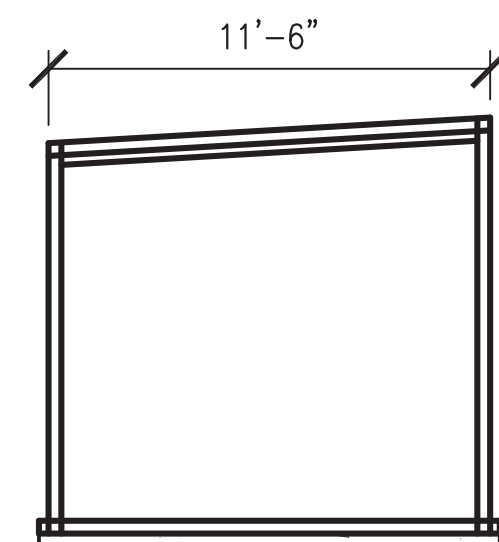
③ EXISTING WEST PENTHOUSE: NORTH ELEVATION: STRUCTURAL STEEL
R3.04 SCALE: 1"=10'-0"(11"x17"); 1"=5'-0"(22"x34")



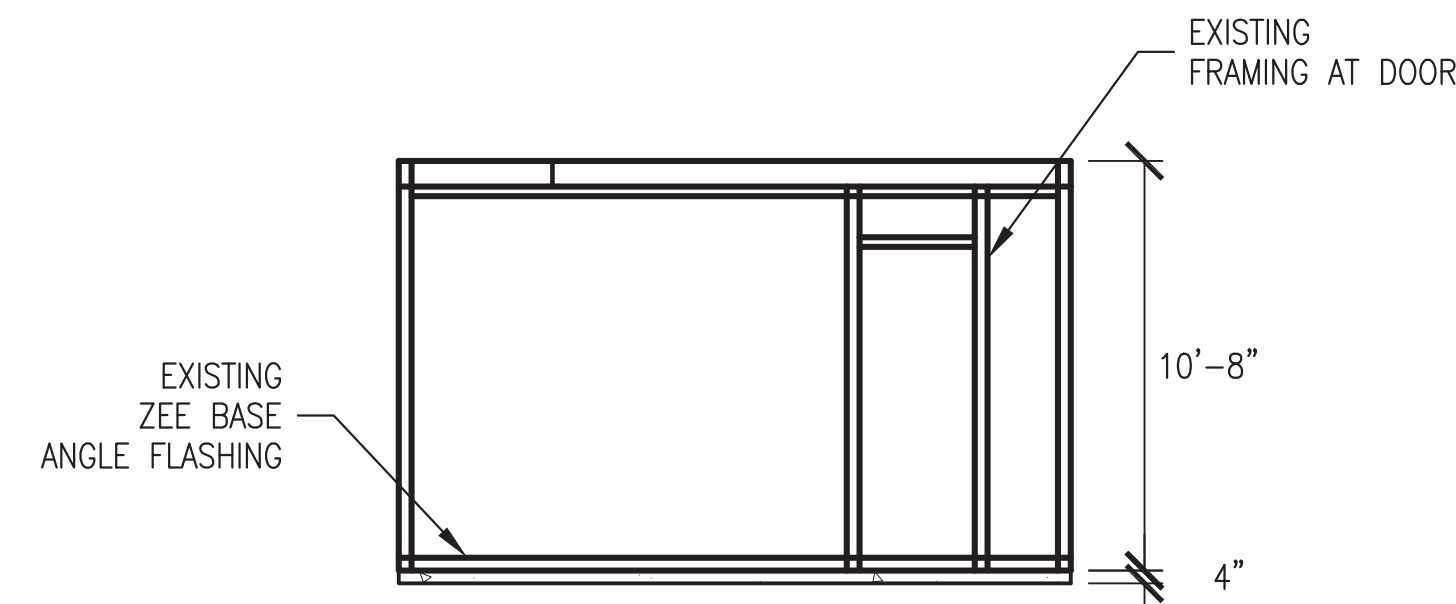
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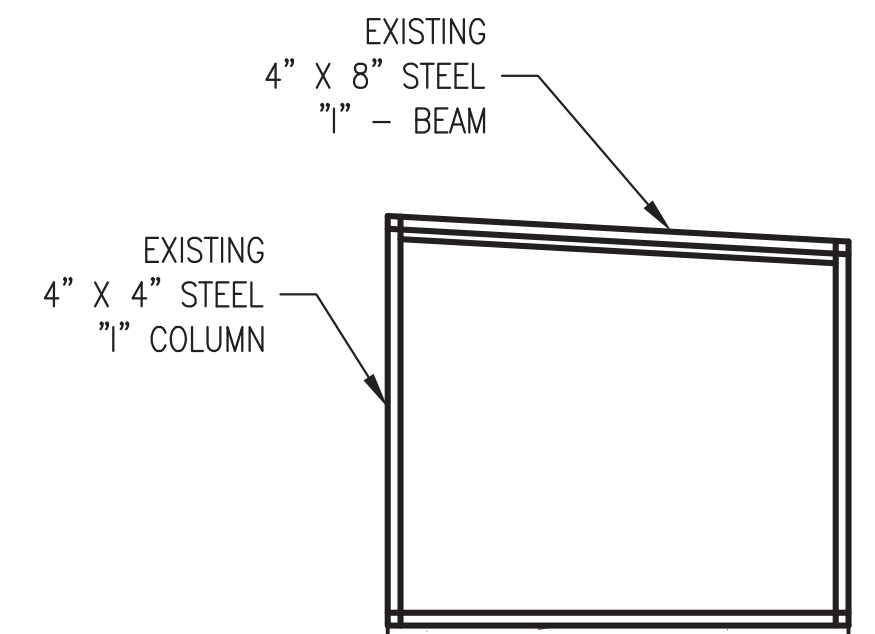
⑤ EXISTING EAST PENTHOUSE: SOUTH ELEVATION: STRUCTURAL STEEL
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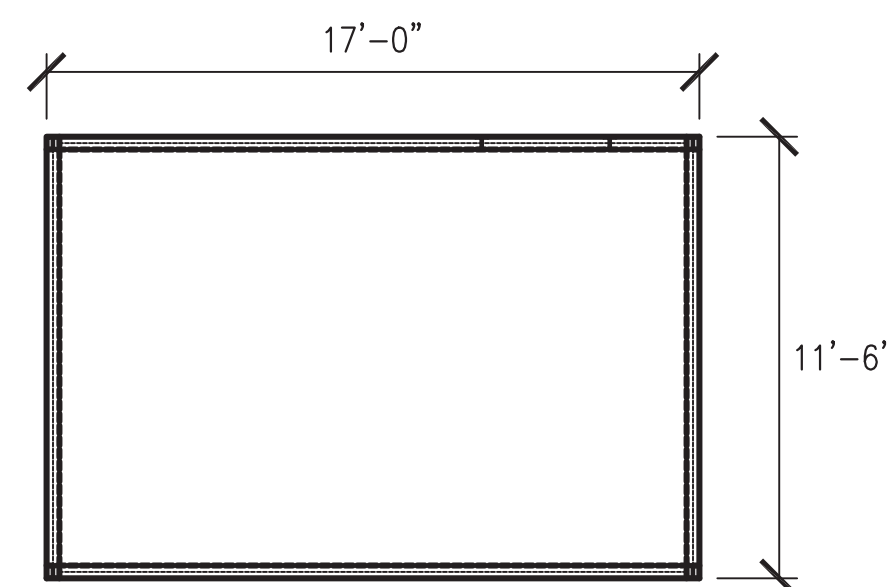
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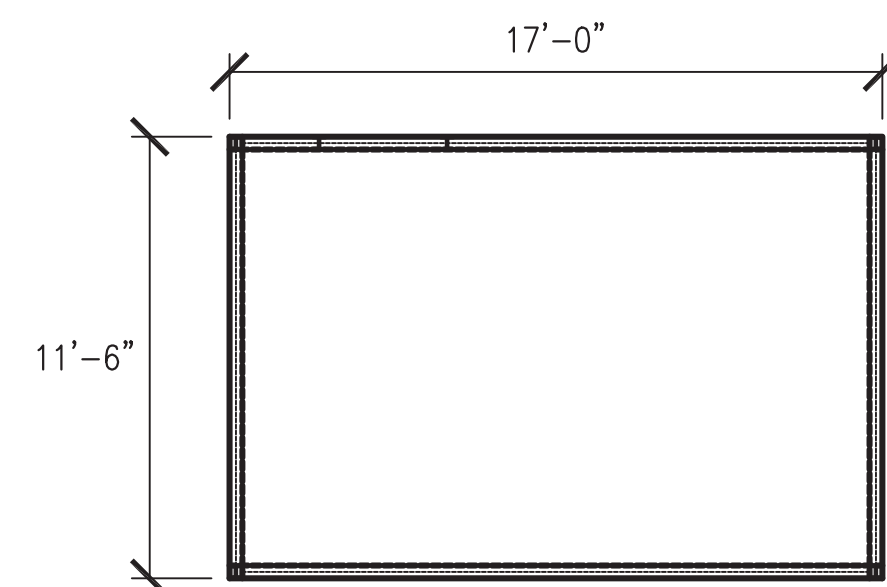
⑦ EXISTING EAST PENTHOUSE: NORTH ELEVATION: STRUCTURAL STEEL
R3.04 SCALE: 1"=10'-0"(11"x17"); 1"=5'-0"(22"x34")



⑧ EXISTING EAST PENTHOUSE: WEST ELEVATION: STRUCTURAL STEEL
R3.04 SCALE: 1"=10'-0"(11"x17"); 1"=5'-0"(22"x34")



⑨ EXISTING WEST PENTHOUSE: STRUCTURAL STEEL
R3.04 SCALE: 1"=10'-0"(11"x17"); 1"=5'-0"(22"x34") (PLAN VIEW)



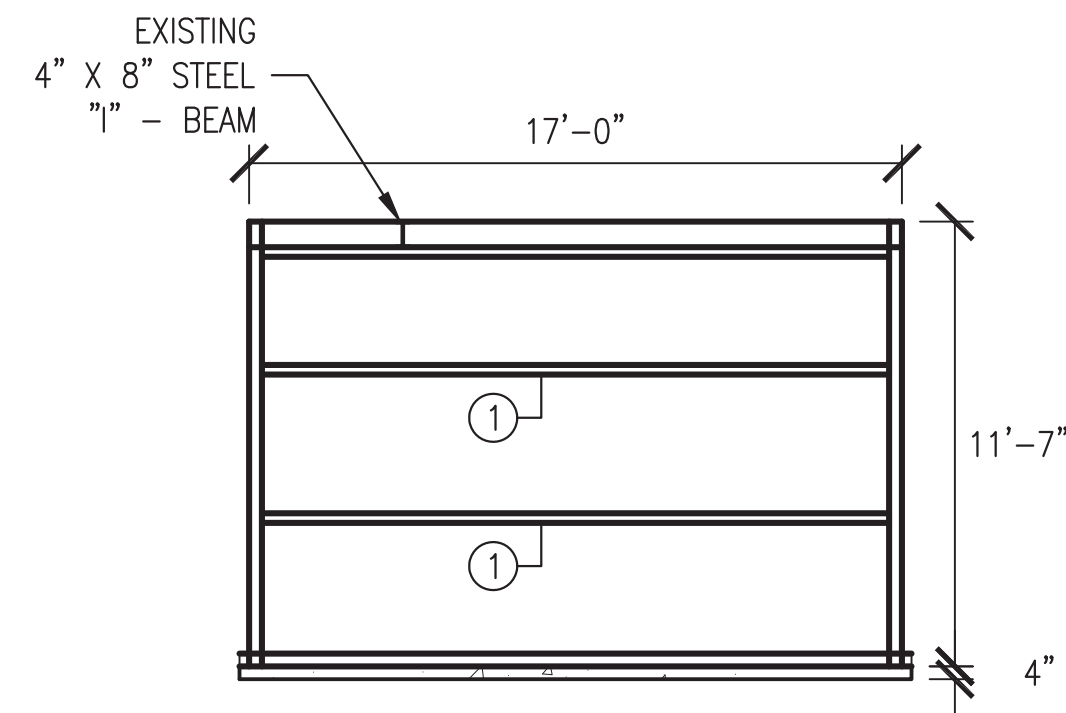
⑩ EXISTING EAST PENTHOUSE: STRUCTURAL STEEL
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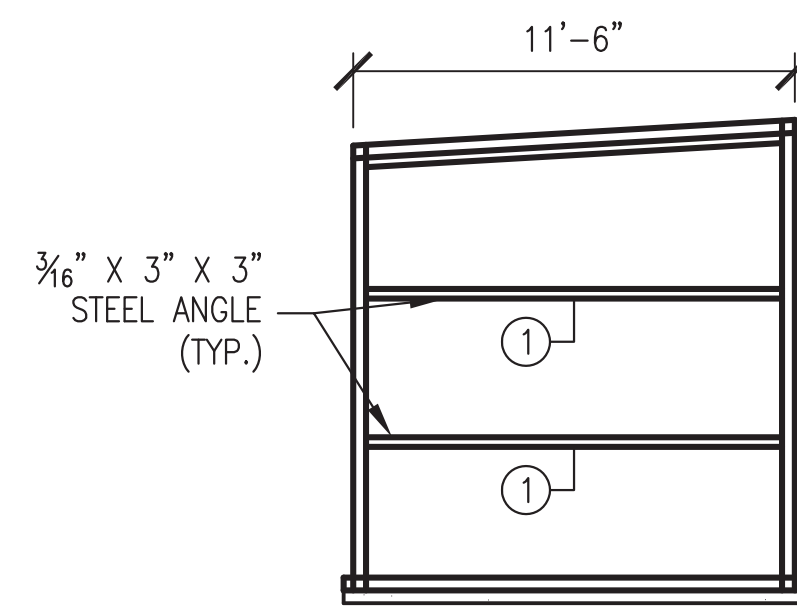
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PENTHOUSE GENERAL NOTES:

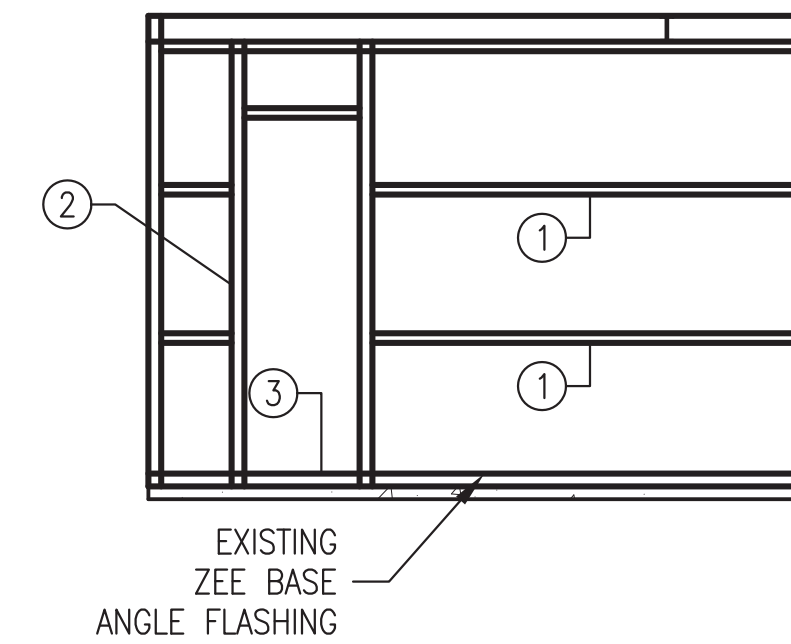
- ① ADD STEEL ANGLE TO PENTHOUSE STRUCTURES.
- ② MODIFY EXISTING HEIGHT AT DOOR LOCATIONS.
- ③ INSTALL CONCRETE CURB BENEATH DOORS.



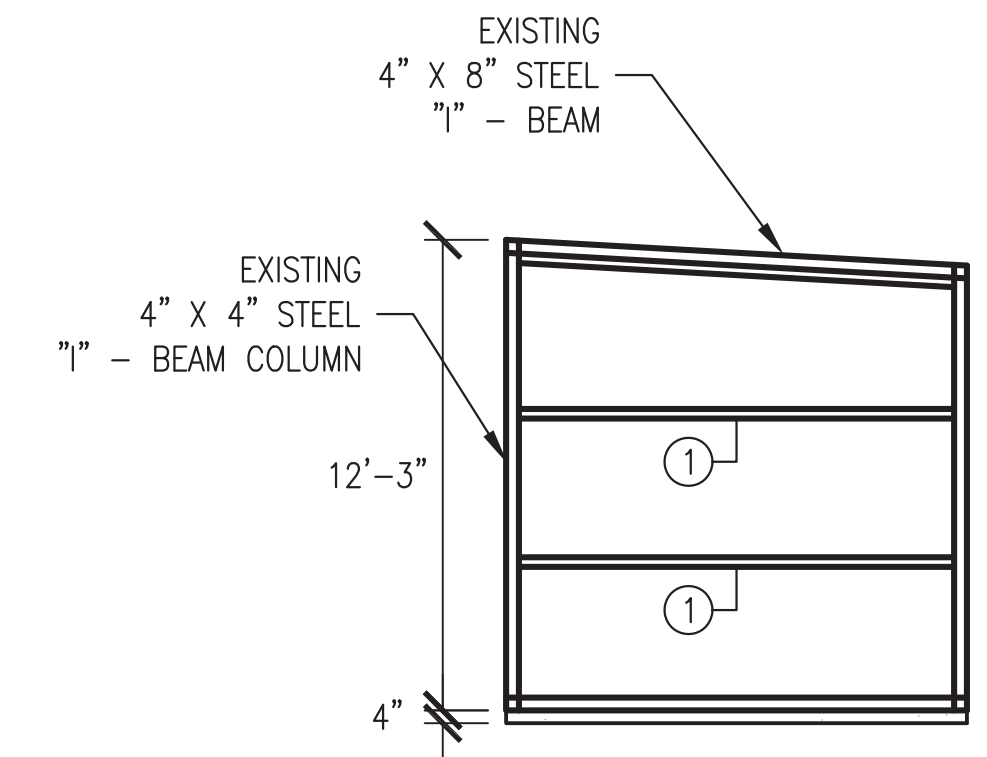
① WEST PENTHOUSE: SOUTH ELEVATION: STRUCTURAL STEEL
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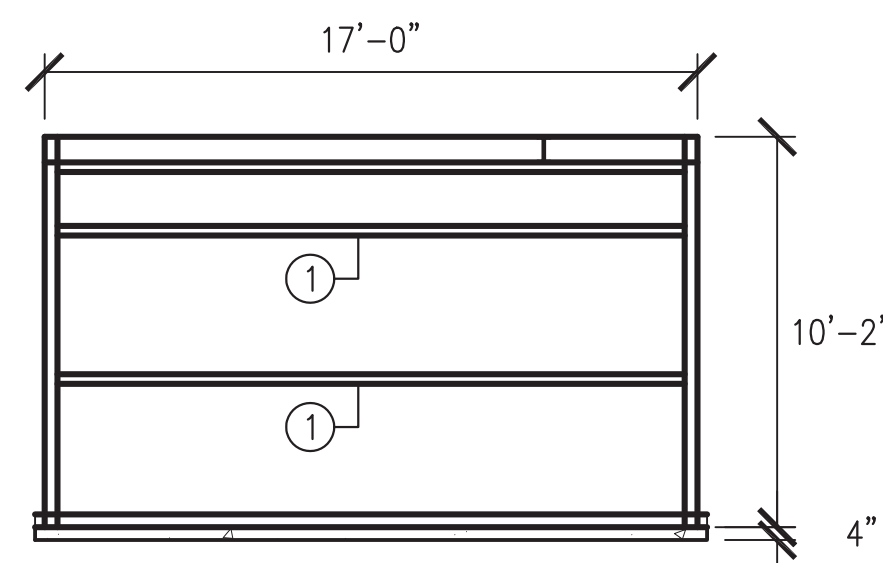
② WEST PENTHOUSE: EAST ELEVATION: STRUCTURAL STEEL
R3.04 SCALE: 1"=10'-0"(11"x17"); 1"=5'-0"(22"x34")



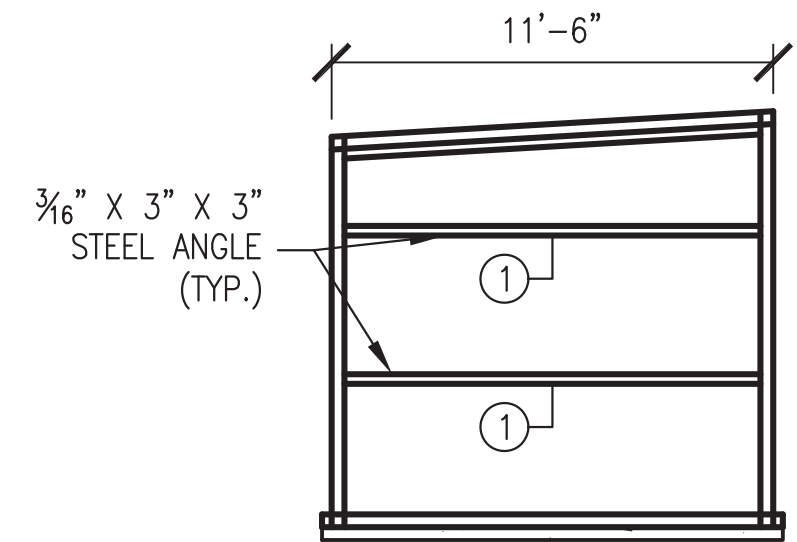
③ WEST PENTHOUSE: NORTH ELEVATION: STRUCTURAL STEEL
R3.04 SCALE: 1"=10'-0"(11"x17"); 1"=5'-0"(22"x34")



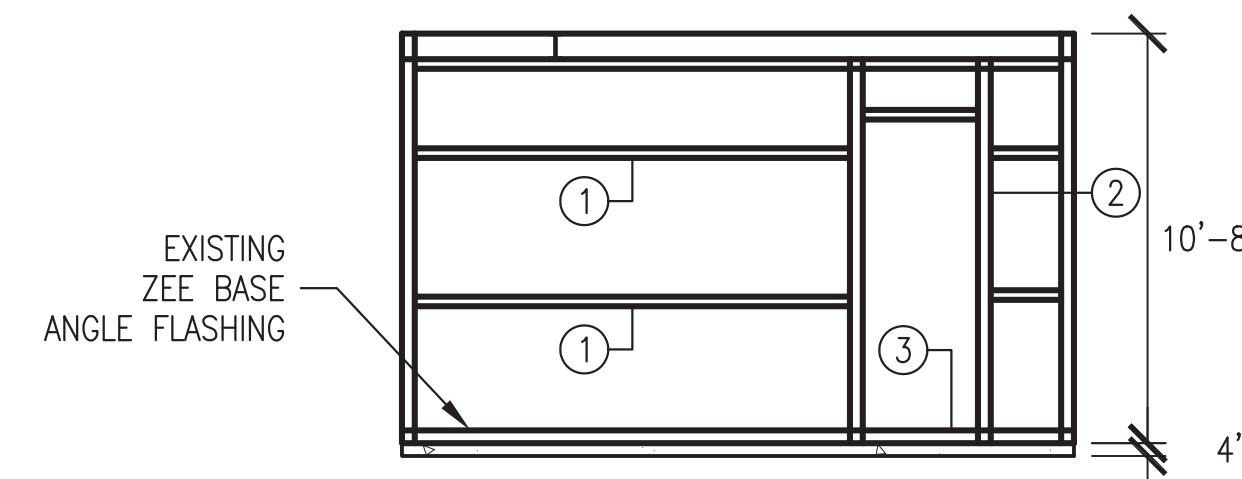
④ WEST PENTHOUSE: WEST ELEVATION: STRUCTURAL STEEL
R3.04 SCALE: 1"=10'-0"(11"x17"); 1"=5'-0"(22"x34")



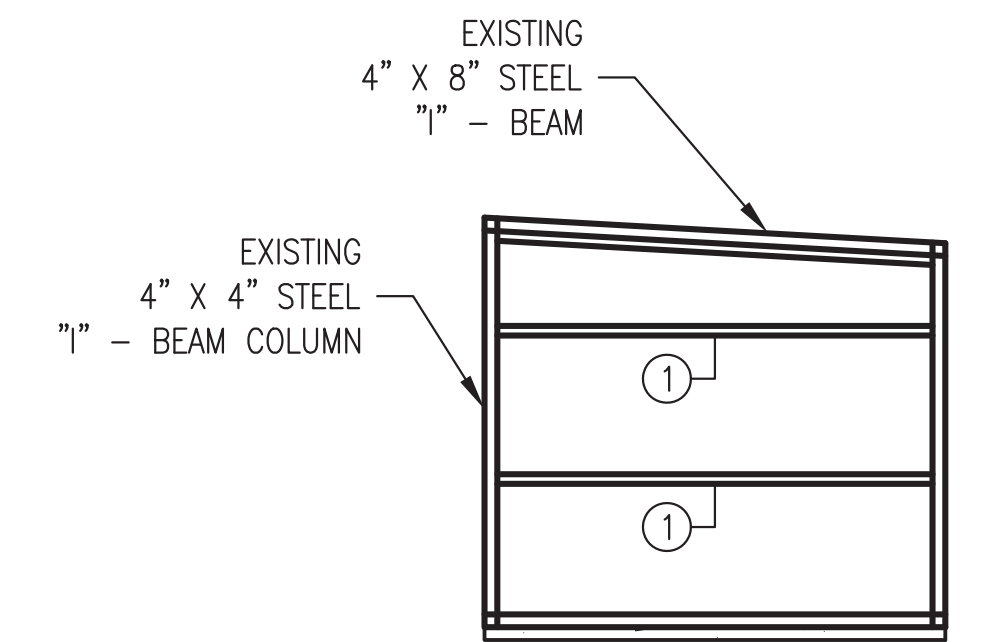
⑤ EAST PENTHOUSE: SOUTH ELEVATION: STRUCTURAL STEEL
R3.04 SCALE: 1"=10'-0"(11"x17"); 1"=5'-0"(22"x34")



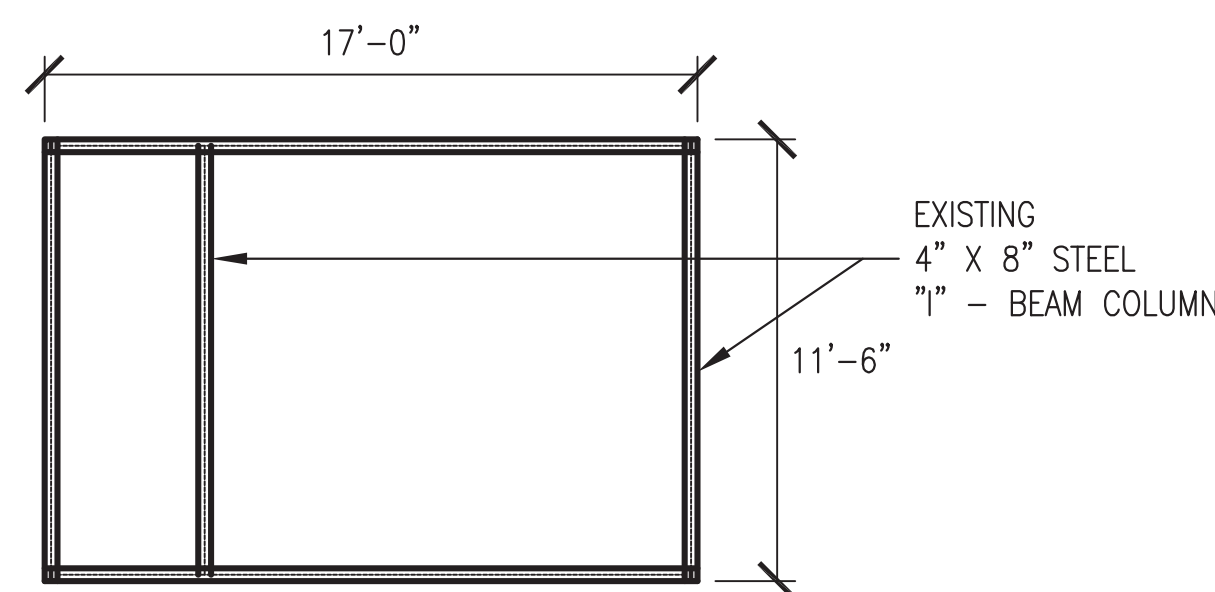
⑥ EAST PENTHOUSE: EAST ELEVATION: STRUCTURAL STEEL
R3.04 SCALE: 1"=10'-0"(11"x17"); 1"=5'-0"(22"x34")



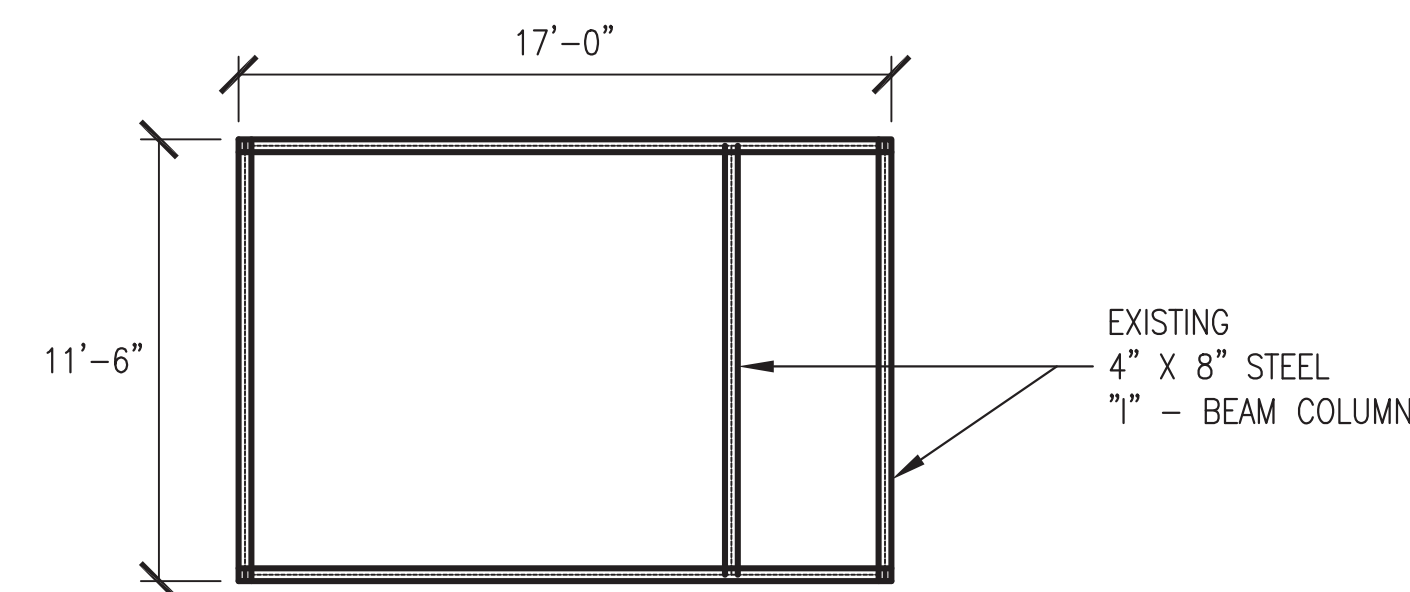
⑦ EAST PENTHOUSE: NORTH ELEVATION: STRUCTURAL STEEL
R3.04 SCALE: 1"=10'-0"(11"x17"); 1"=5'-0"(22"x34")



⑧ EAST PENTHOUSE: WEST ELEVATION: STRUCTURAL STEEL
R3.04 SCALE: 1"=10'-0"(11"x17"); 1"=5'-0"(22"x34")

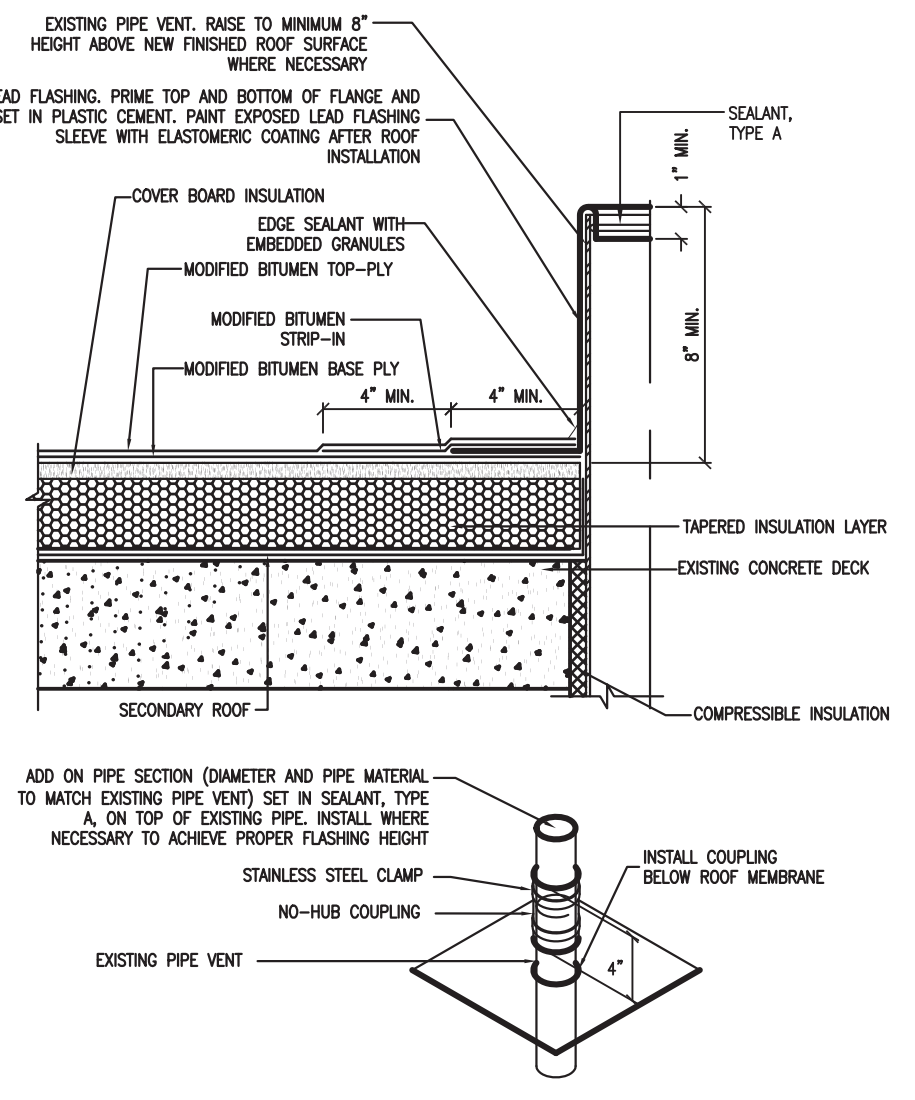


⑨ WEST PENTHOUSE: STRUCTURAL STEEL
R3.04 SCALE: 1"=10'-0"(11"x17"); 1"=5'-0"(22"x34") (PLAN VIEW)

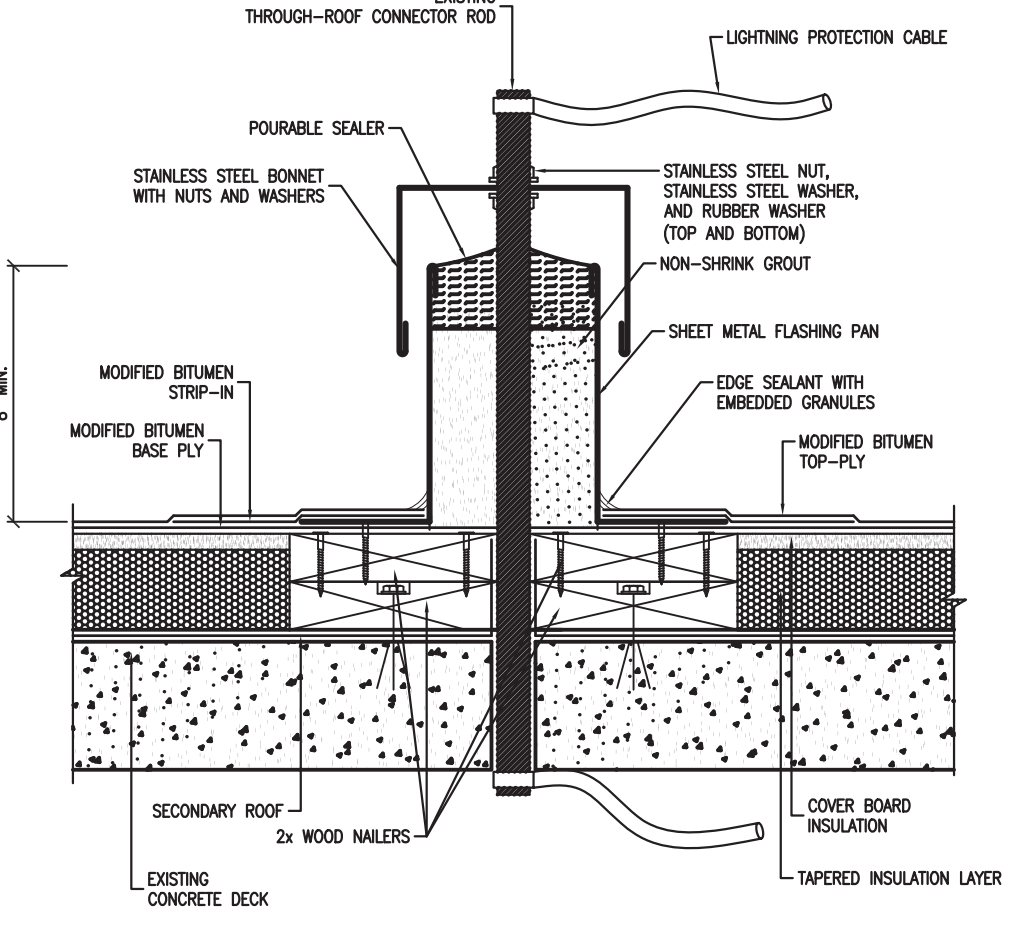


⑩ EAST PENTHOUSE: STRUCTURAL STEEL
R3.04 SCALE: 1"=10'-0"(11"x17"); 1"=5'-0"(22"x34") (PLAN VIEW)

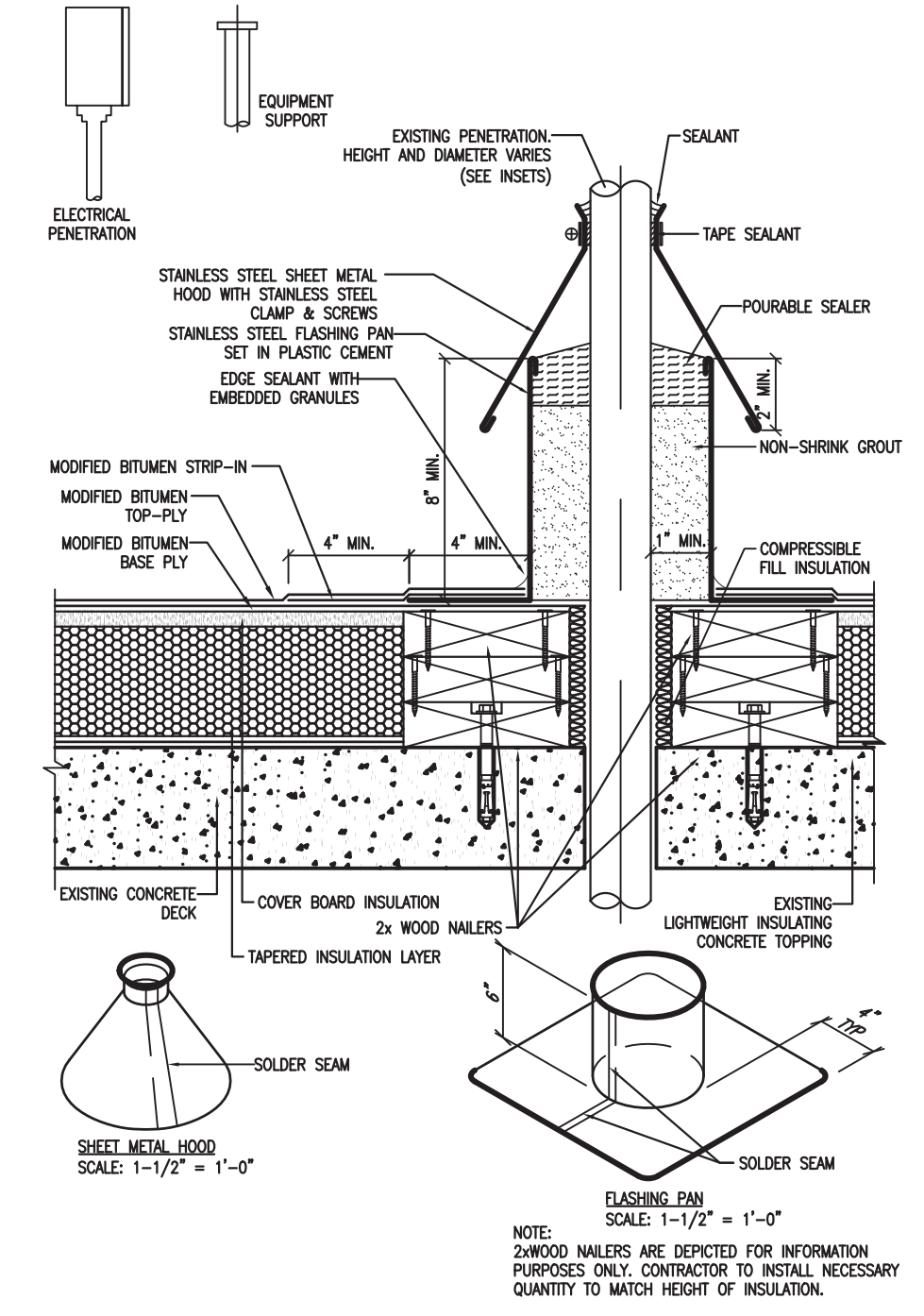




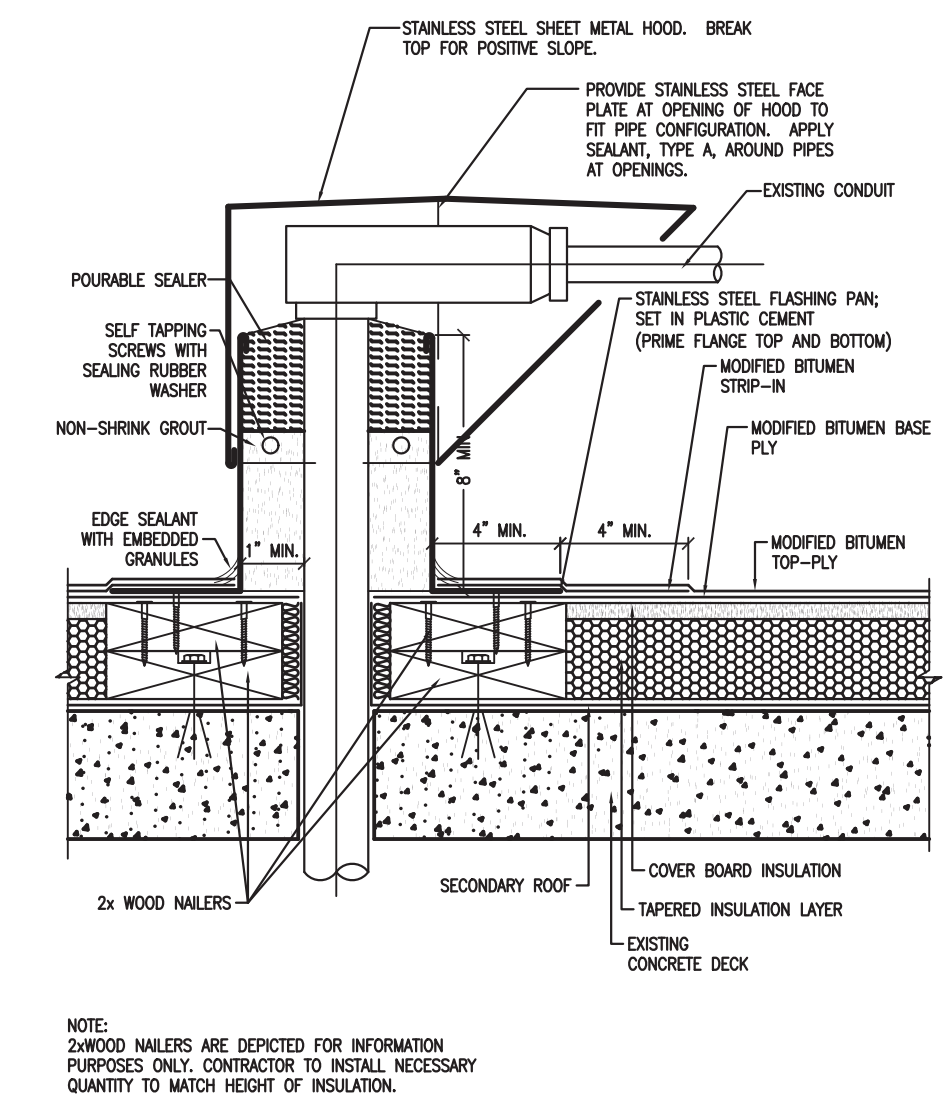
1 PLUMBING VENT
 R5.00 SCALE: NOT TO SCALE (ALTERNATE #5 ON ROOF AREA "D")



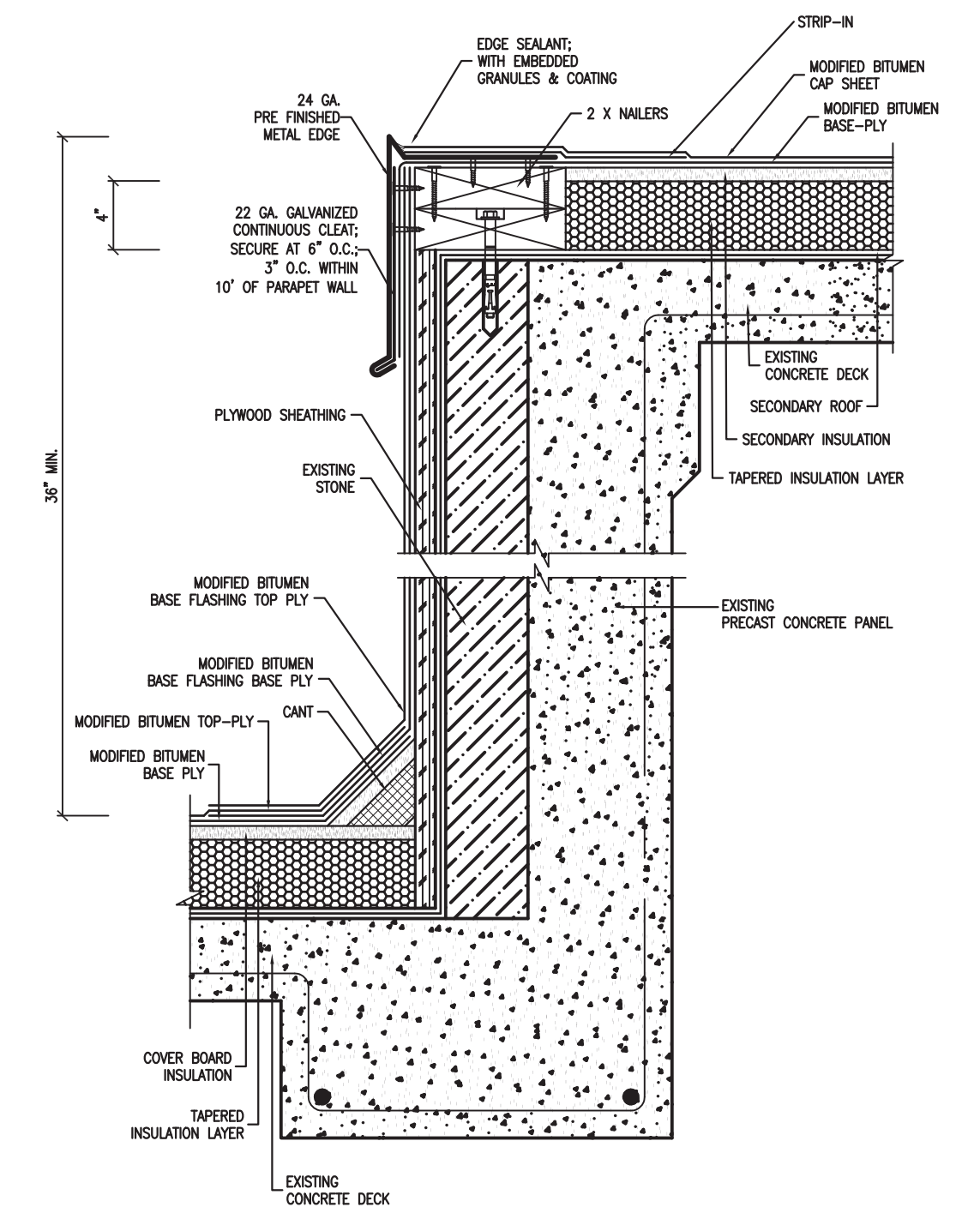
2 LIGHTNING PROTECTION
 R5.00 SCALE: NOT TO SCALE



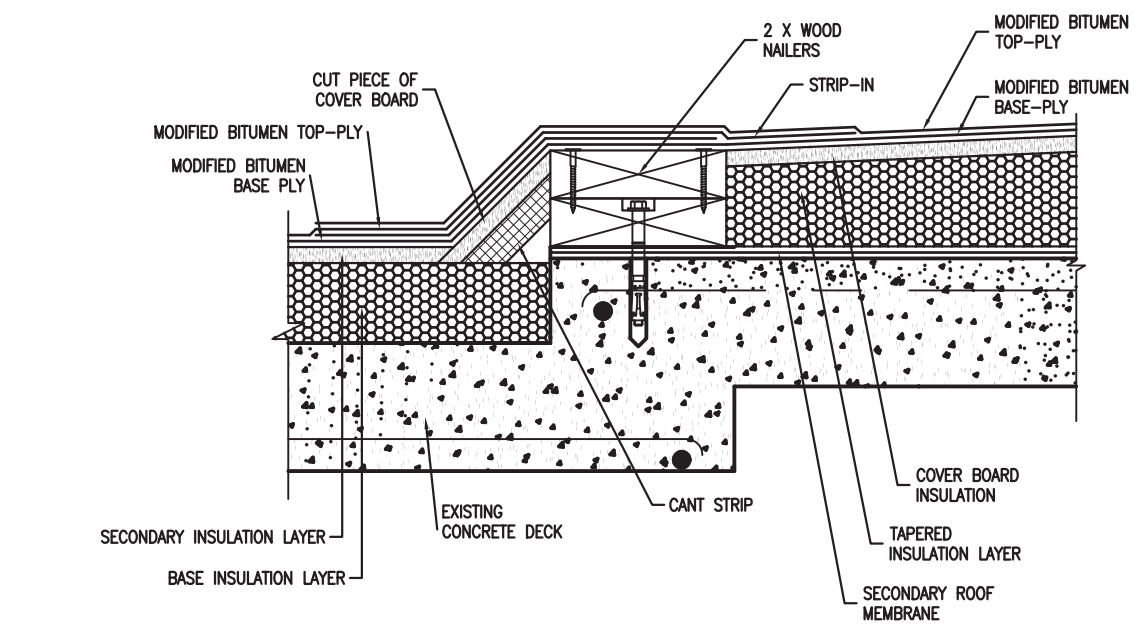
3 PENETRATION FLASHING
 R5.00 SCALE: NOT TO SCALE



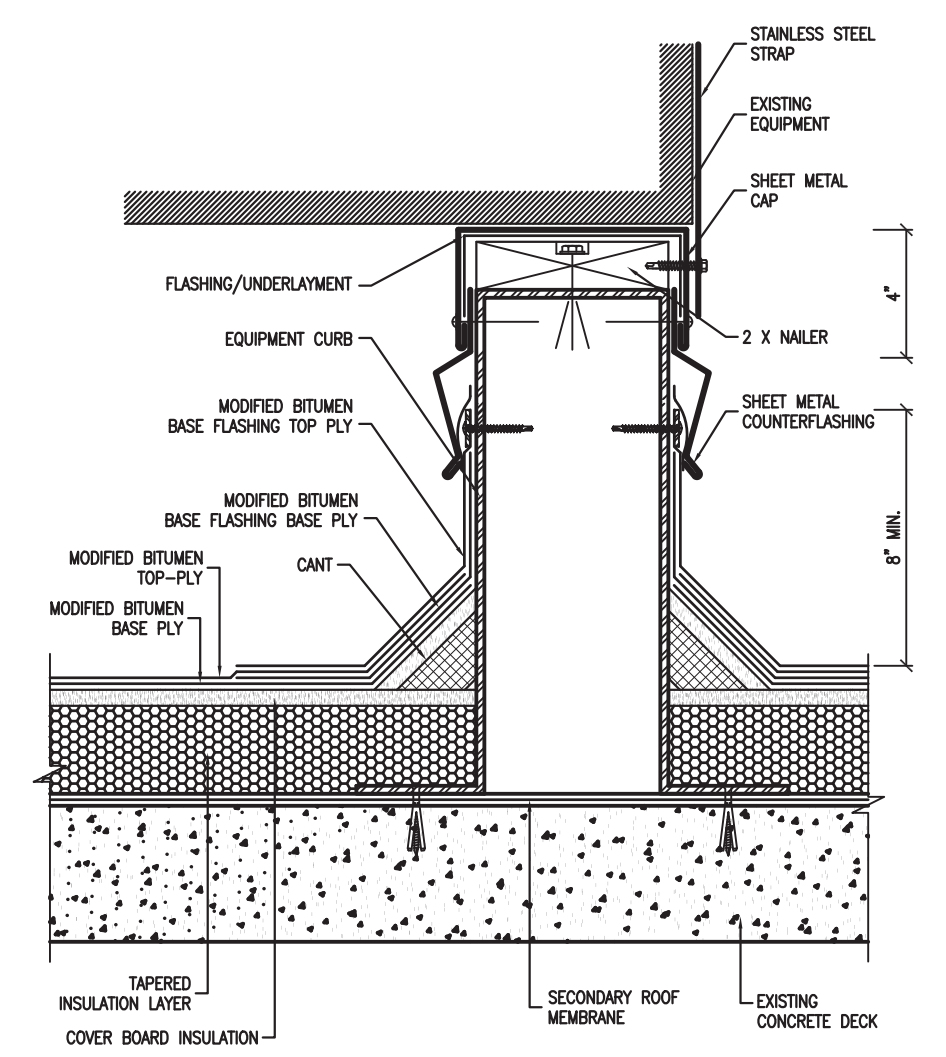
4 PIPE BOX
 R5.00 SCALE: NOT TO SCALE



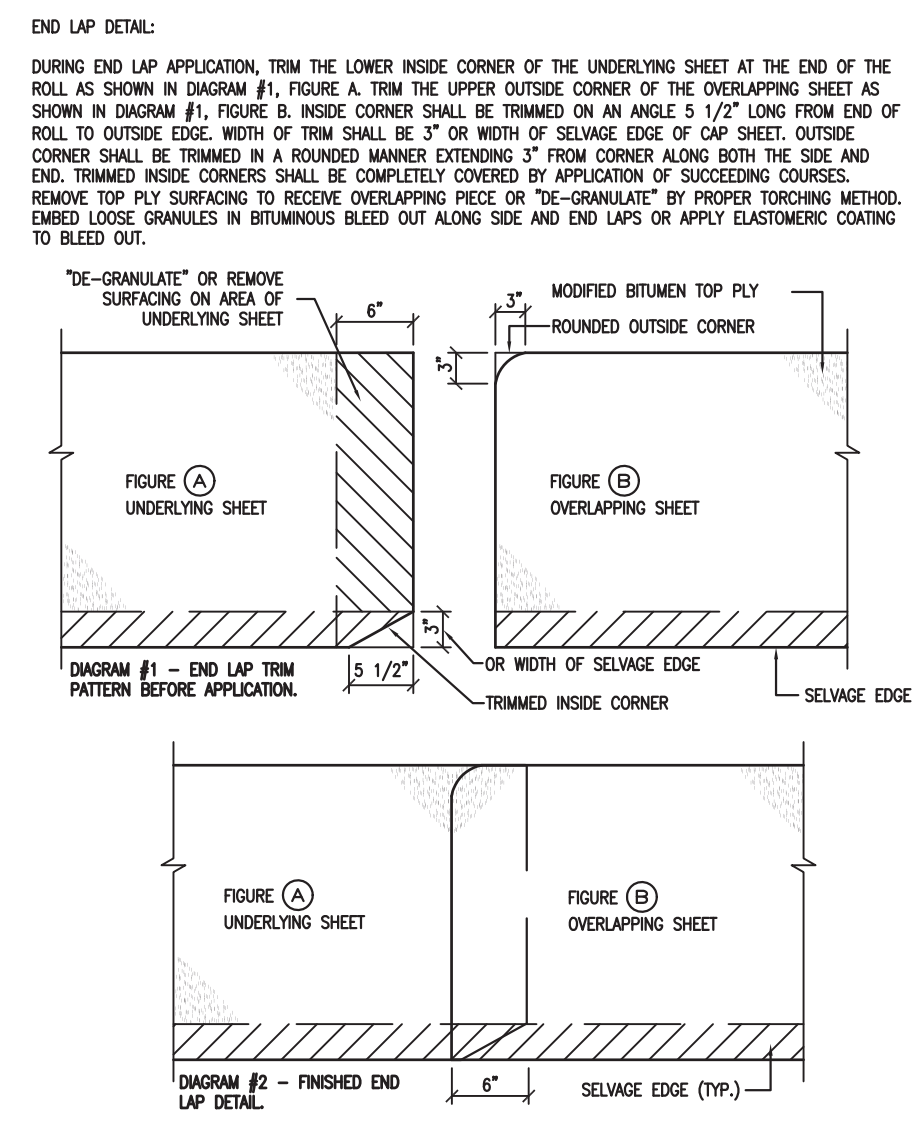
5 RISEWALL
 R5.00 SCALE: NOT TO SCALE



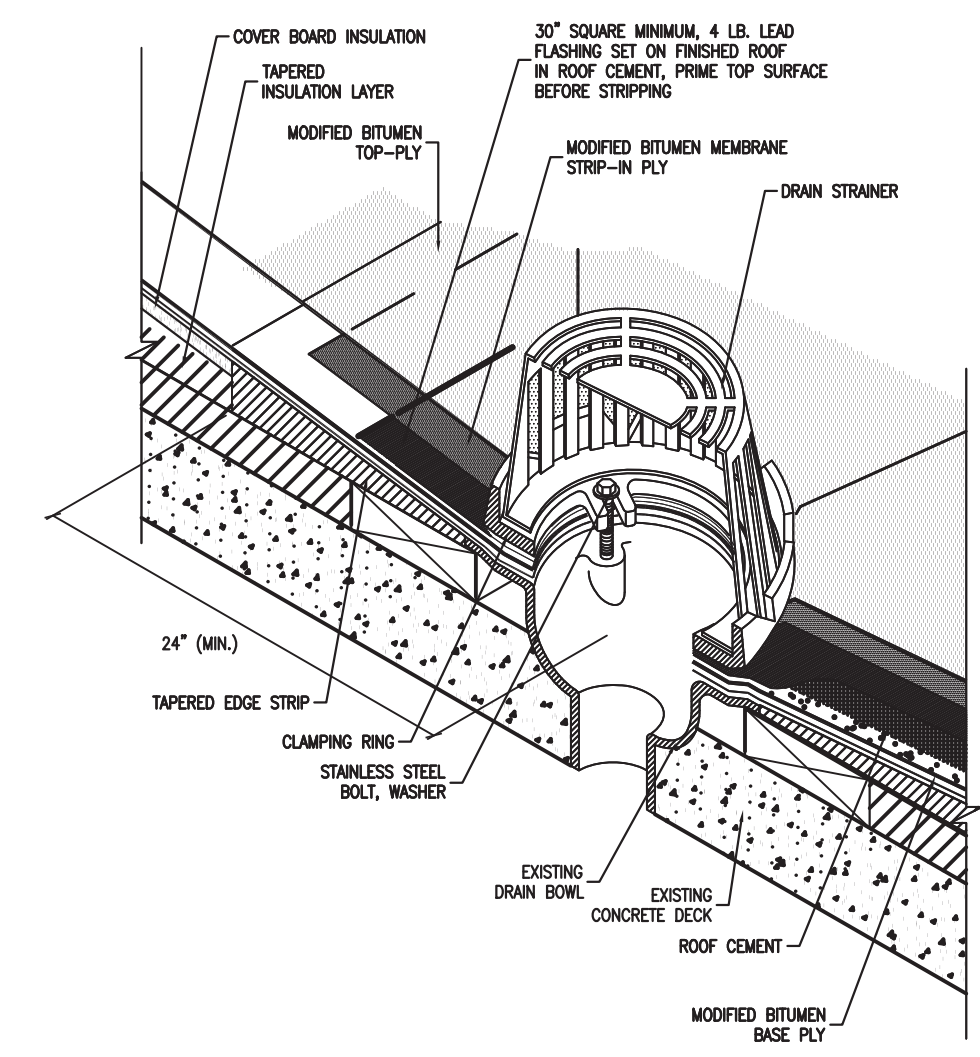
6 TRANSITION AT RAISED AREA
 R5.00 SCALE: NOT TO SCALE



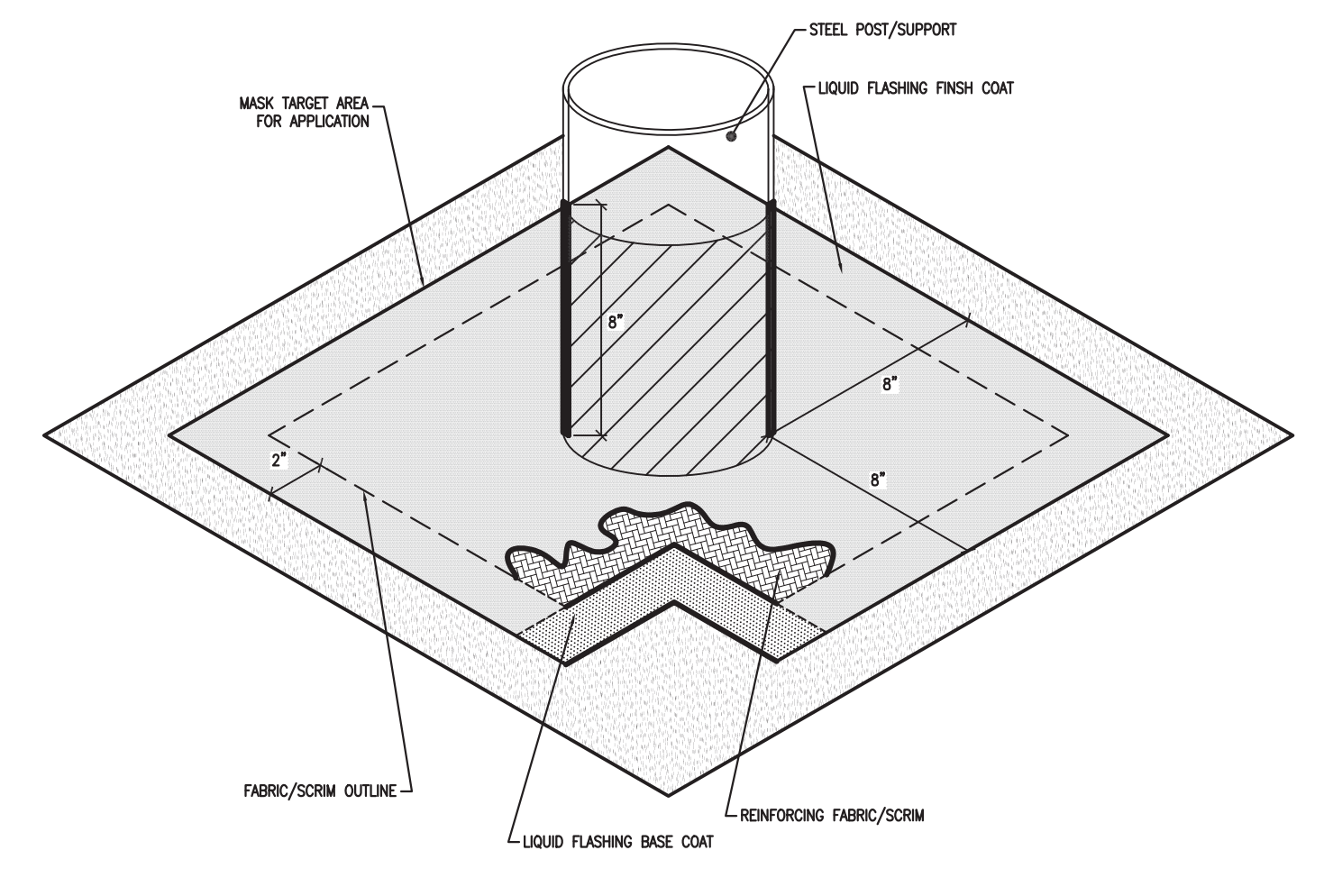
7 EQUIPMENT SUPPORT
 R5.00 SCALE: NOT TO SCALE



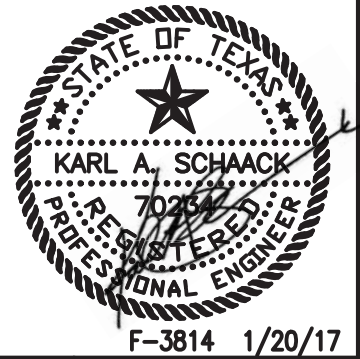
8 GRANULE SURFACED CAP SHEET: END LAP CONSTRUCTION DETAIL
 R5.00 SCALE: NOT TO SCALE

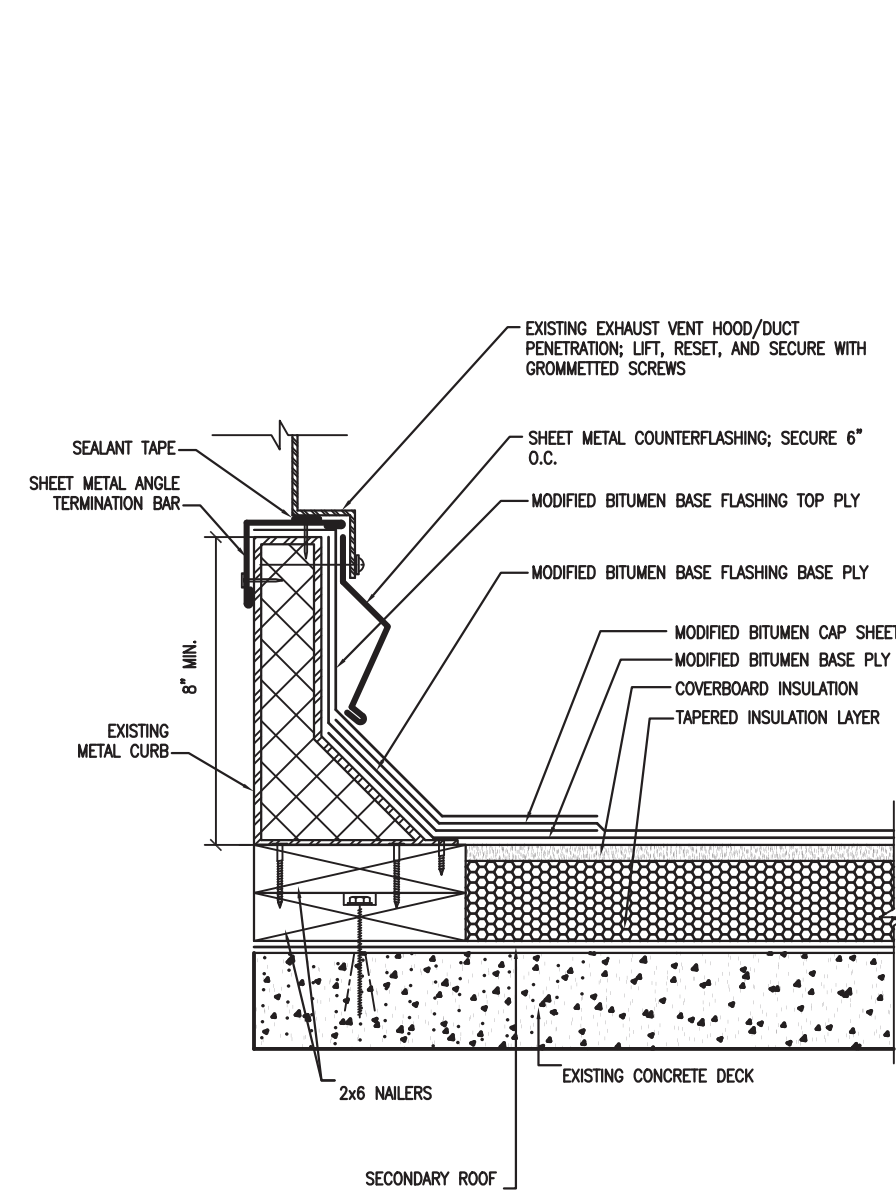


9 ROOF DRAIN
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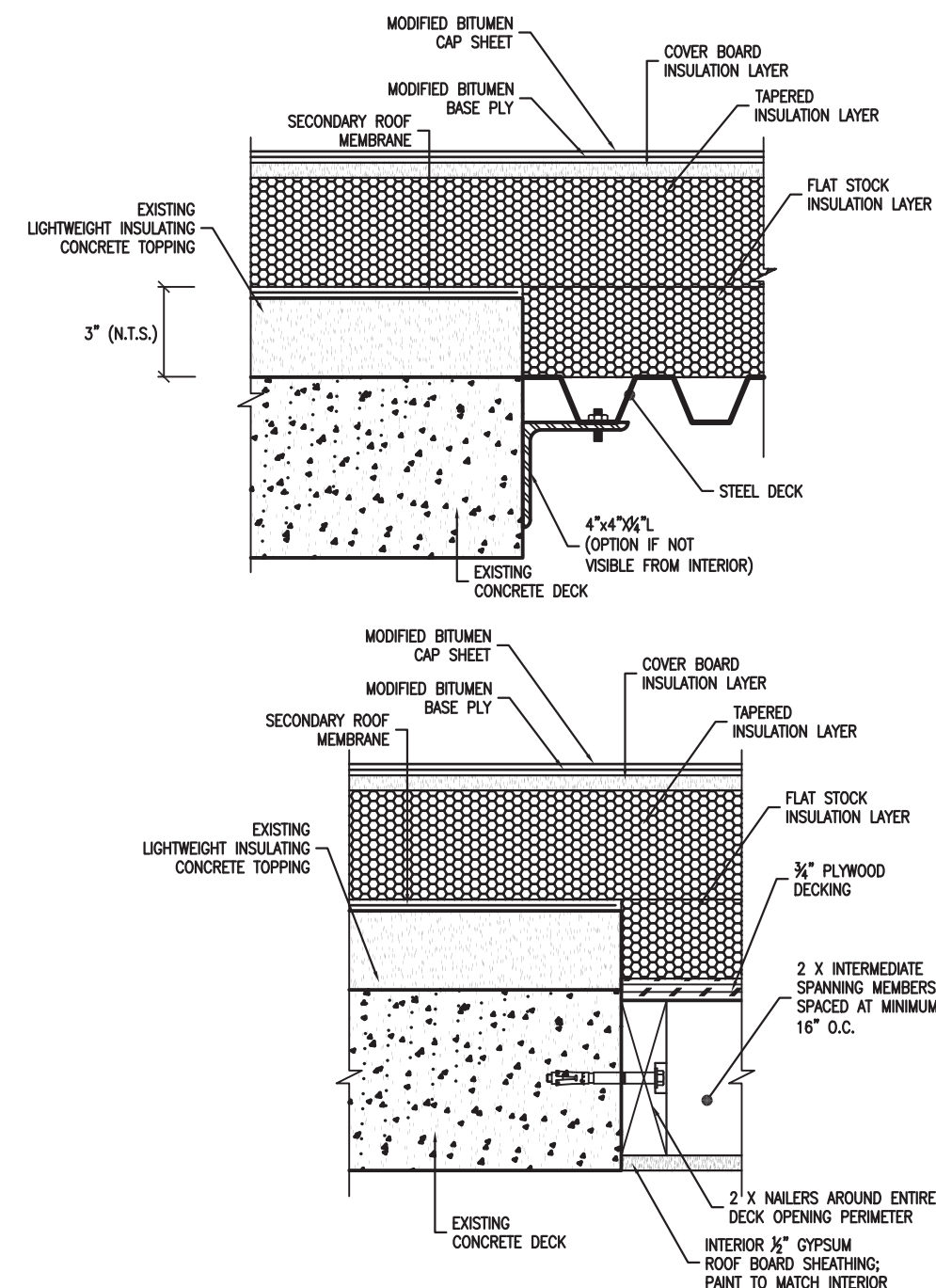


10 LIQUID FLASHING AT PENETRATION
 R5.00 SCALE: NOT TO SCALE

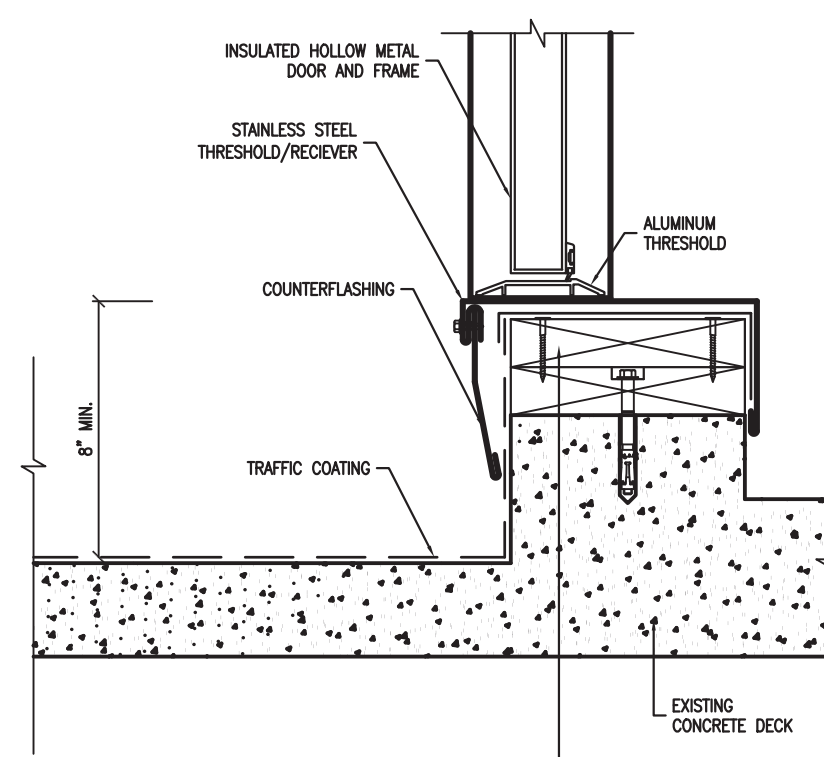




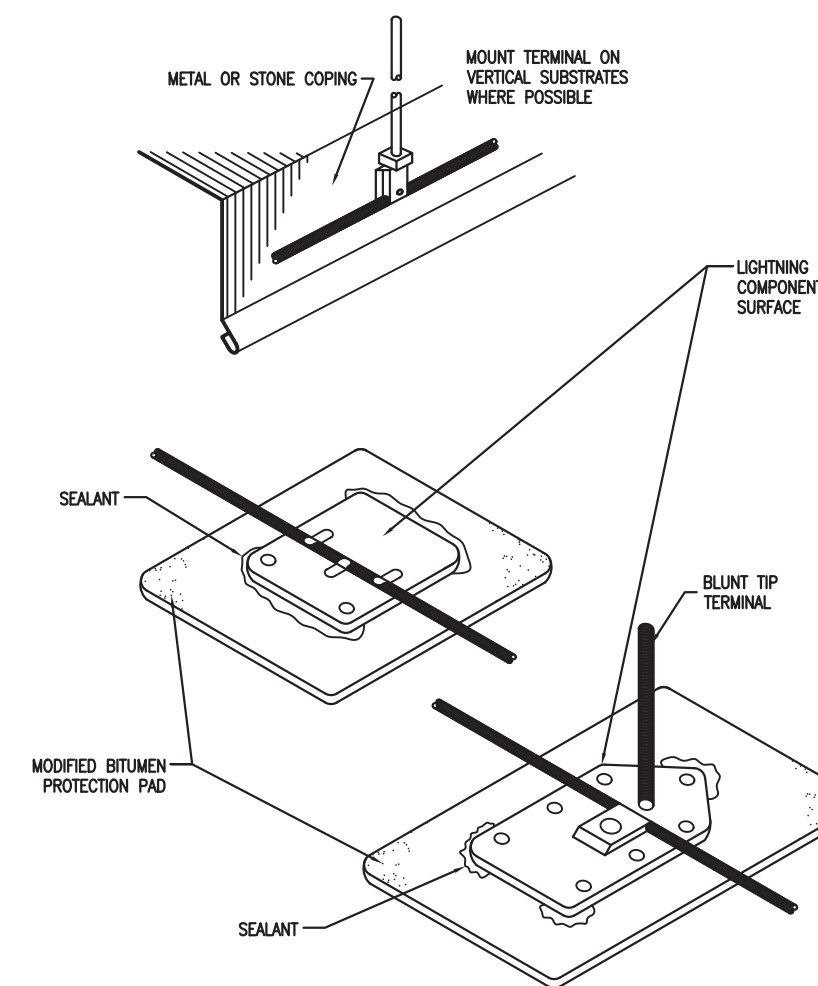
11 CURBED PENETRATION
 R5.01 SCALE: NOT TO SCALE (ALTERNATE #5 ON ROOF AREA "D")



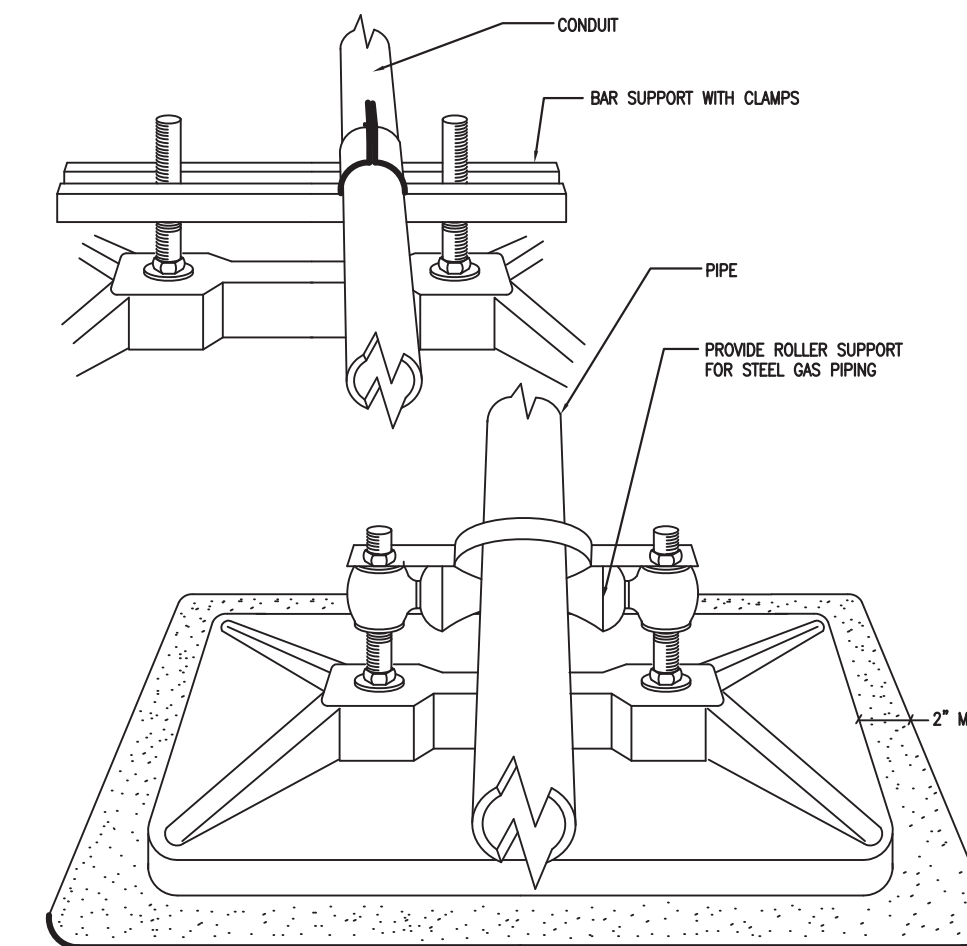
12 DECK OPENING INFILL
 R5.01 SCALE: NOT TO SCALE



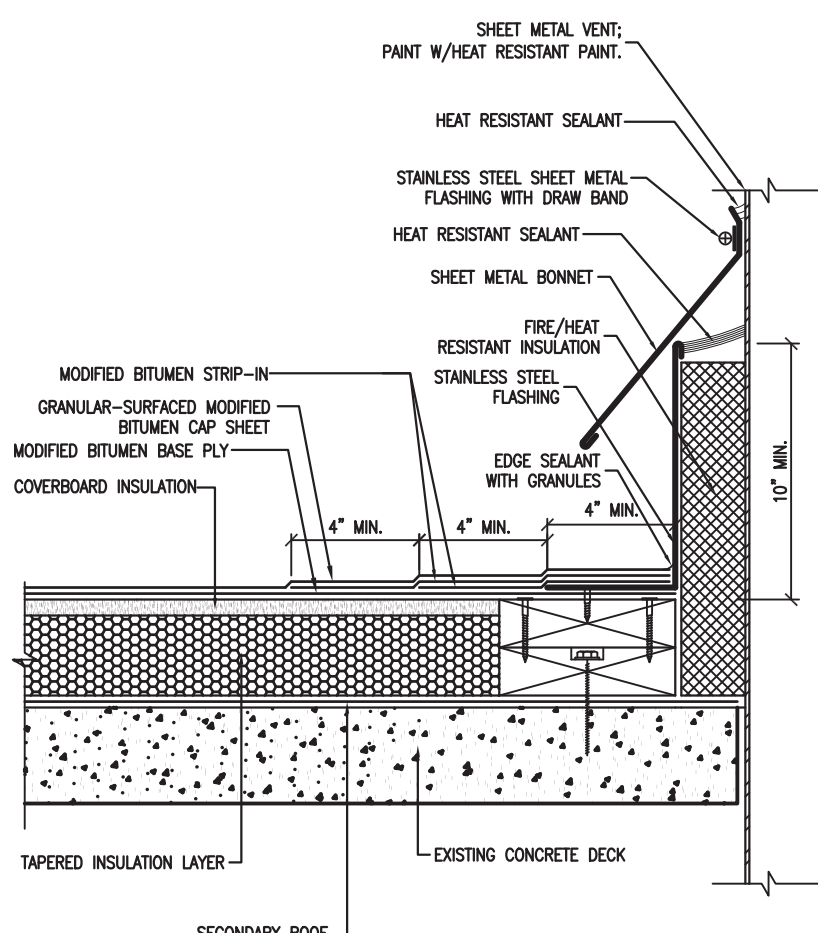
13 THRESHOLD
 R5.01 SCALE: NOT TO SCALE



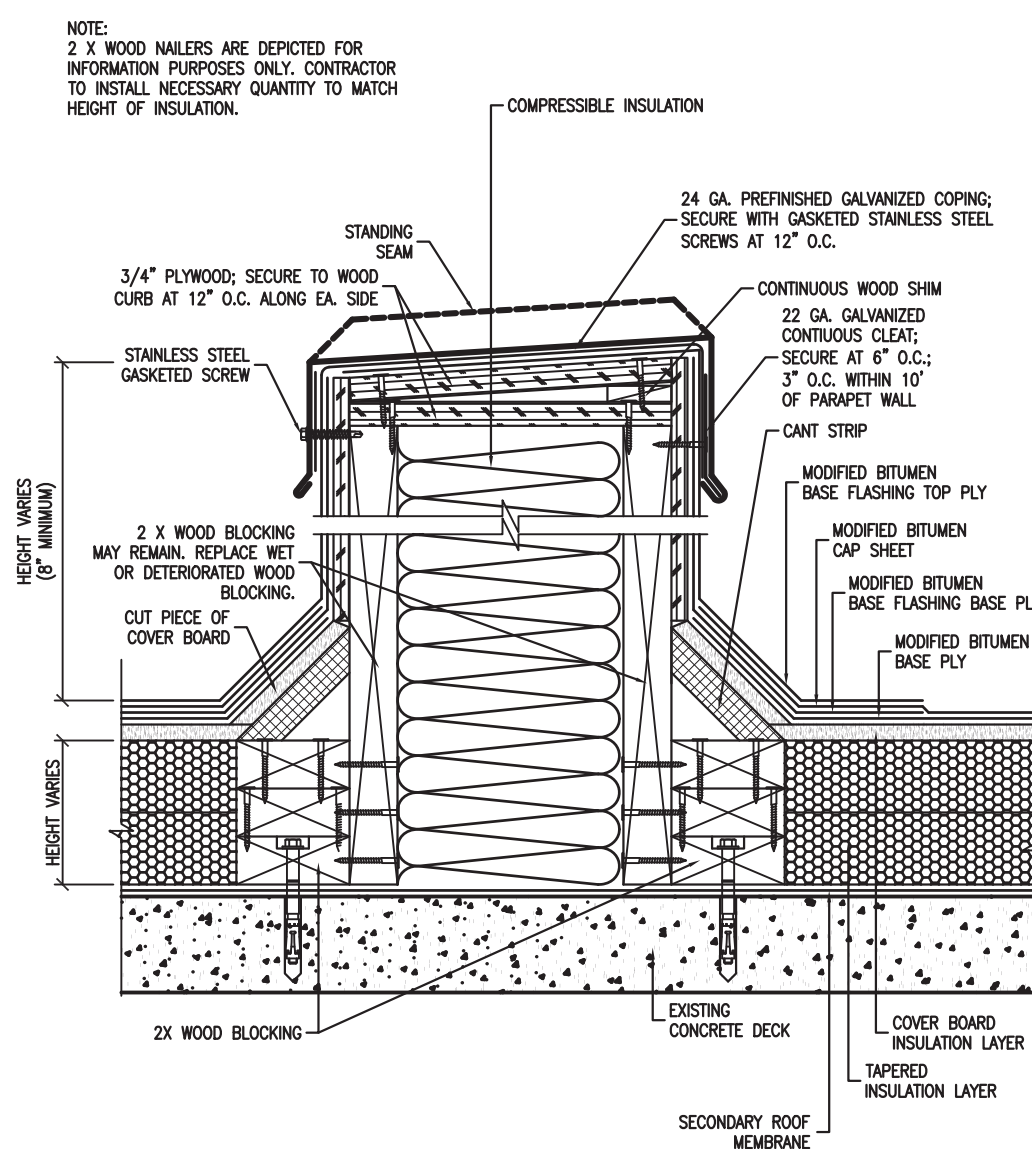
14 LIGHTNING PROTECTION
 R5.01 SCALE: NOT TO SCALE



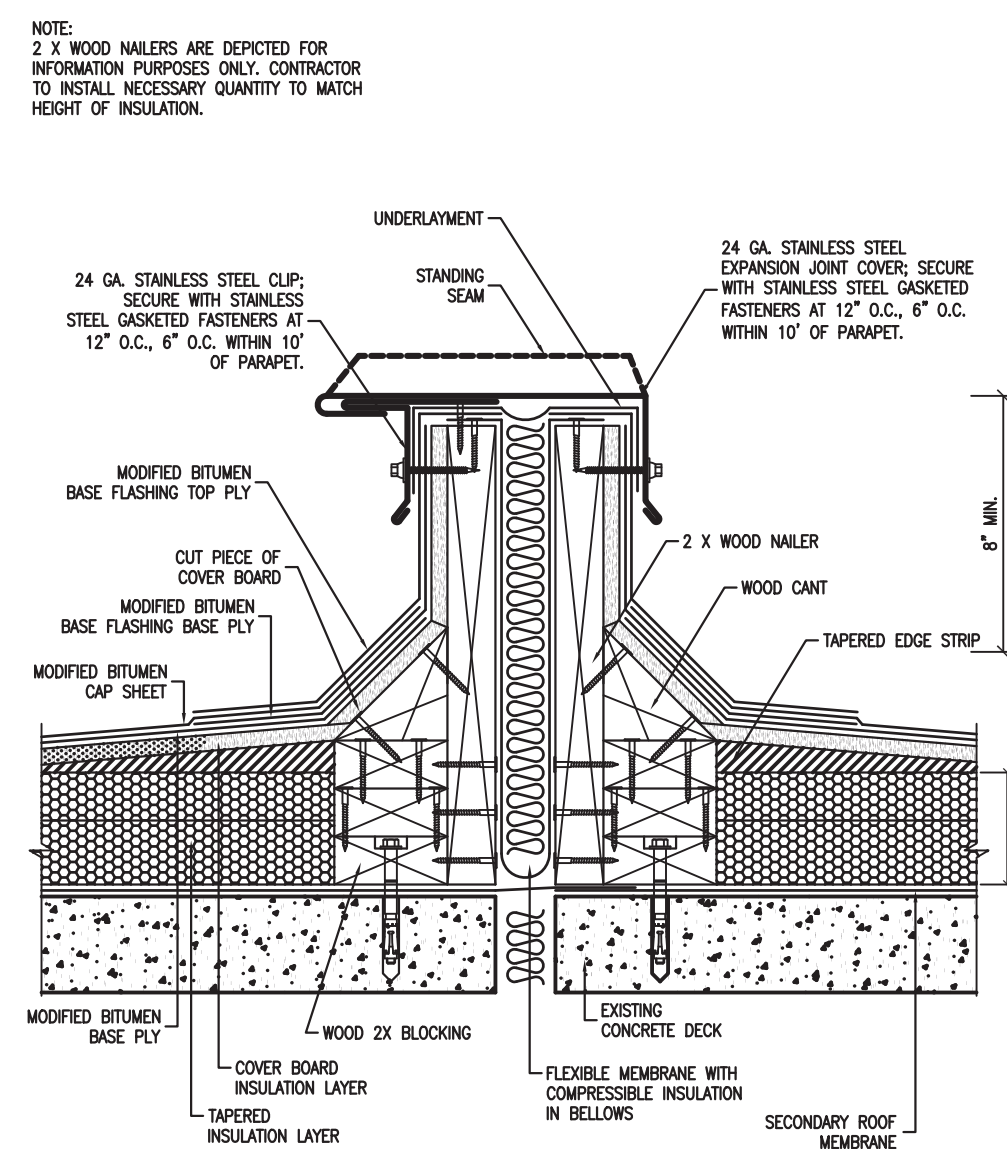
15 PIPE SUPPORT
 R5.01 SCALE: NOT TO SCALE



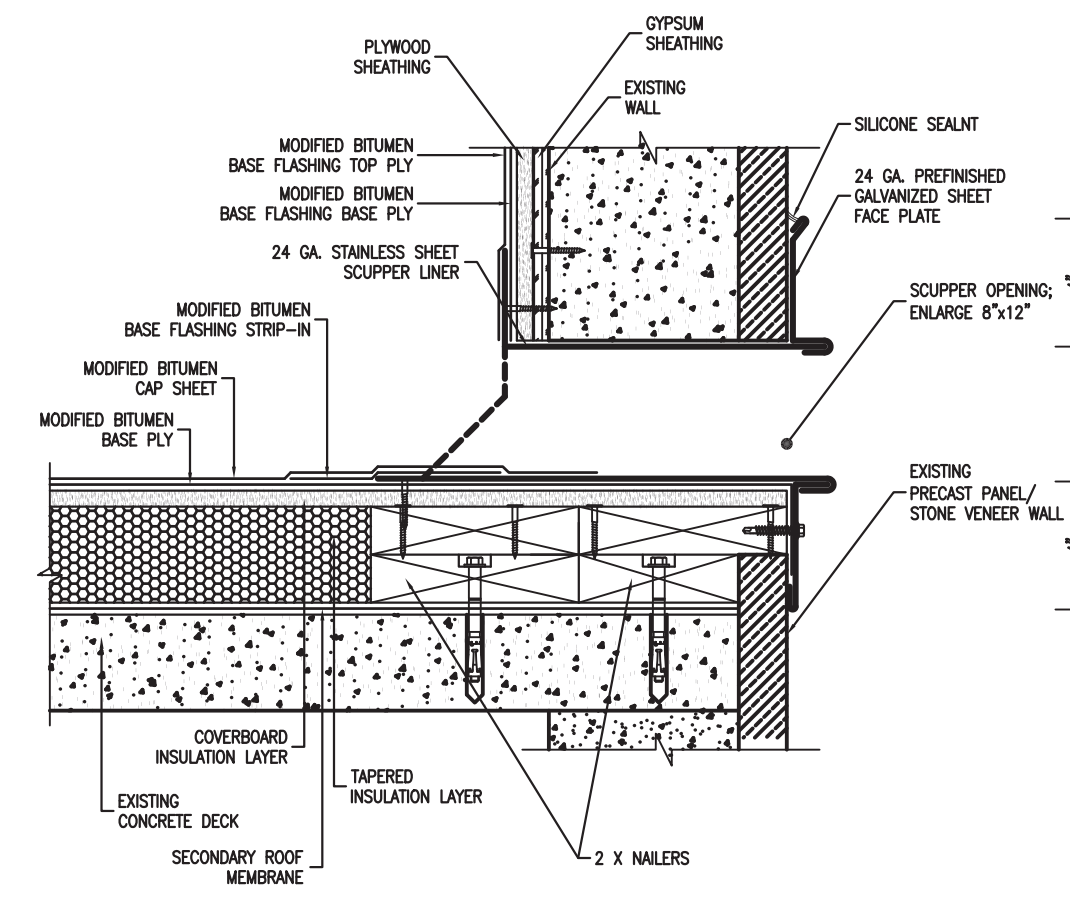
16 HEAT VENT
 R5.01 SCALE: NOT TO SCALE



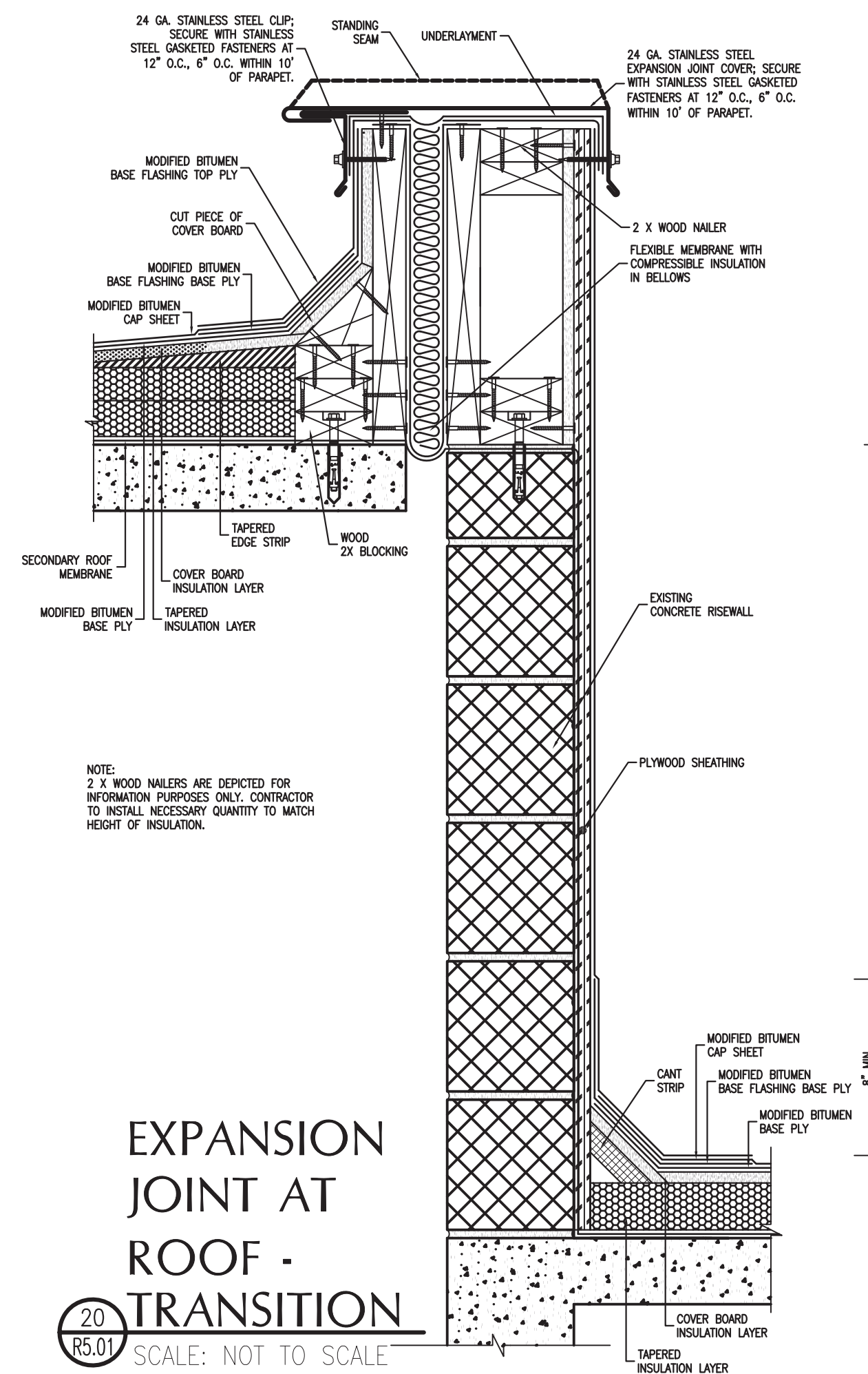
17 AREA DIVIDER
 R5.01 SCALE: NOT TO SCALE



18 EXPANSION JOINT
 R5.01 SCALE: NOT TO SCALE (ALTERNATE #5 ON ROOF AREA "D")

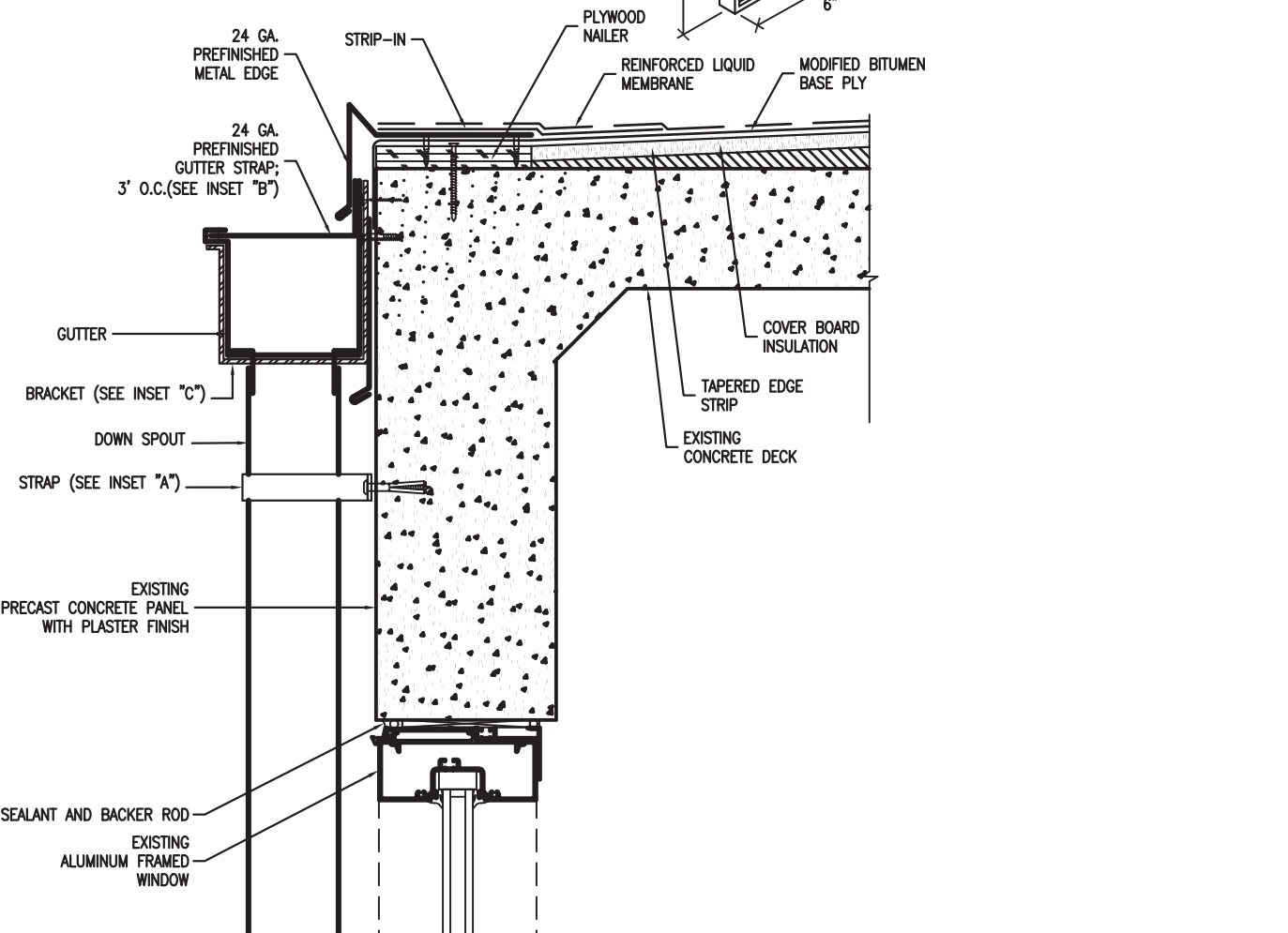
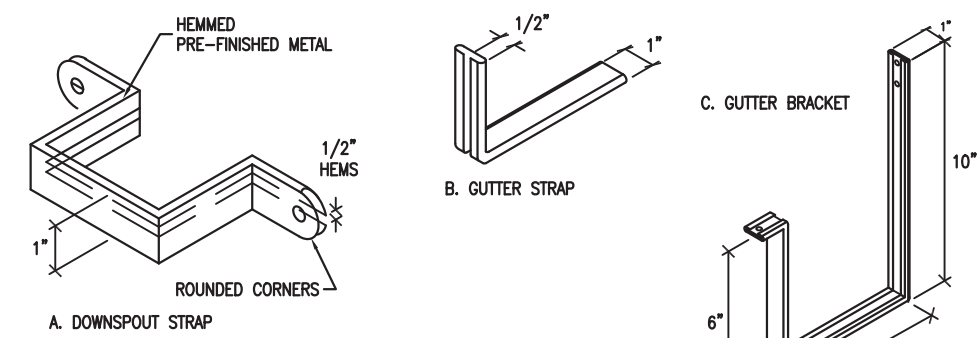


19 THROUGH-WALL SCUPPER
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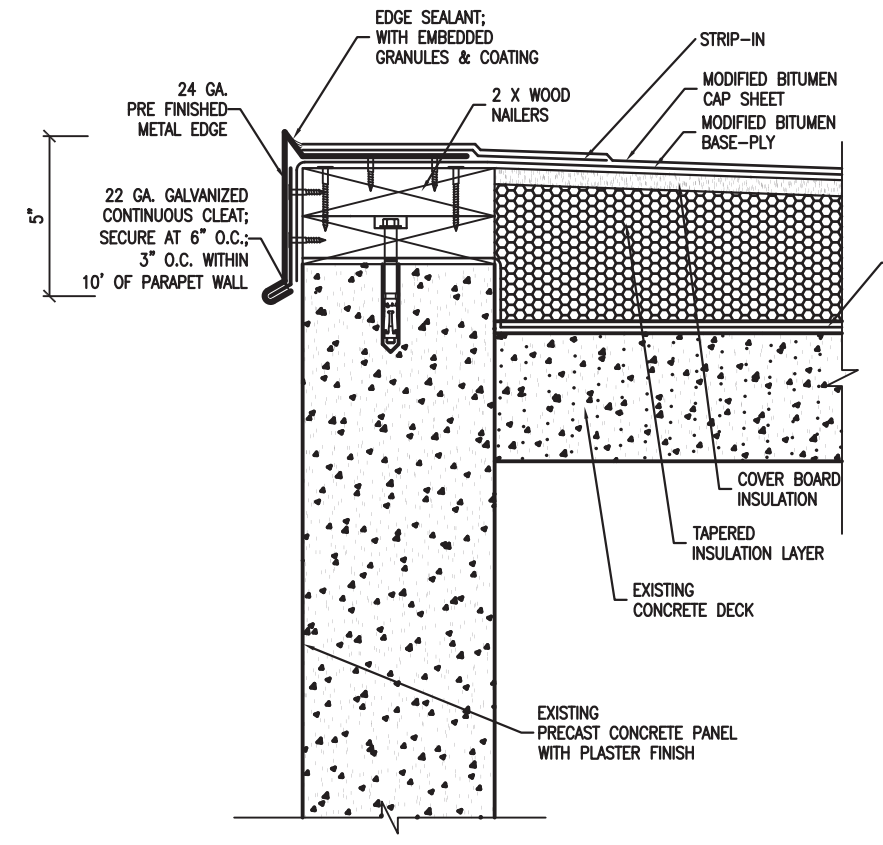


20 EXPANSION JOINT AT ROOF TRANSITION
 R5.01 SCALE: NOT TO SCALE

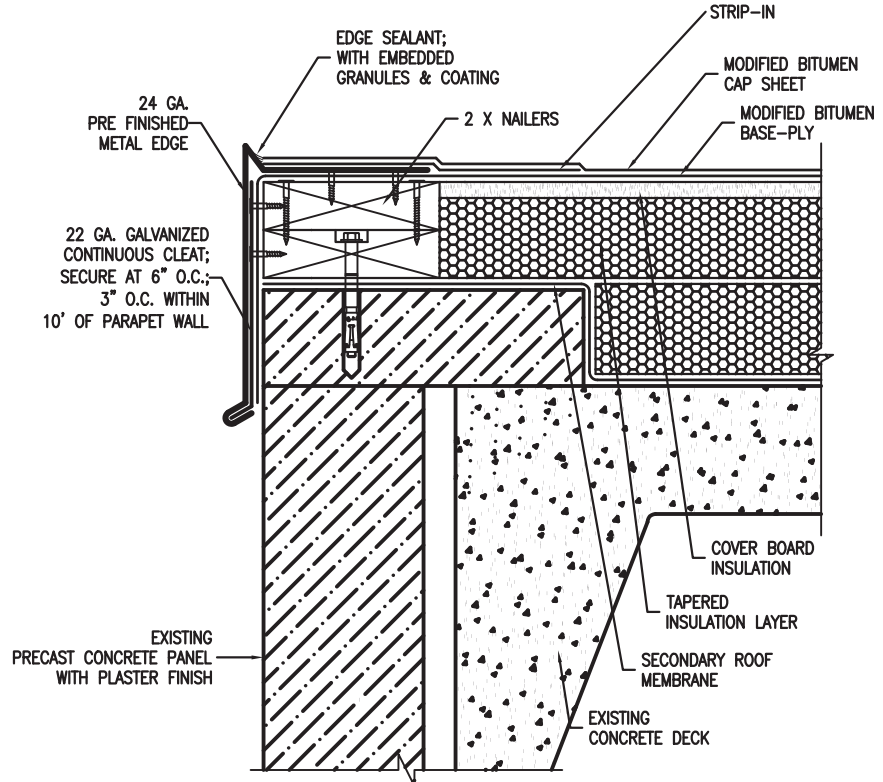




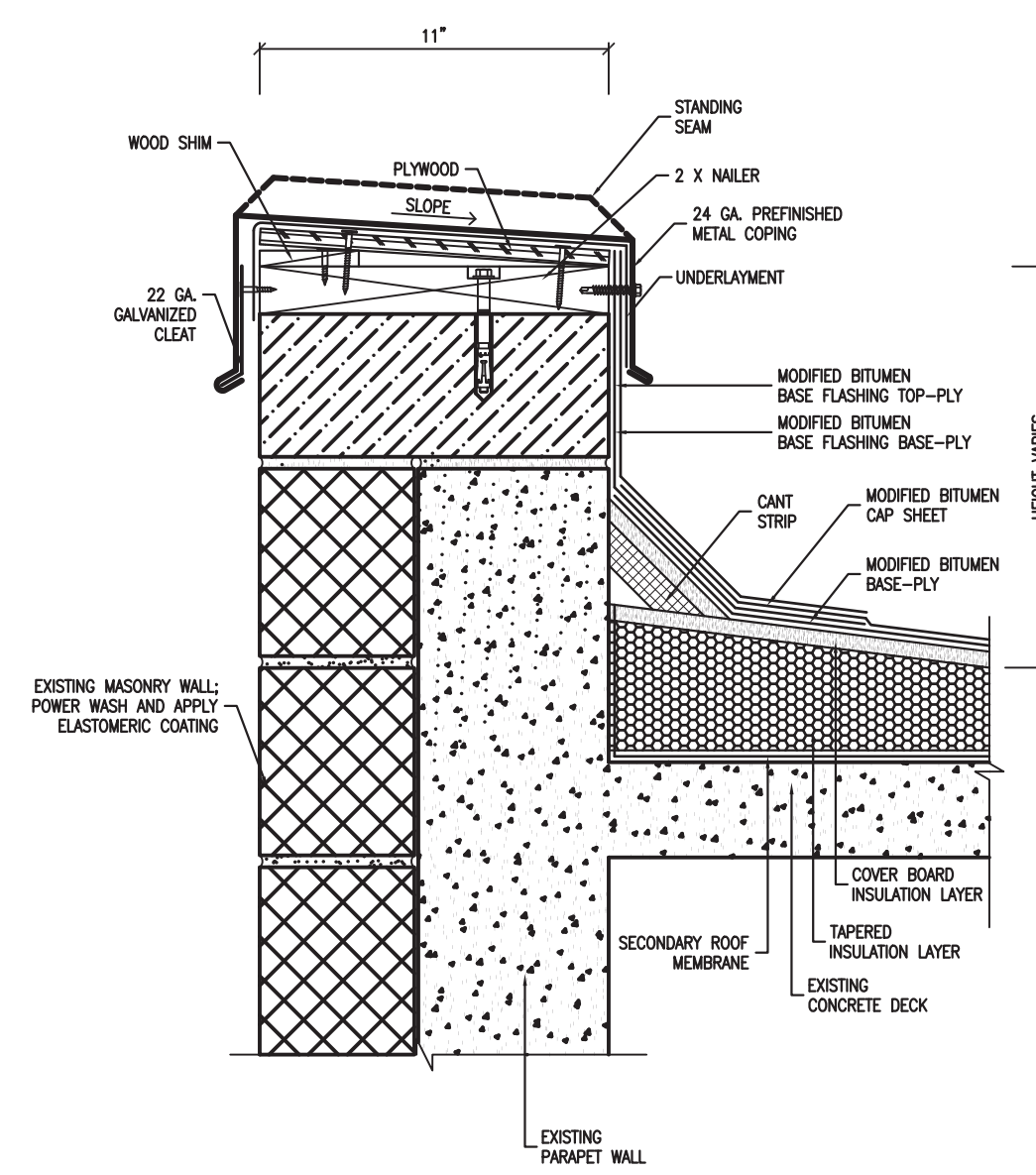
21 METAL EDGE W/GUTTER AT LOW ROOF
R5.02 SCALE: NOT TO SCALE



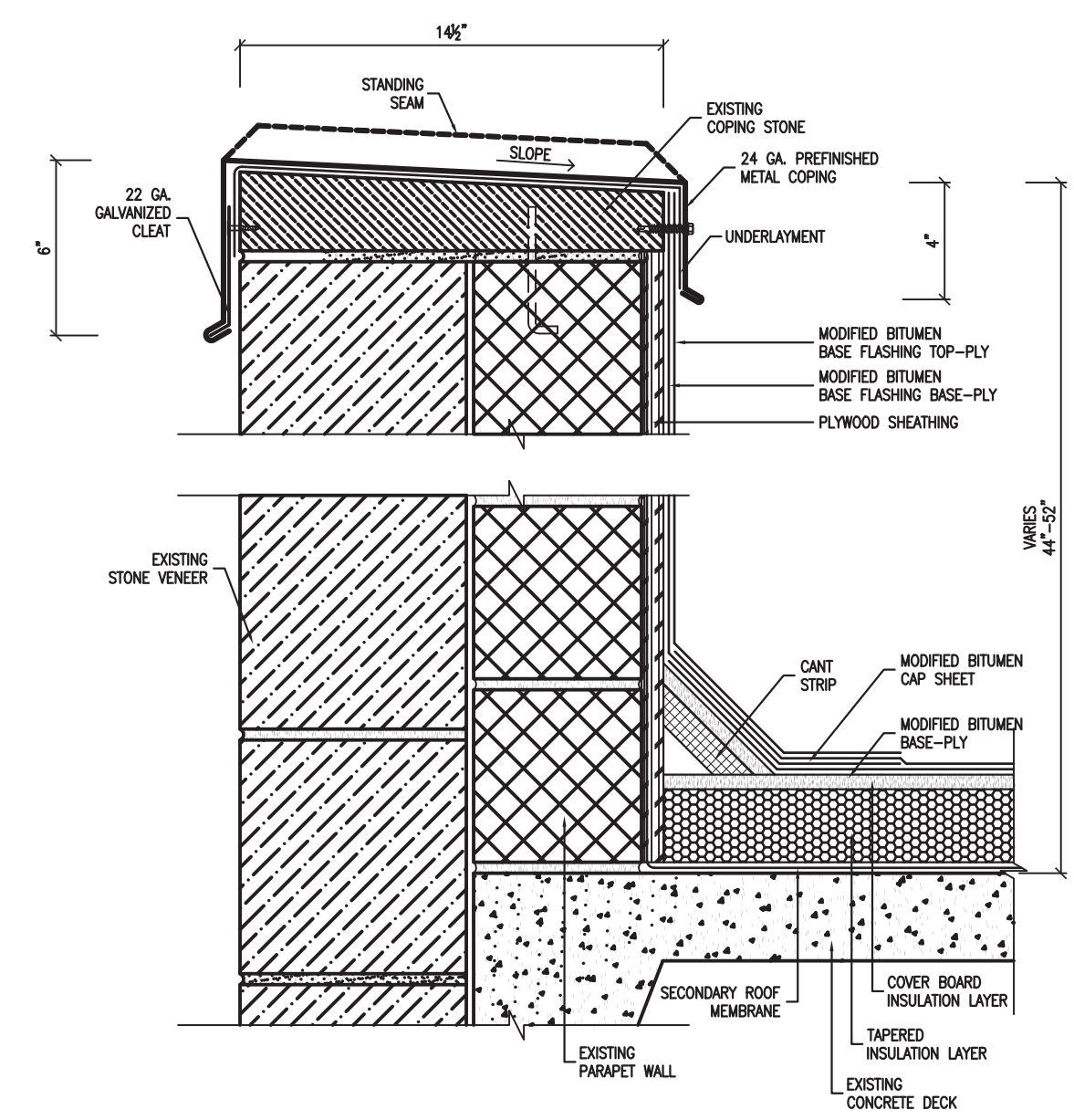
22 METAL EDGE
R5.02 SCALE: NOT TO SCALE (ALT. NO. 5)



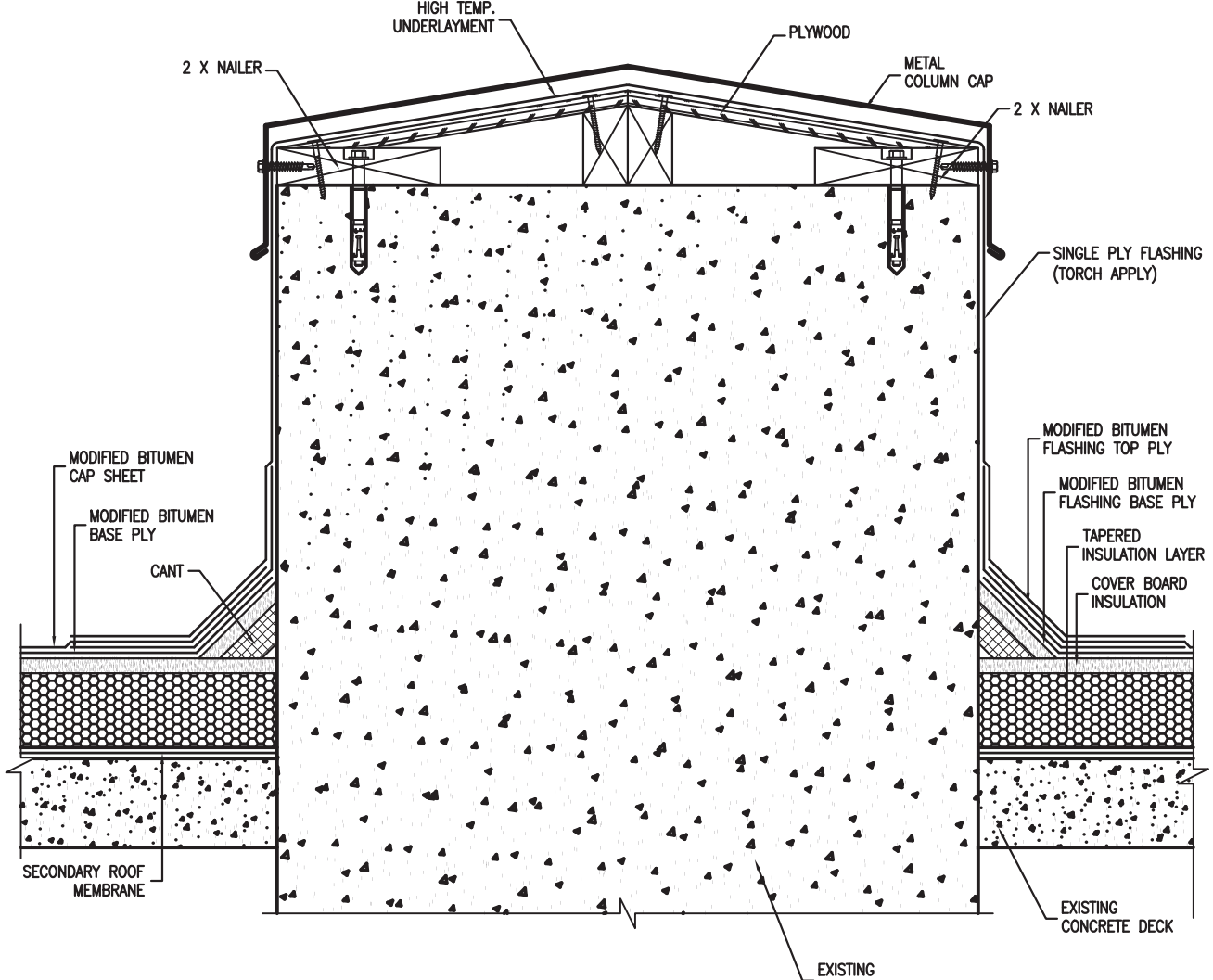
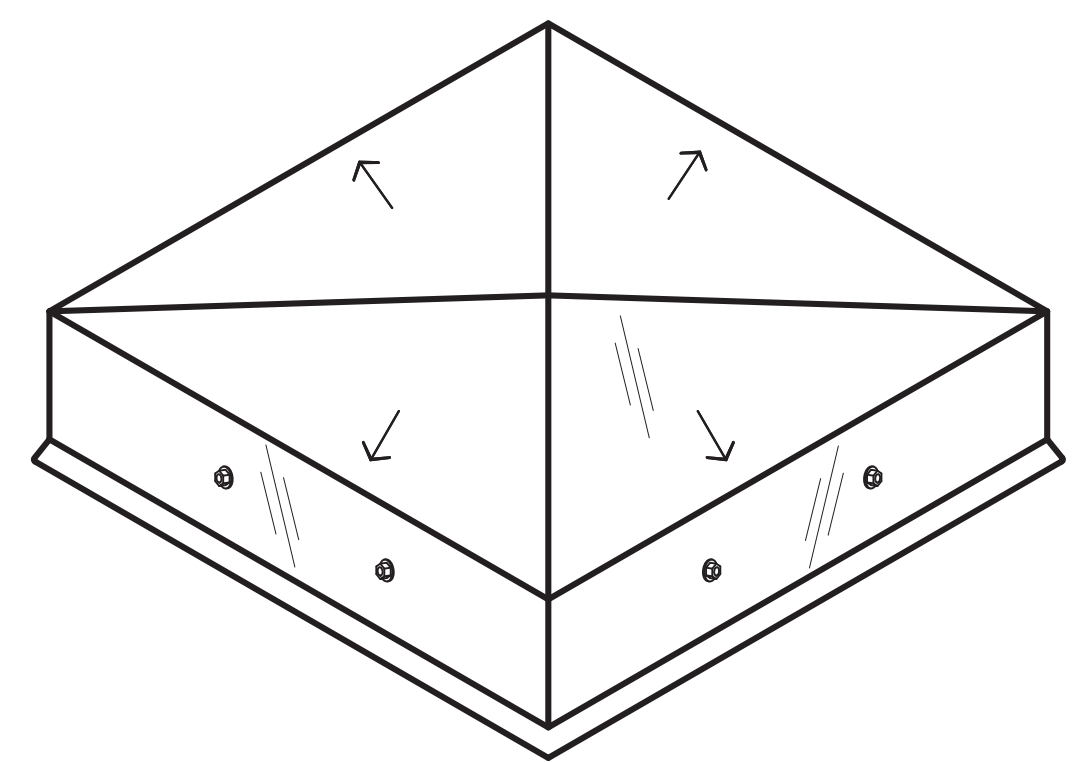
23 METAL EDGE
R5.02 SCALE: NOT TO SCALE



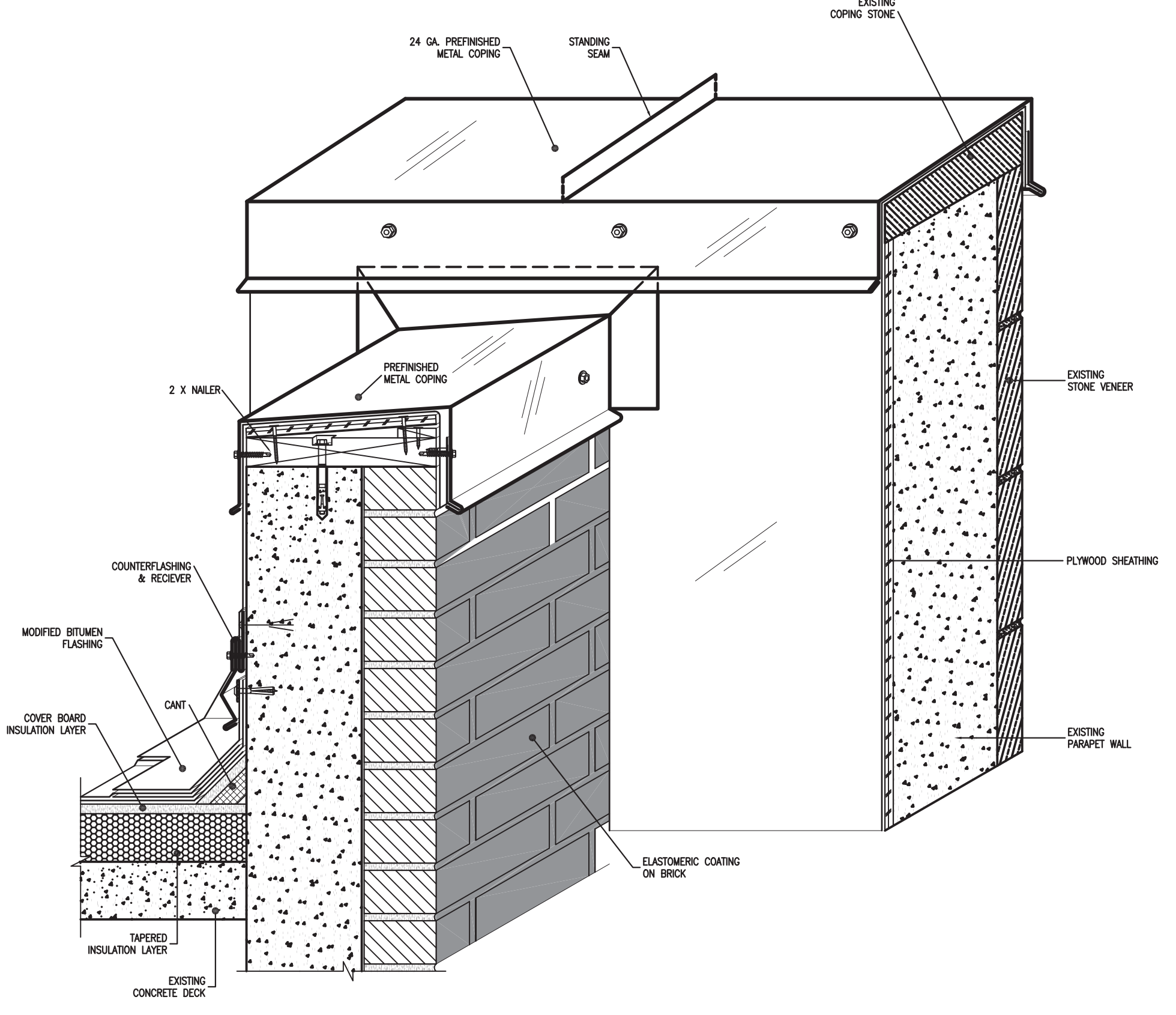
24 PARAPET WALL AT STAIRWELL
R5.02 SCALE: NOT TO SCALE



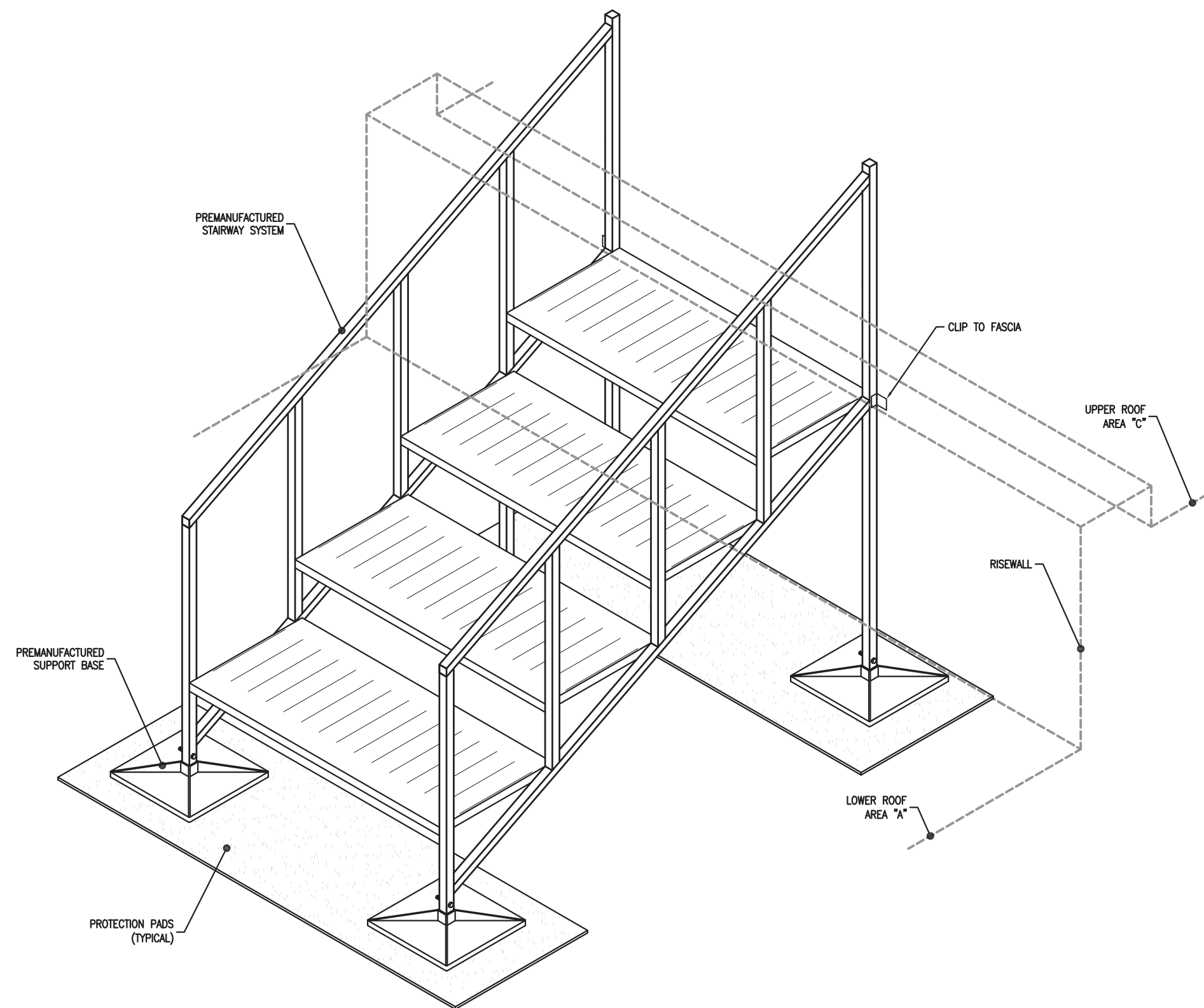
25 PARAPET WALL
R5.02 SCALE: NOT TO SCALE



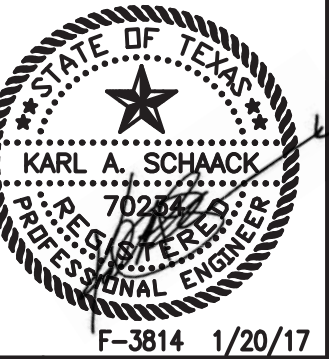
26 COLUMN CAP
R5.02 SCALE: NOT TO SCALE (ALT. NO. 5)



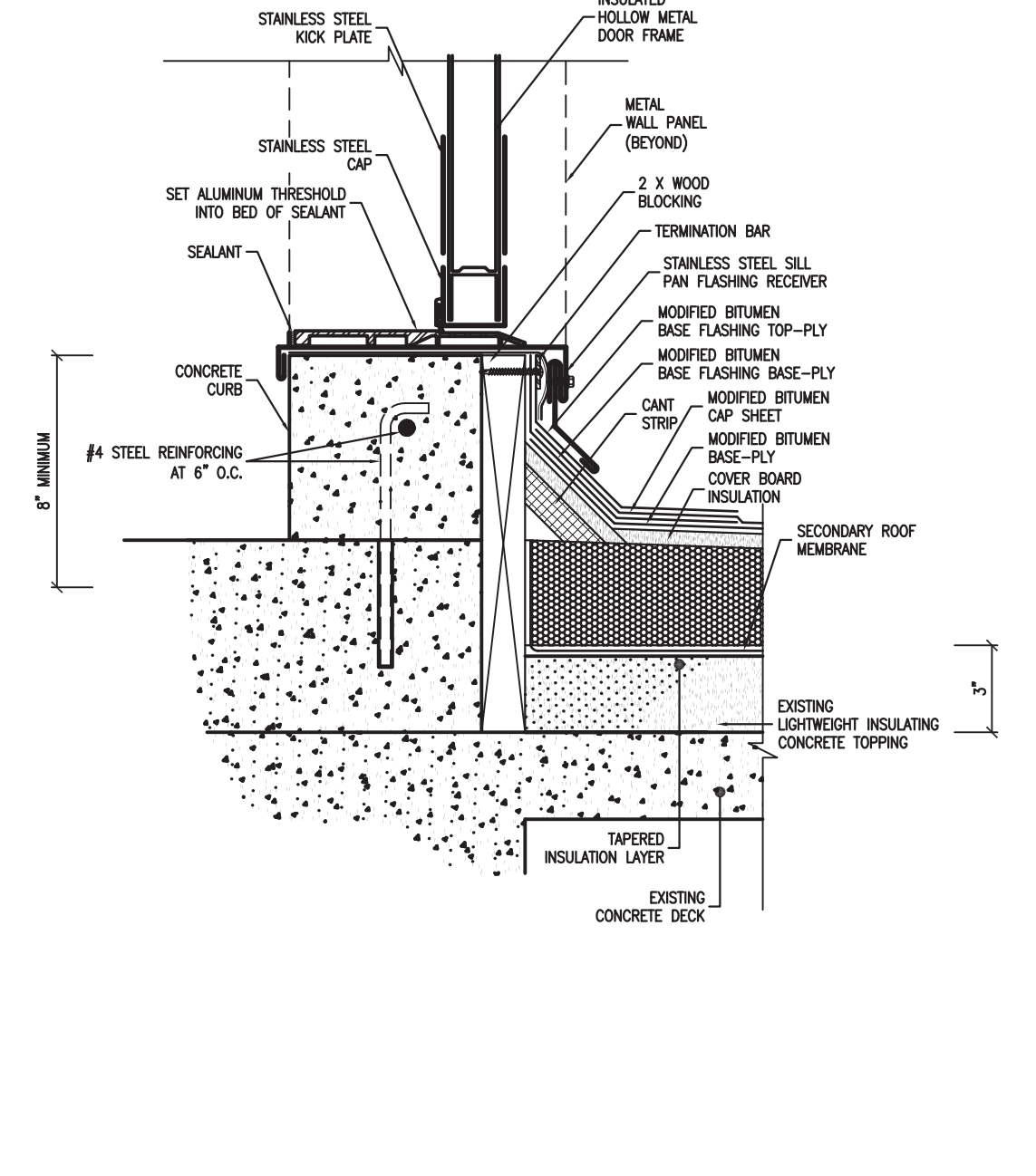
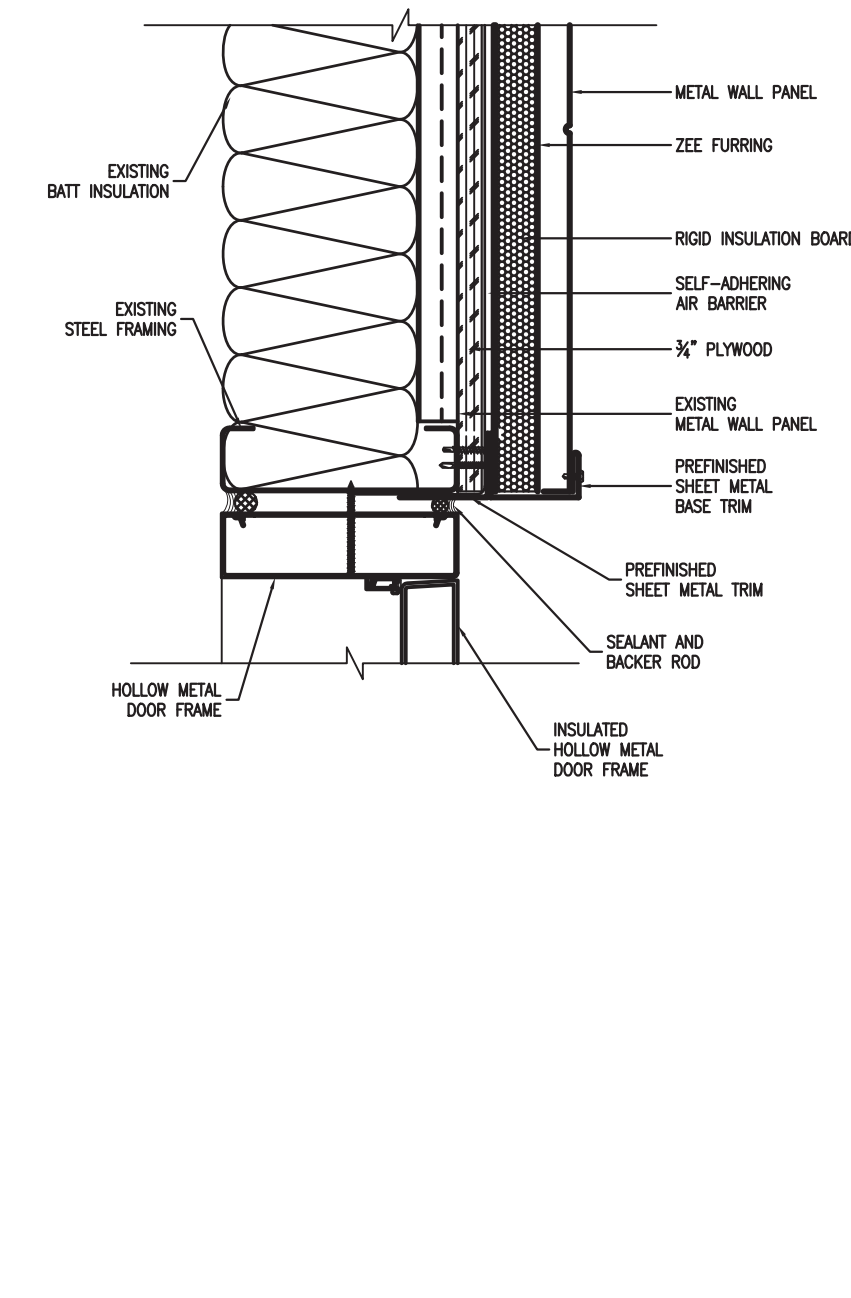
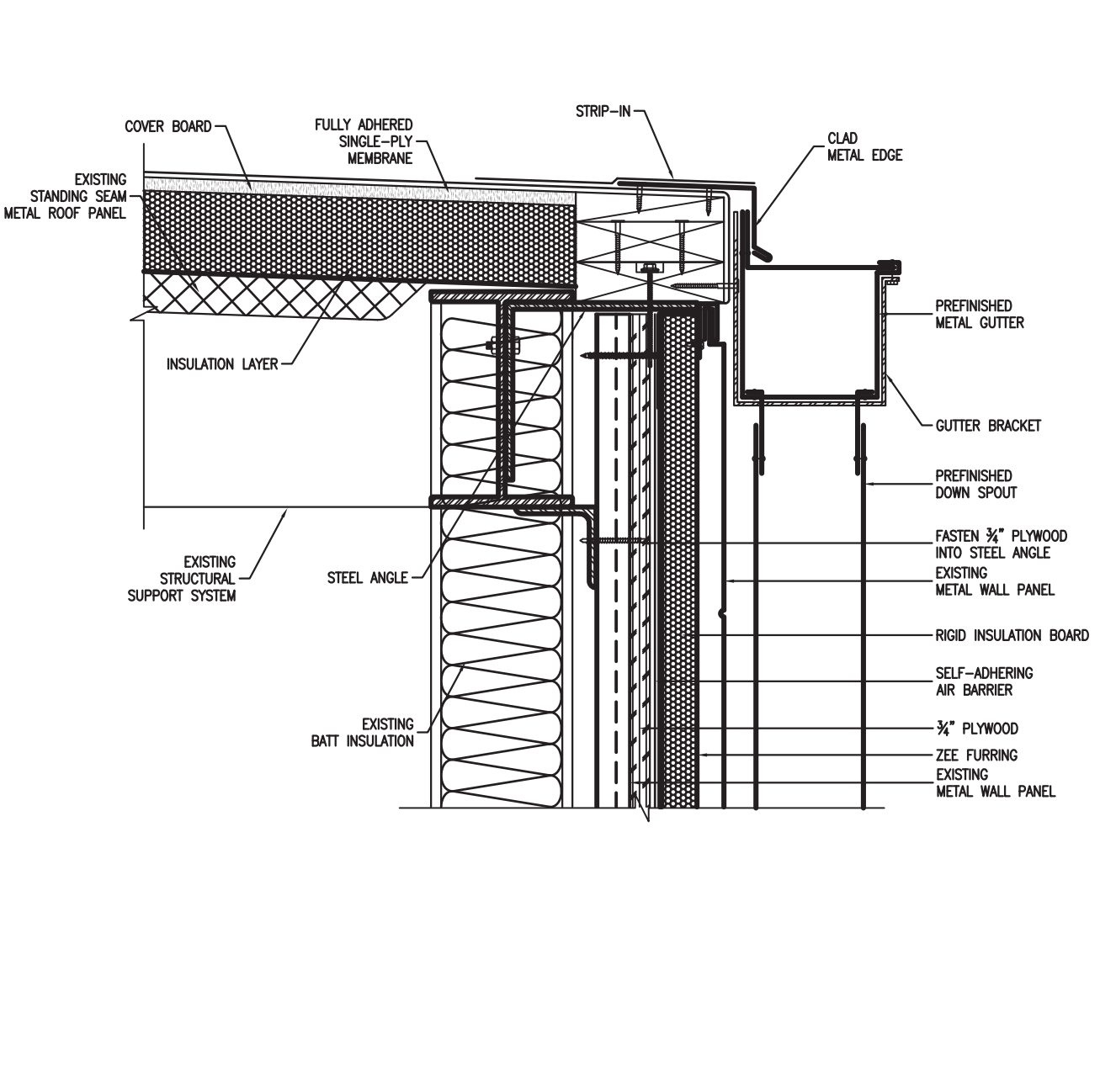
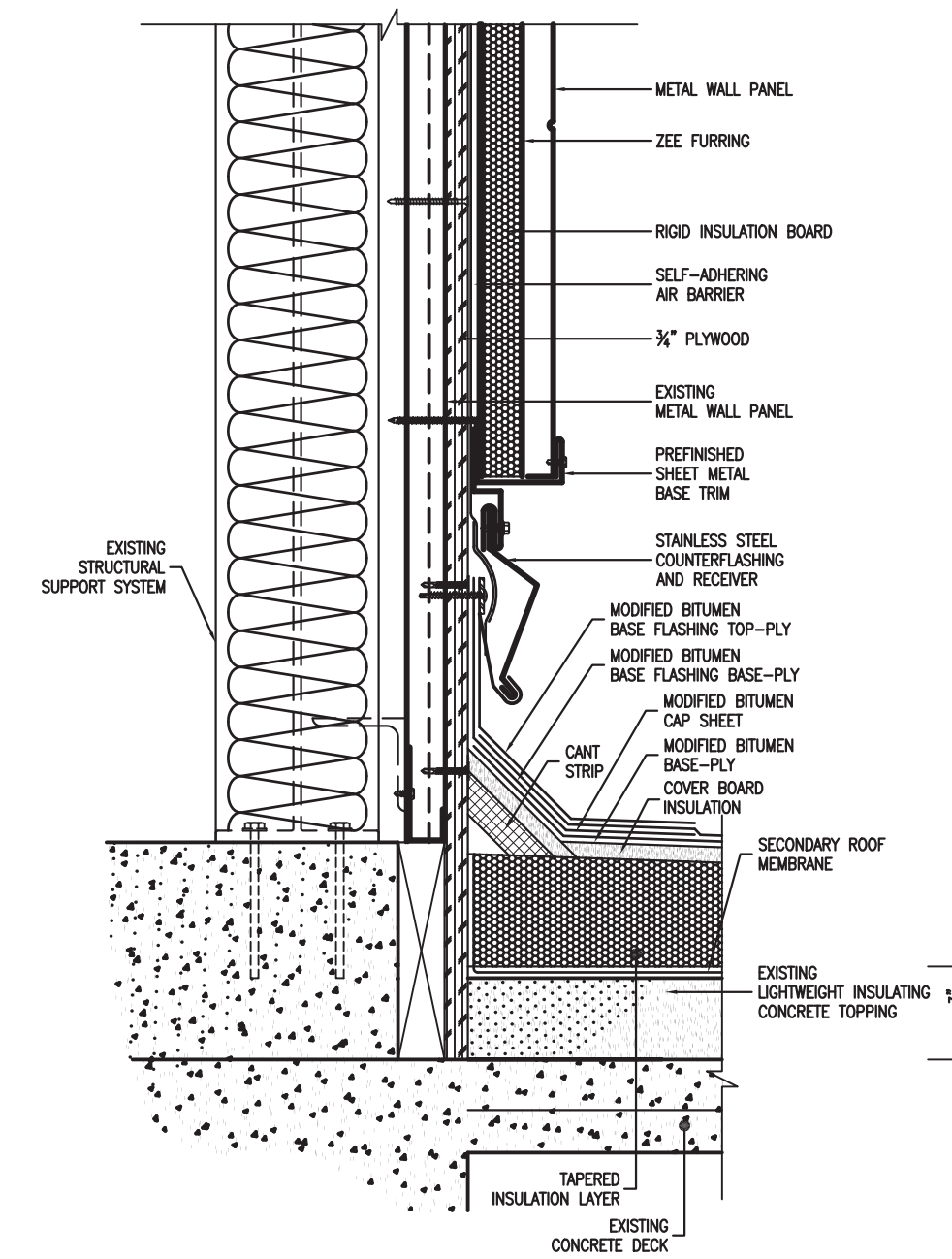
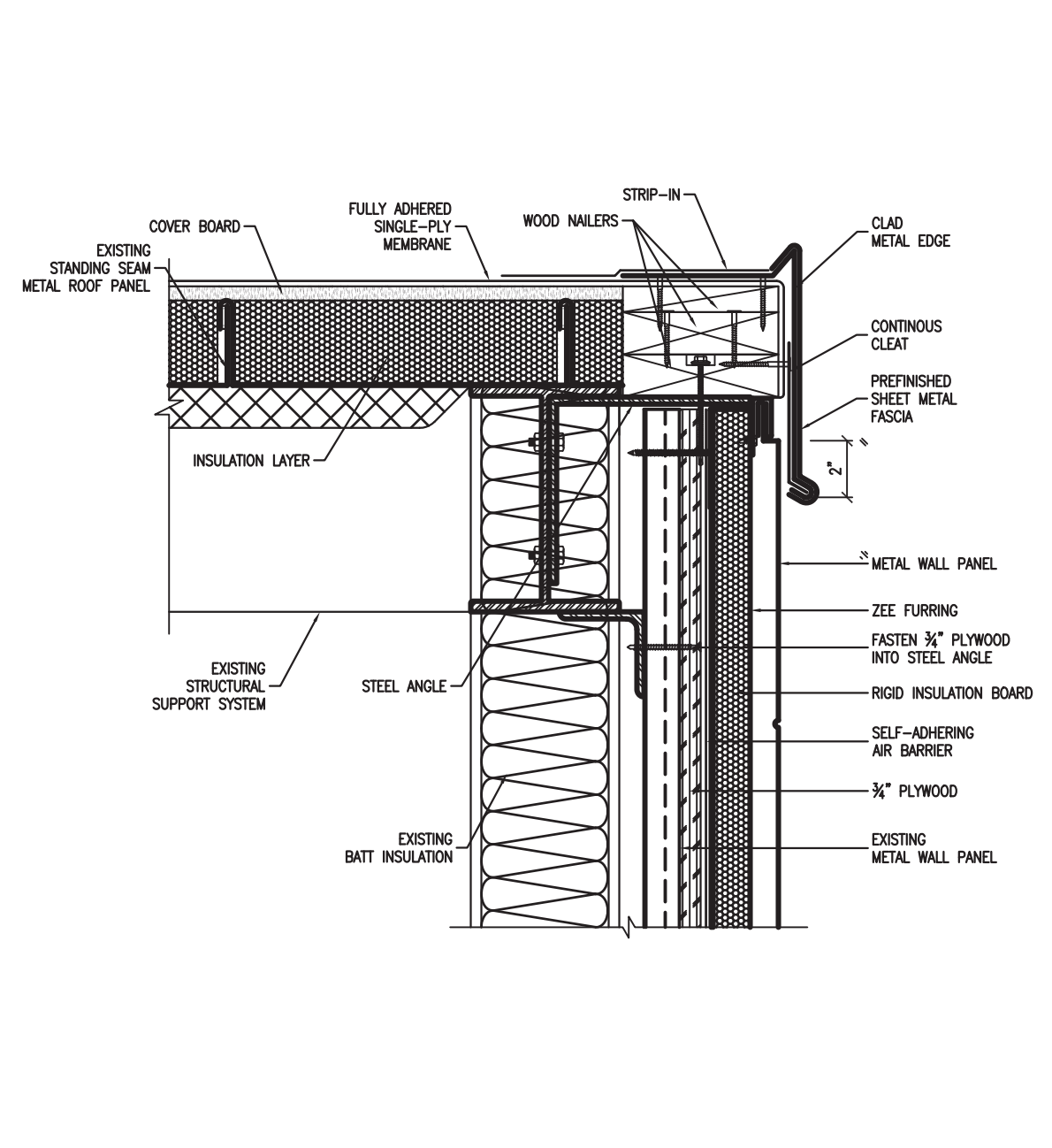
27 STAIR PARAPET AT RISEWALL
R5.02 SCALE: NOT TO SCALE



28 STAIRS AT RISE WALL
R5.02 SCALE: NOT TO SCALE



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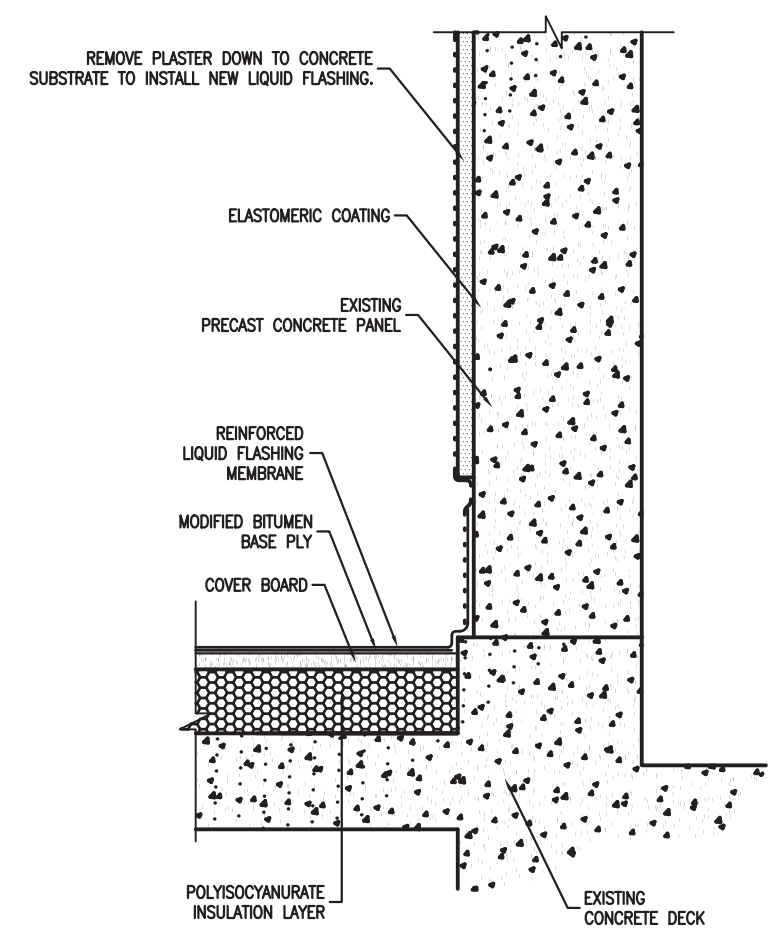
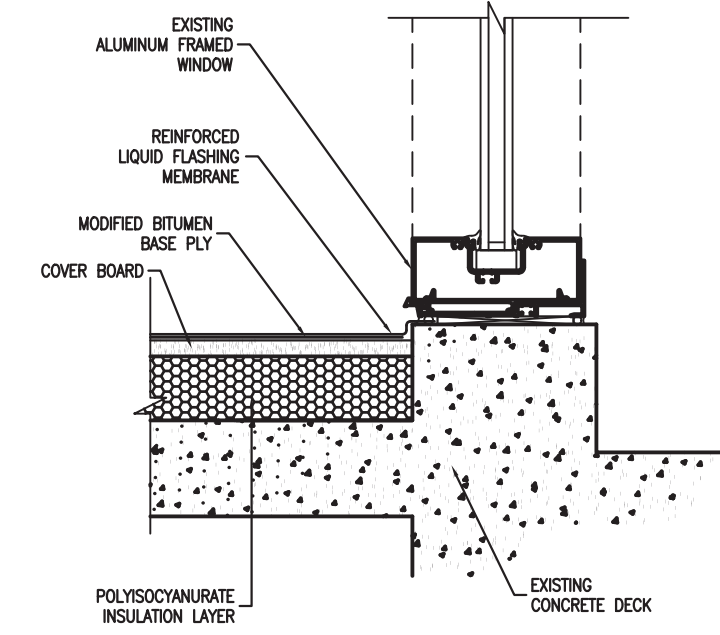
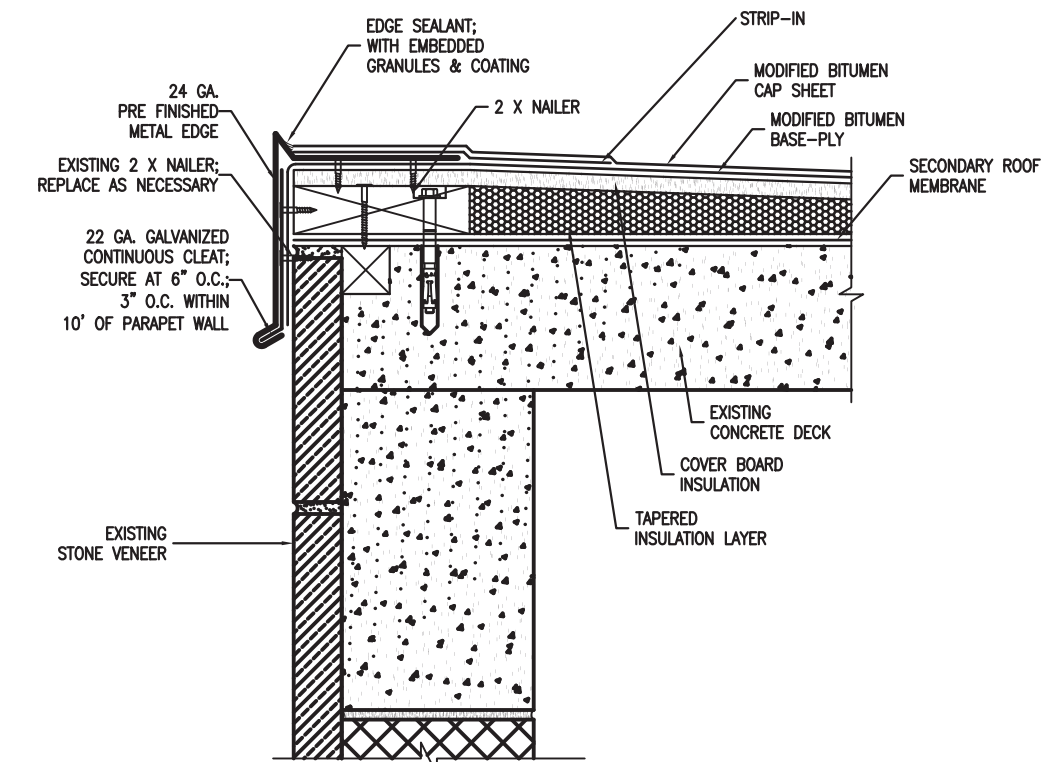
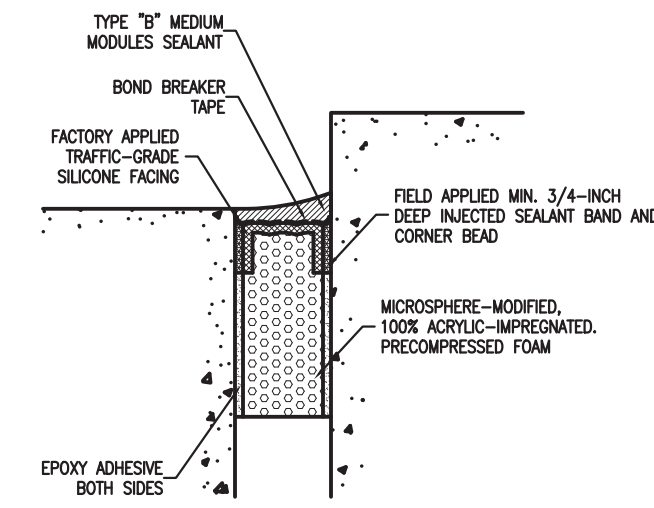
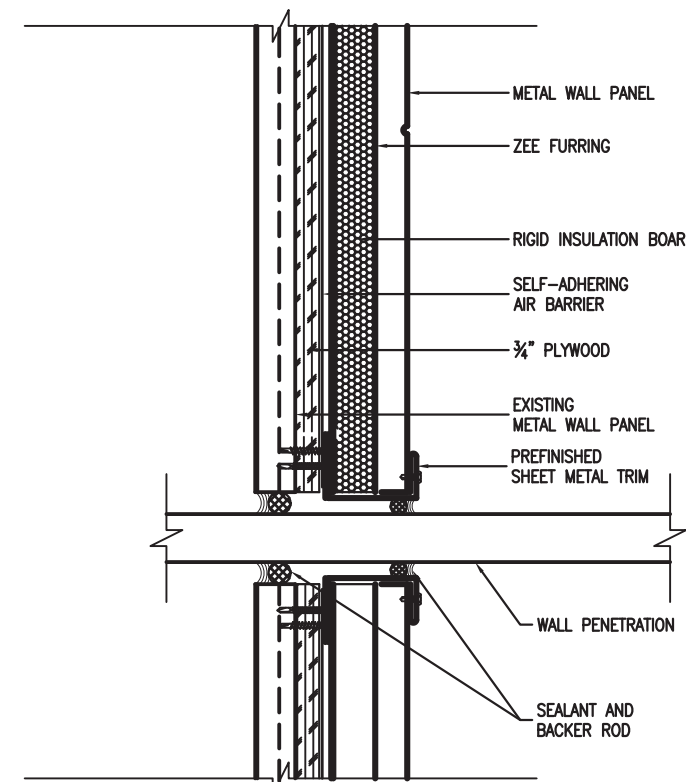
29 METAL RAKE EDGE AT PENTHOUSE
R5.03 SCALE: NOT TO SCALE

30 RISE WALL AT PENTHOUSE
R5.03 SCALE: NOT TO SCALE

31 METAL EDGE W/GUTTER AT PENTHOUSE
R5.03 SCALE: NOT TO SCALE

32 DOOR HEAD AT PENTHOUSE
R5.03 SCALE: NOT TO SCALE

33 THRESHOLD AT PENTHOUSES
R5.03 SCALE: NOT TO SCALE



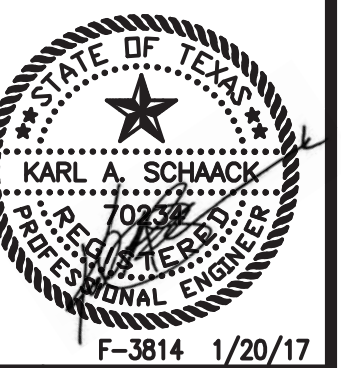
34 WALL PENETRATION AT PENTHOUSE
R5.03 SCALE: NOT TO SCALE

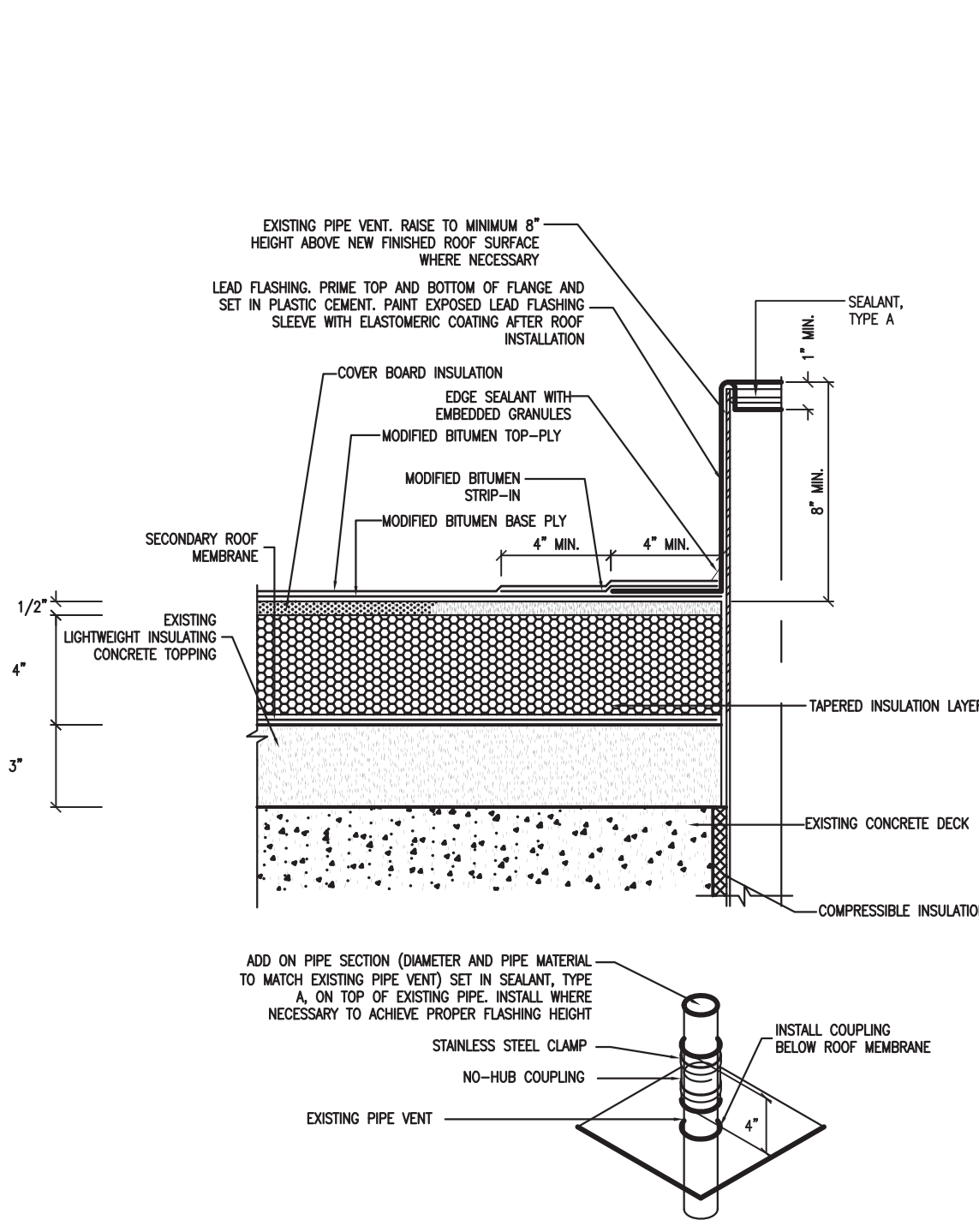
35 EXPANSION JOINT WITH SEALANT CAP
R5.03 SCALE: NOT TO SCALE

36 METAL EDGE
R5.03 SCALE: NOT TO SCALE

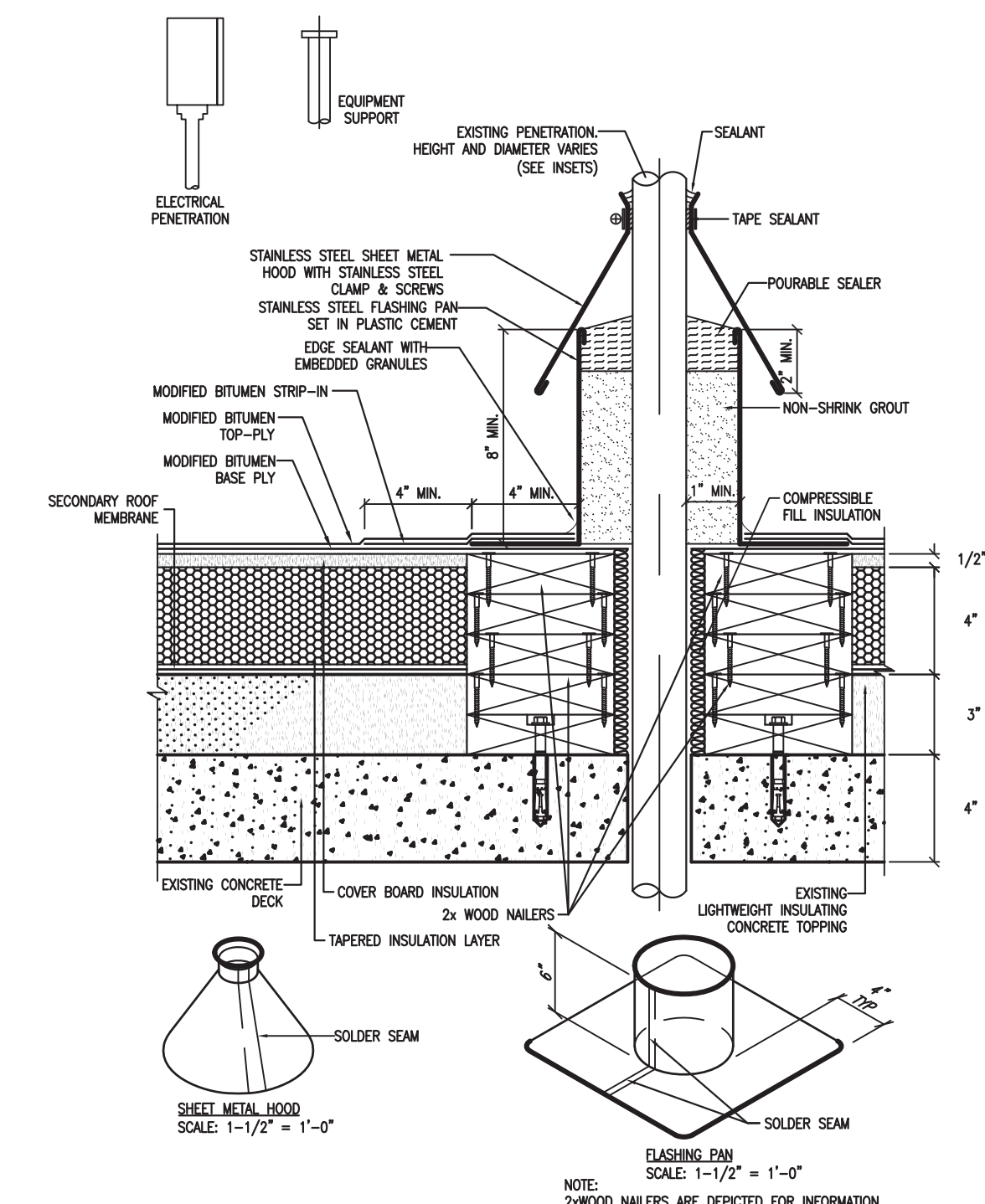
37 RISEWALL WITH WINDOW AT LOW ROOF
R5.03 SCALE: NOT TO SCALE

38 RISEWALL AT LOW ROOF
R5.03 SCALE: NOT TO SCALE

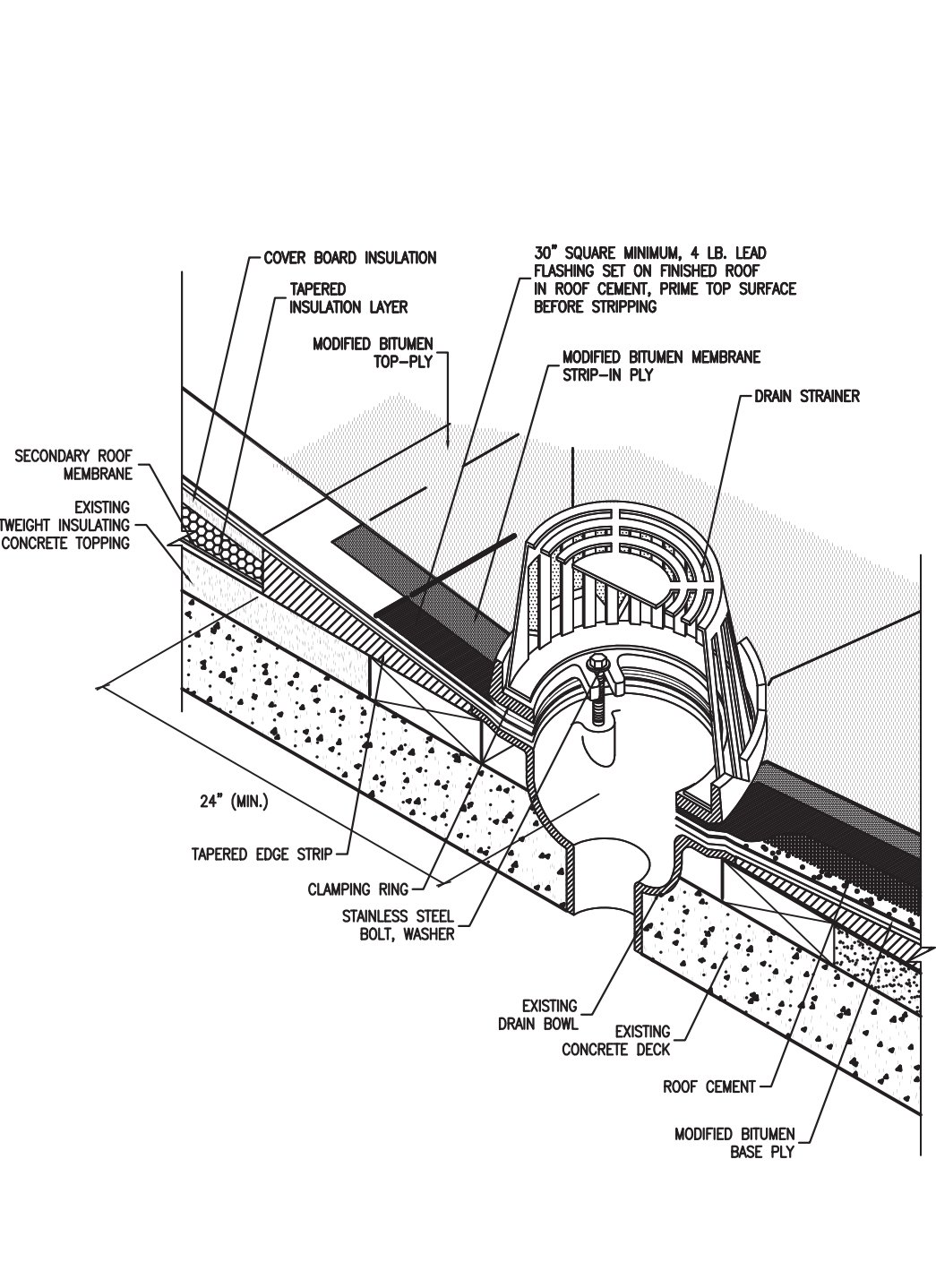




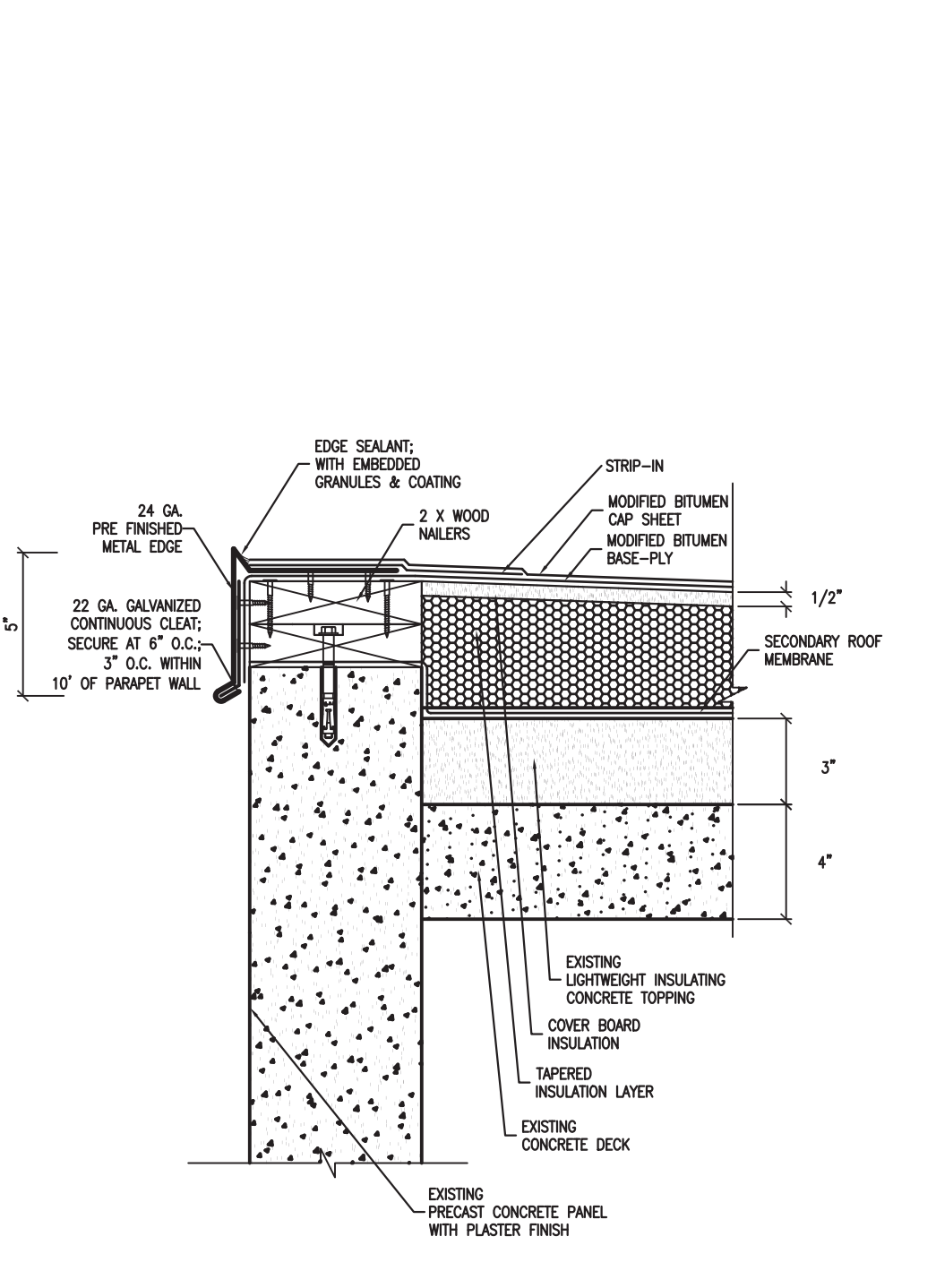
39 PLUMBING VENT
 R5.04 SCALE: NOT TO SCALE



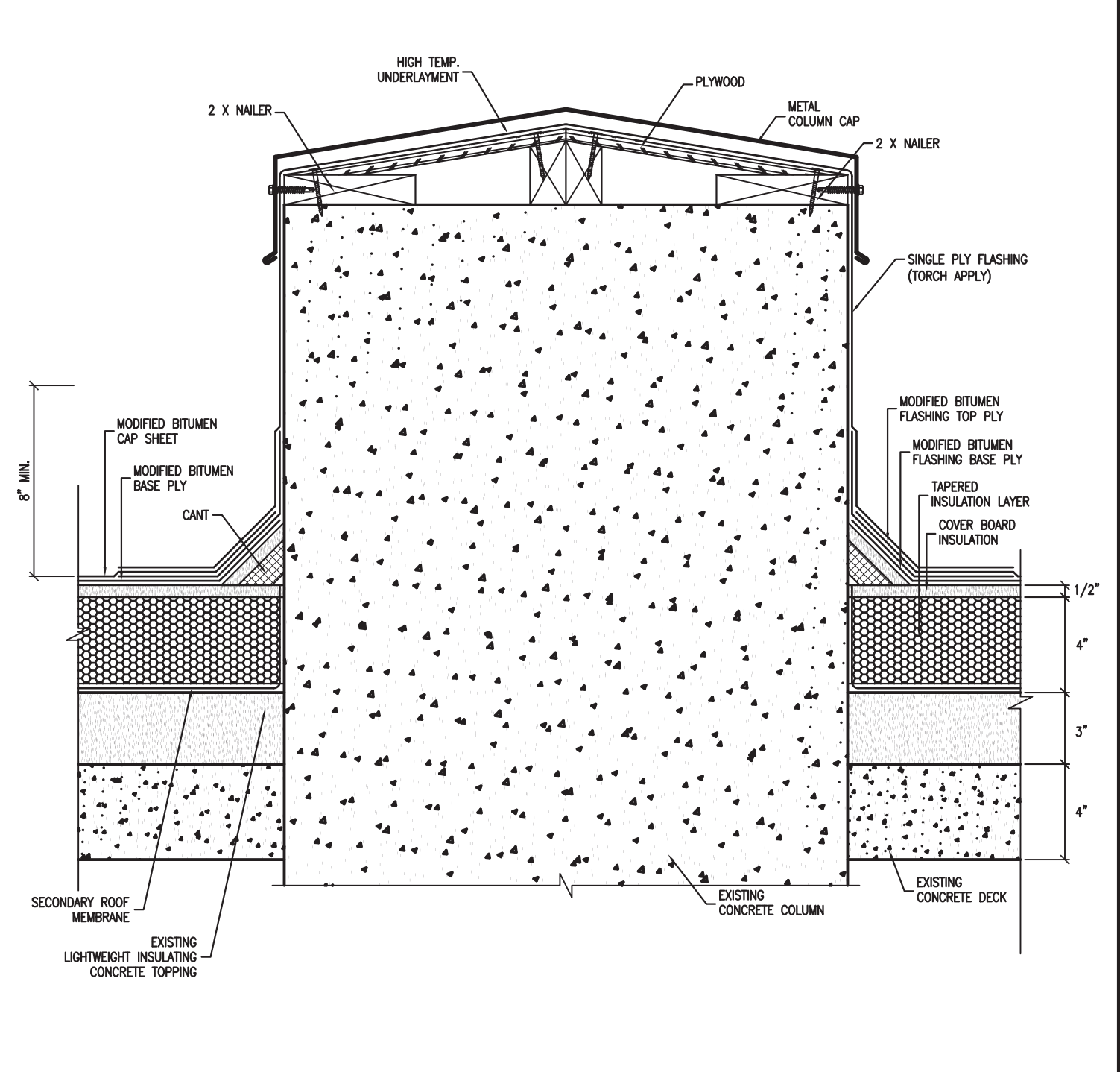
40 PENETRATION FLASHING
 R5.04 SCALE: NOT TO SCALE



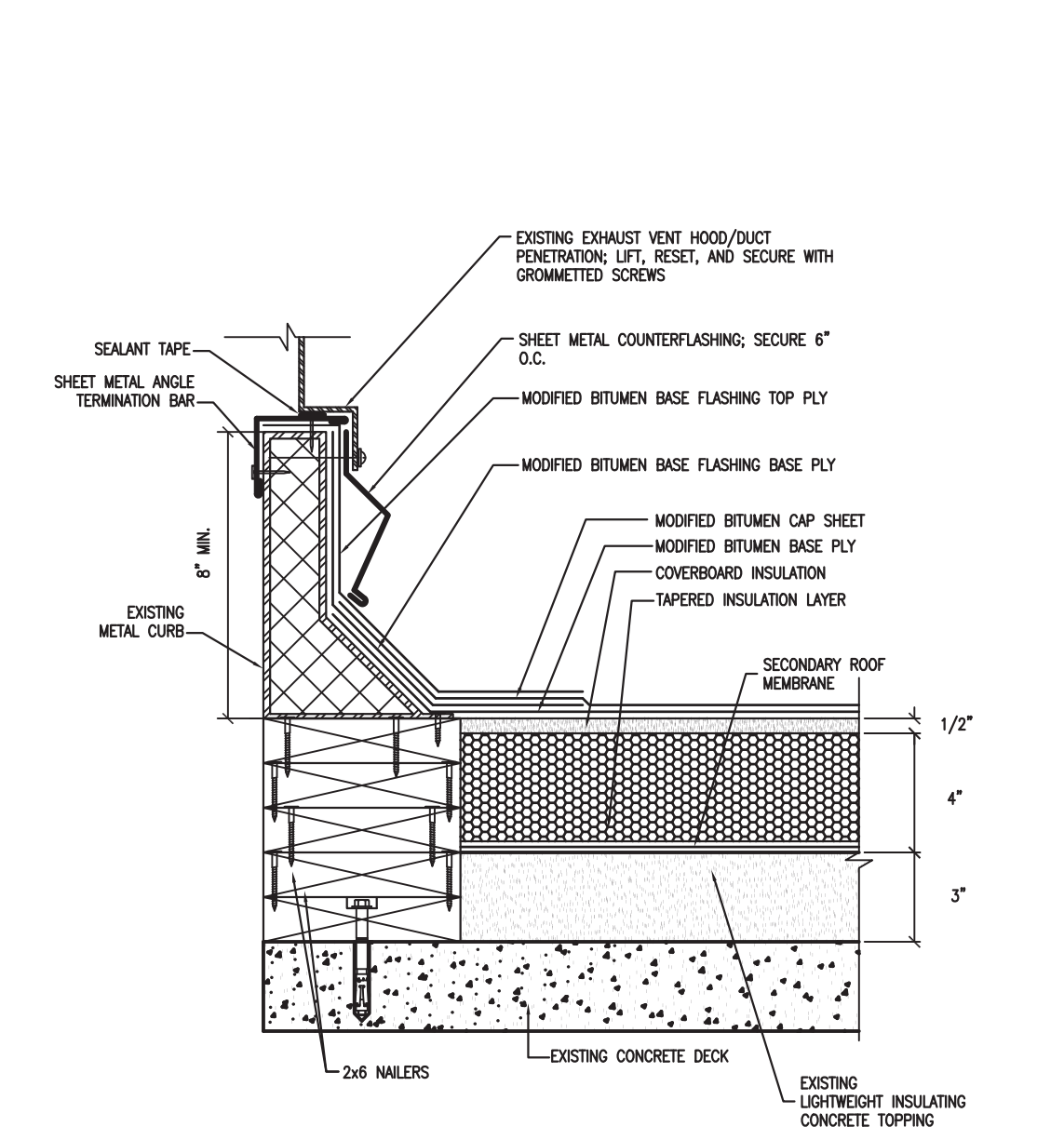
41 ROOF DRAIN
 R5.04 SCALE: NOT TO SCALE



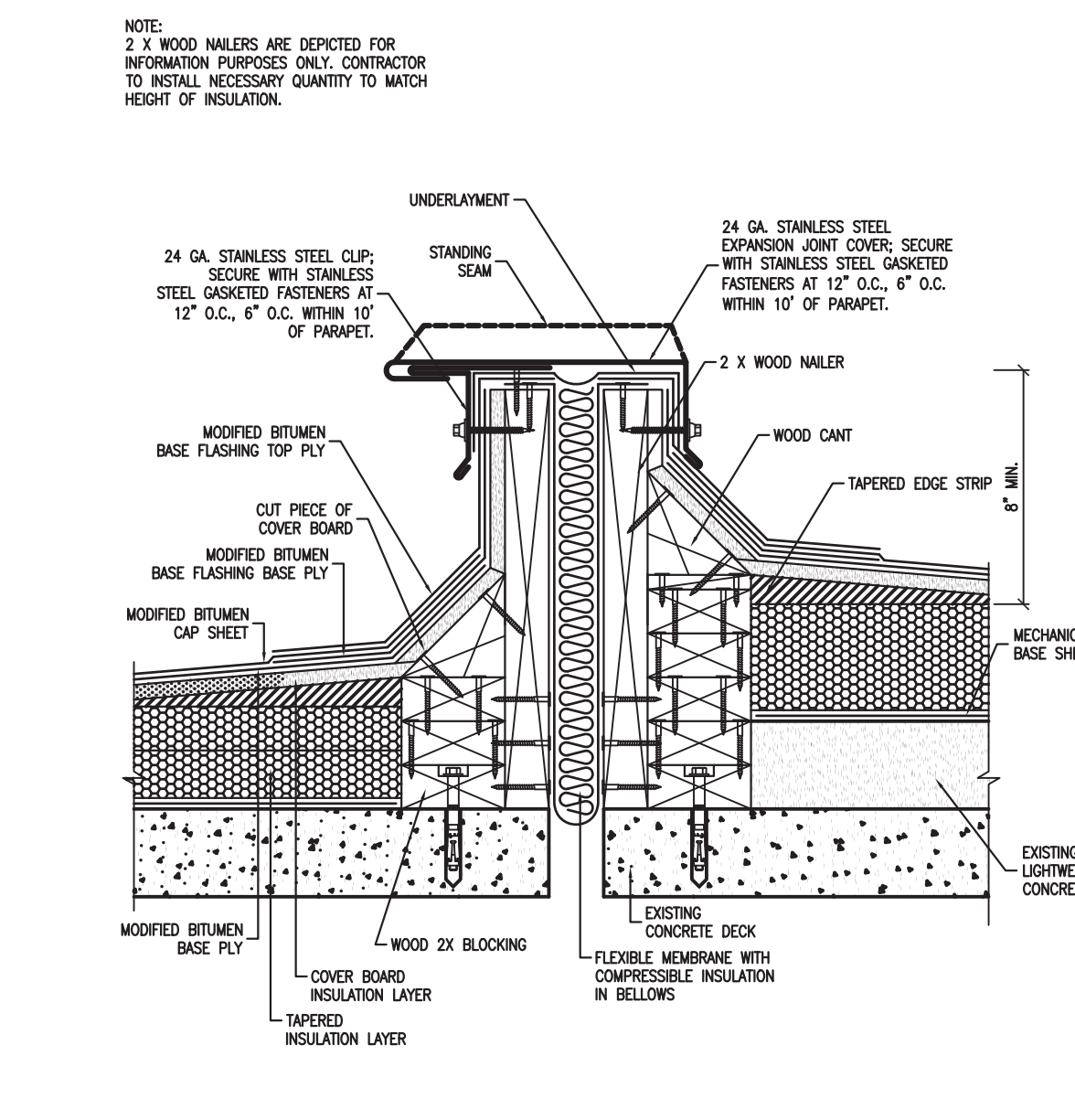
42 METAL EDGE
 R5.04 SCALE: NOT TO SCALE



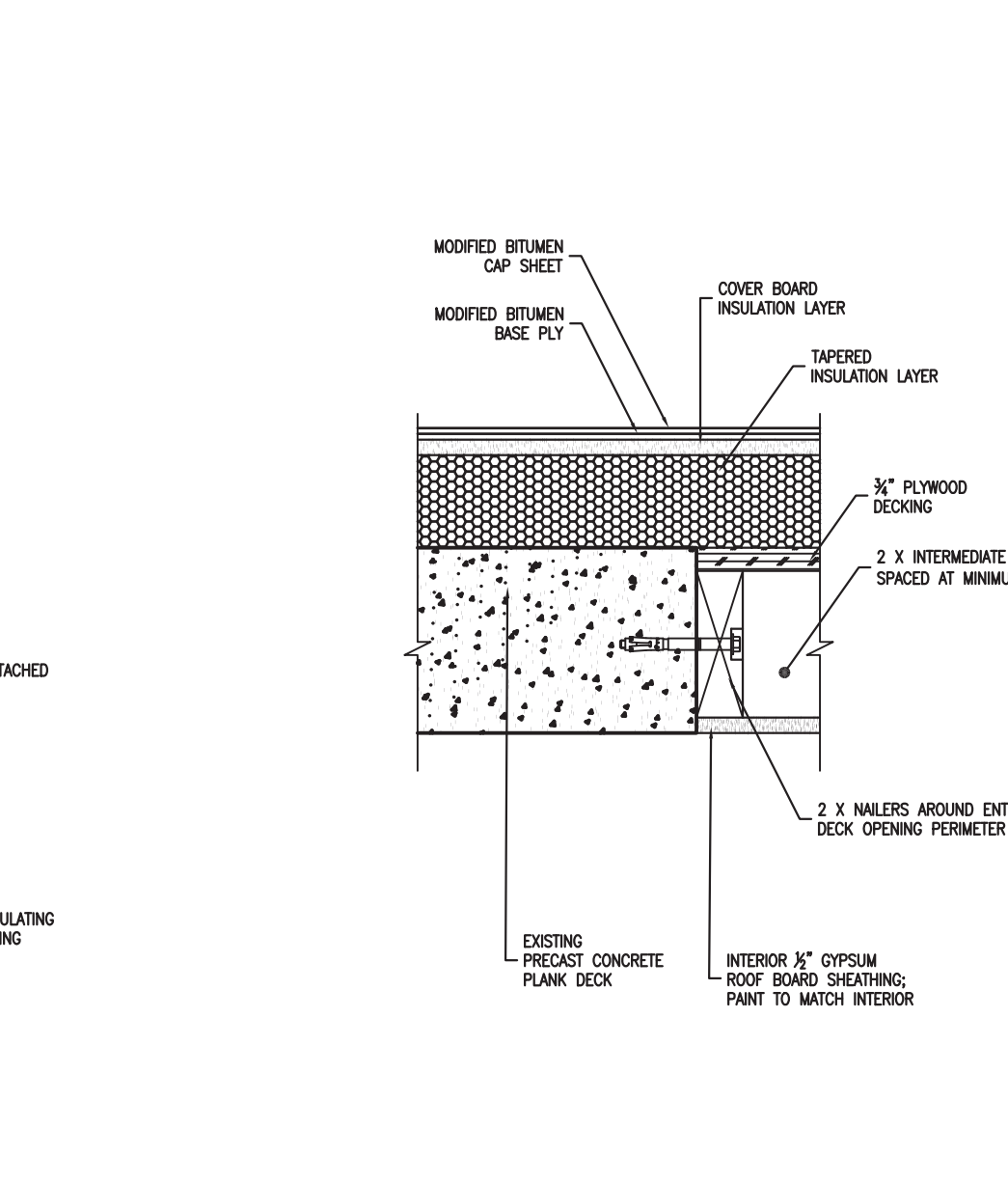
43 COLUMN CAP
 R5.04 SCALE: NOT TO SCALE



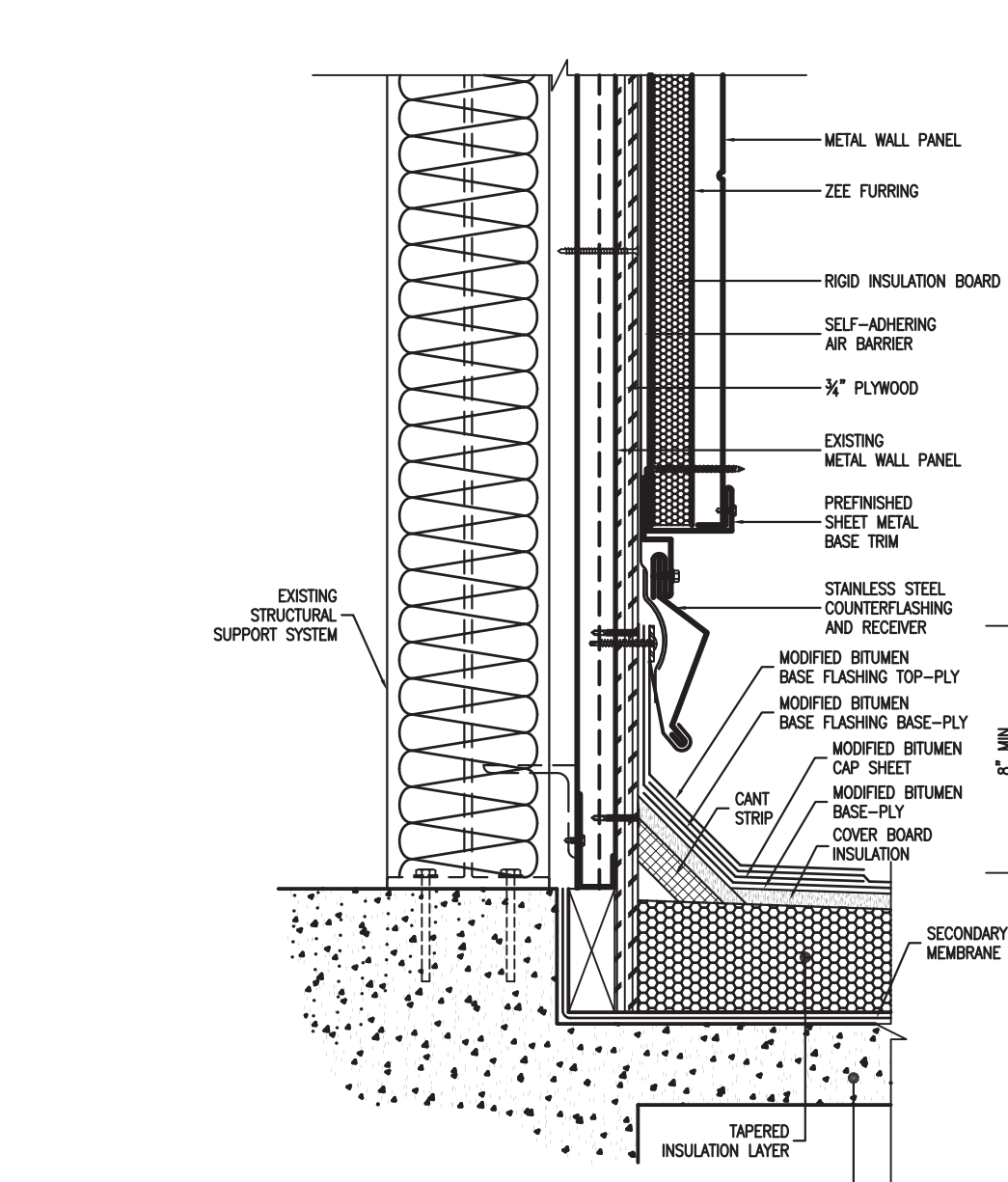
44 CURBED PENETRATION
 R5.04 SCALE: NOT TO SCALE



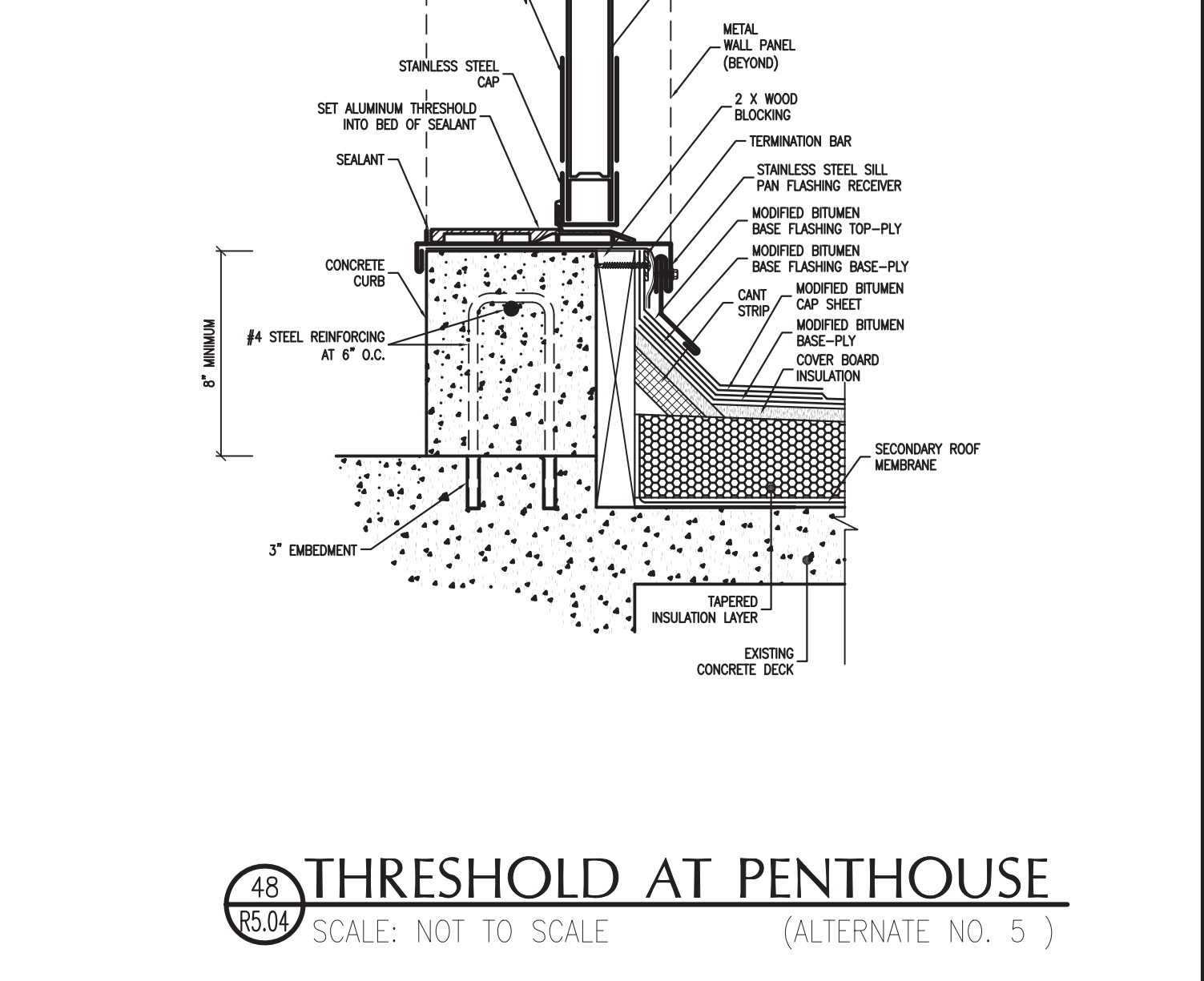
45 EXPANSION JOINT
 R5.04 SCALE: NOT TO SCALE



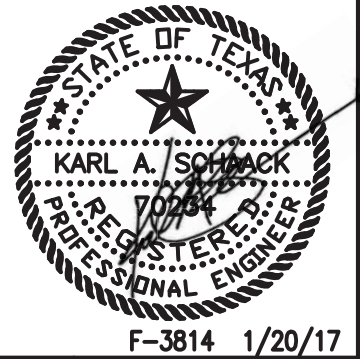
46 ROOF DECK INFILL
 R5.04 SCALE: NOT TO SCALE (ALTERNATE NO. 5)



47 RISEWALL AT PENTHOUSE
 R5.04 SCALE: NOT TO SCALE (ALTERNATE NO. 5)



48 THRESHOLD AT PENTHOUSE
 R5.04 SCALE: NOT TO SCALE (ALTERNATE NO. 5)



PRICE CONSULTING, INC.
 PRICE CONSULTING, INC.
 PRICE CONSULTING, INC.
 PRICE CONSULTING, INC.

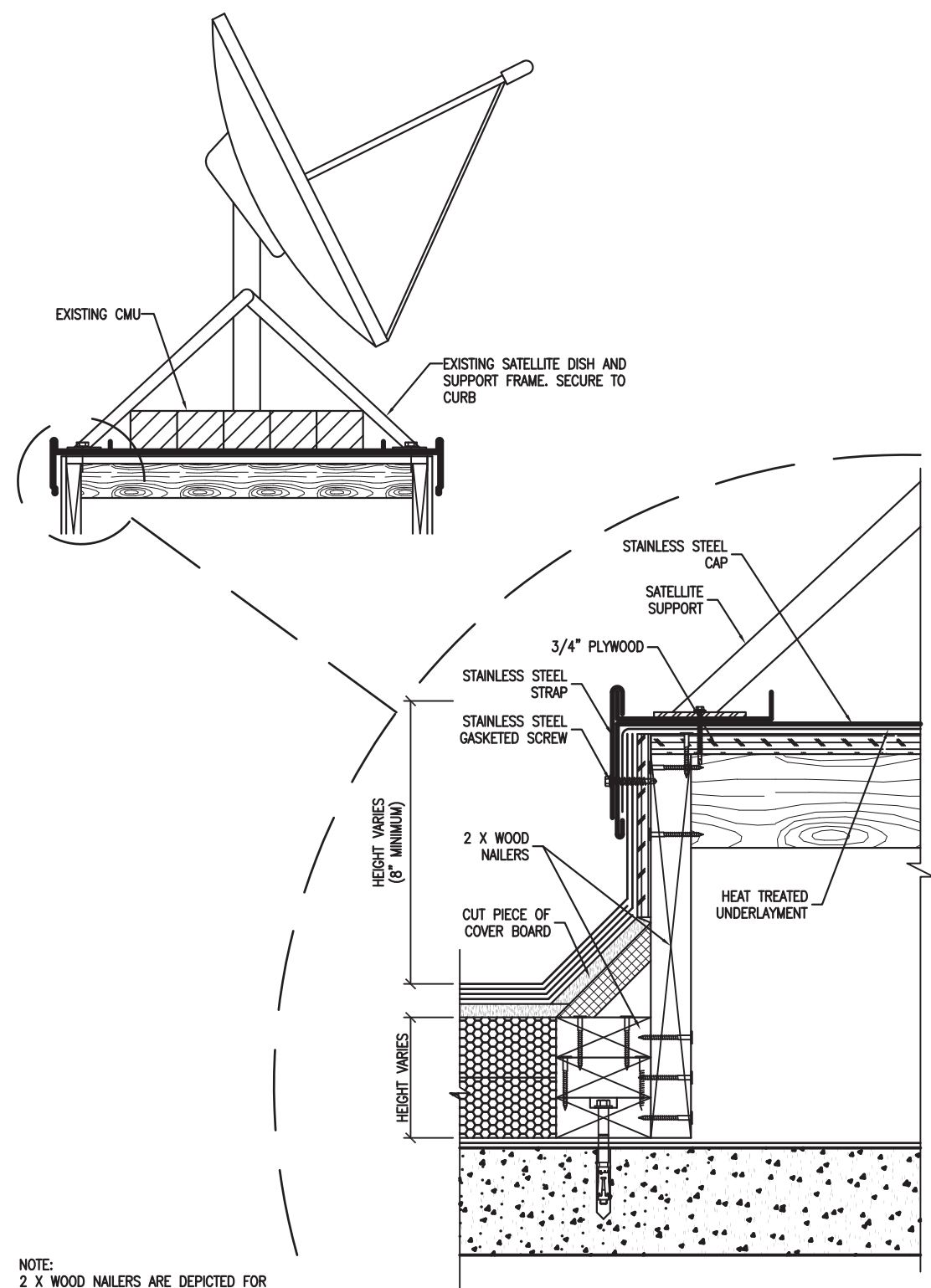
PROJECT:
 JESSE JONES LIBRARY
 1133 JOHNFREEMAN BLVD.
 HOUSTON, TEXAS

OWNER/CLIENT:
 UT HEALTH SCIENCE CENTER AT HOUSTON
 7000 FANNIN, UCT M125
 HOUSTON, TEXAS 77030

REVISIONS		
NO.	DATE	BY

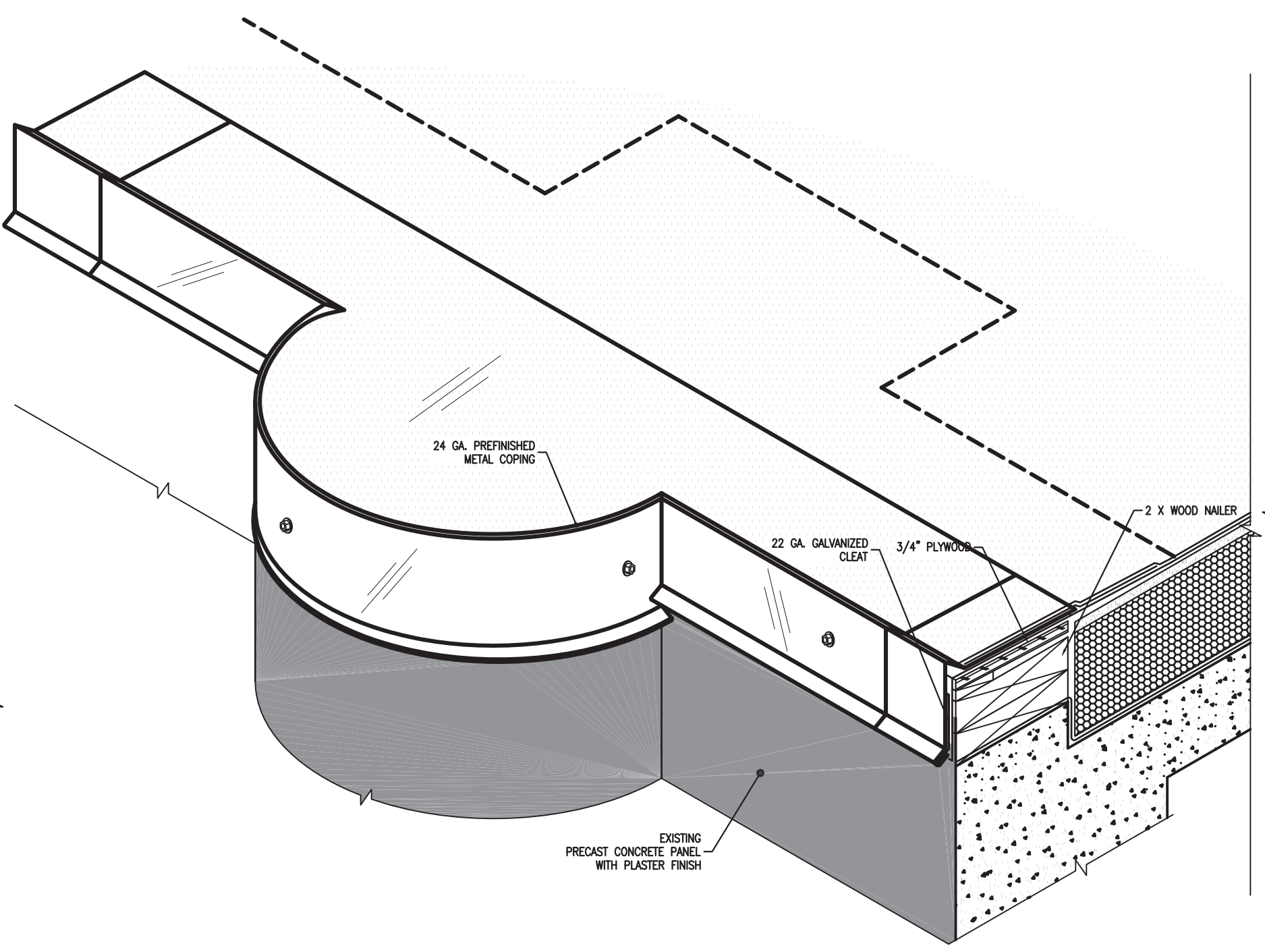
DETAILS
 PCI PROJECT NO.: 11212.15
 PCI FILE NAME: R5.00-R5.05
 SCALE: AS NOTED

DWN.BY: DATE:
 ESG 01/20/17
 SHEET:
 R5.04

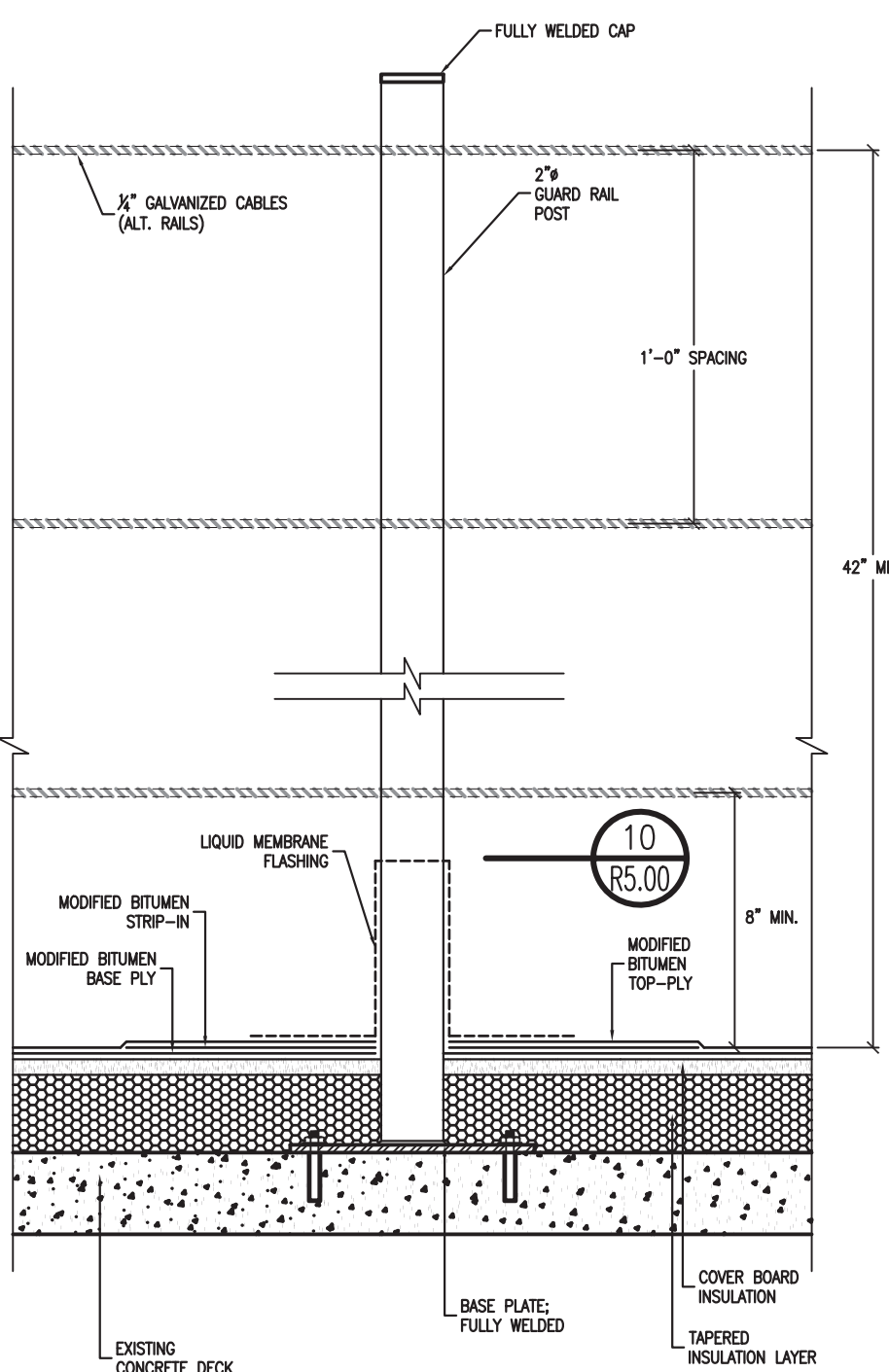


NOTE:
2 X WOOD NAILERS ARE DEPICTED FOR INFORMATION PURPOSES ONLY. CONTRACTOR TO INSTALL NECESSARY QUANTITY TO MATCH HEIGHT OF INSULATION.

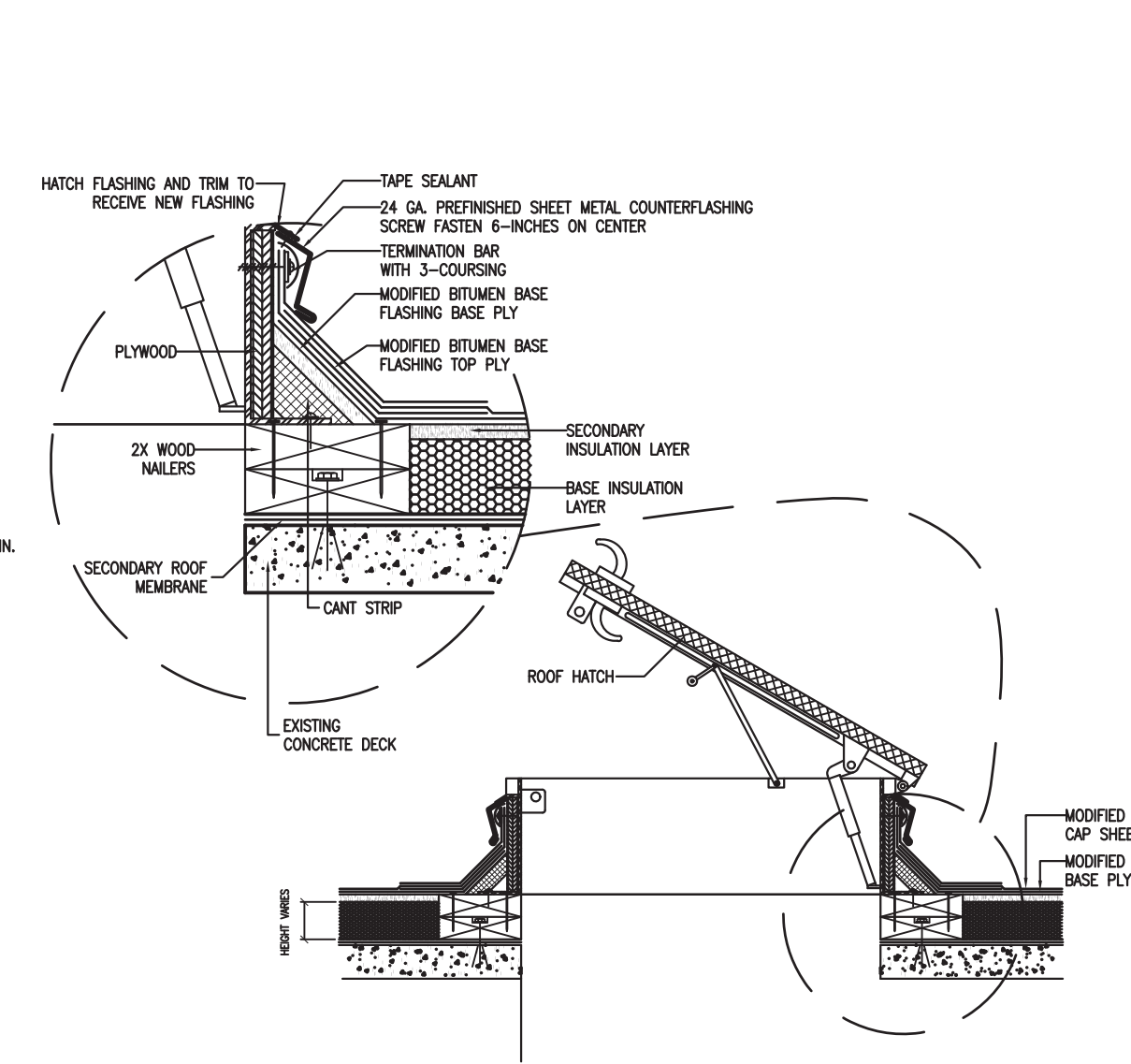
49 **SATELLITE DISH SUPPORT**
R5.05 SCALE: NOT TO SCALE



50 **METAL FLASHING AT COLUMNS**
R5.05 SCALE: NOT TO SCALE

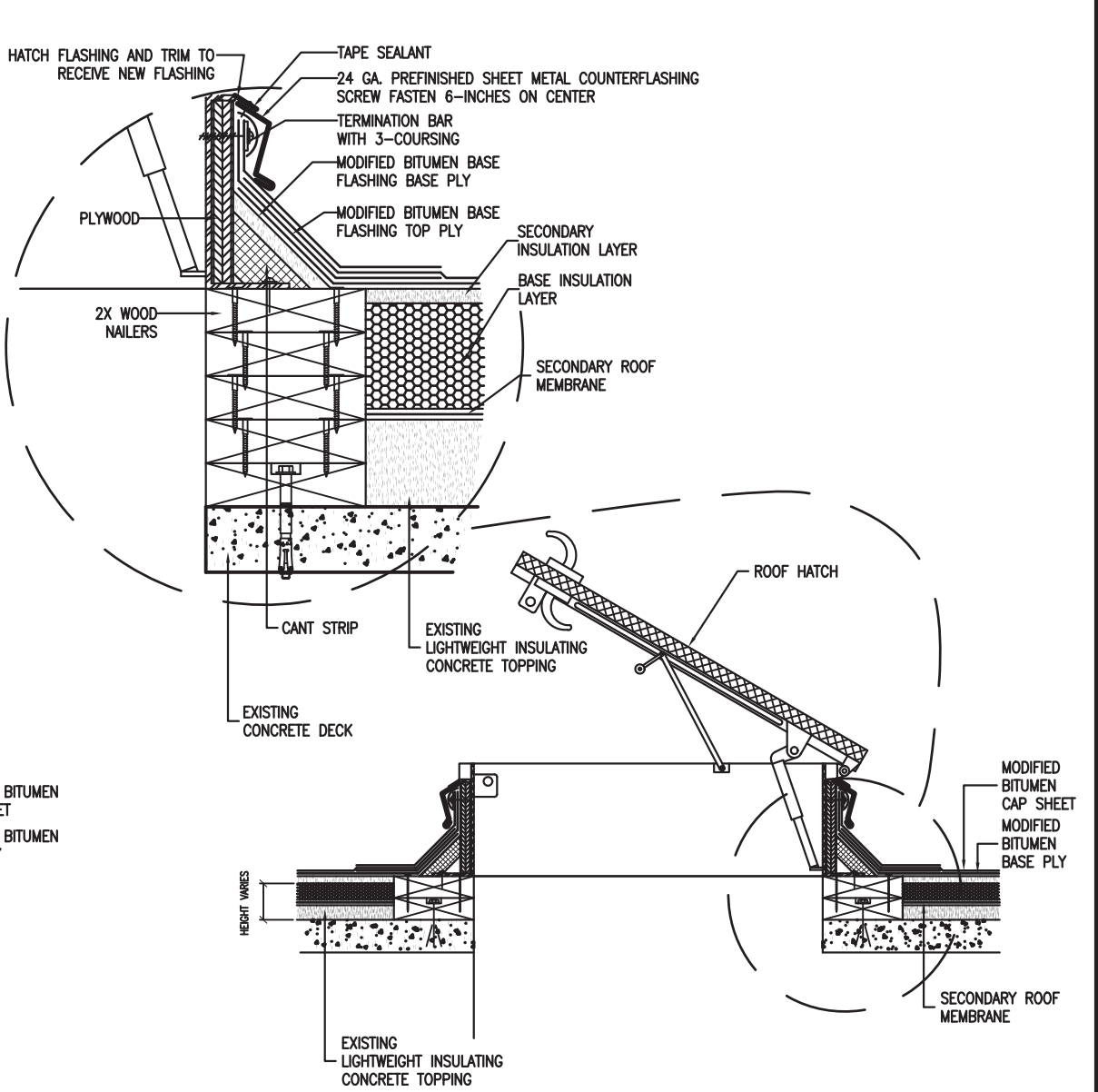


51 **GUARD RAIL**
R5.05 SCALE: NOT TO SCALE (ALTERNATE NO. 6)



NOTE:
2 X WOOD NAILERS ARE DEPICTED FOR INFORMATION PURPOSES ONLY. CONTRACTOR TO INSTALL NECESSARY QUANTITY TO MATCH HEIGHT OF INSULATION.

52 **ROOF HATCH**
R5.05 SCALE: NOT TO SCALE (ALTERNATE NO. 5)



NOTE:
2 X WOOD NAILERS ARE DEPICTED FOR INFORMATION PURPOSES ONLY. CONTRACTOR TO INSTALL NECESSARY QUANTITY TO MATCH HEIGHT OF INSULATION.

53 **ROOF HATCH**
R5.05 SCALE: NOT TO SCALE

