PROJECT MANUAL

ROOF REPLACEMENT

FOR

HARRIS COUNTY APPRAISAL DISTRICT
13013 NORTHWEST FREEWAY
HOUSTON, TEXAS

PREPARED BY
PRICE CONSULTING, INC.
211 HIGHLAND CROSS DRIVE, SUITE 220
HOUSTON, TEXAS 77073-1741

TEXAS REGISTERED ENGINEERING FIRM #F-3814

PCI PROJECT NO. 11416.17
MARCH 21, 2018
00 01 01 - 1

- PROFESSIONAL CONSULTANTS FOR BUILDING ENVELOPE TECHNOLOGY -
HARRIS COUNTY APPRAISAL DISTRICT
13013 NORTHWEST FREEWAY
HOUSTON, TEXAS

DOCUMENT 00 01 02

PROJECT DIRECTORY

PROJECT: Harris County Appraisal District – Roof Replacement
13013 Northwest Freeway
Houston, Texas

OWNER: Harris County Appraisal District
13013 Northwest Freeway
Houston, Texas 77040

Contacts:
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Ms. Theresa Paul
Chief Financial Officer
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Ms. Tammy A. Argento
Purchasing & Facilities Manager
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ENGINEER/CONSULTANT: Price Consulting, Inc.
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Suite 220
Houston, Texas 77073
Contact: Mr. Karl Schaack, P.E., RRC President
Phone: 281-209-1PCI (1724)
Fax: 281-209-2PCI (2724)
Email: kschaack@priceconsulting.com

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INVITATION FOR BIDS

SEALED BIDS:
A. Harris County Appraisal District, hereafter known as Owner, is requesting Bids for roof replacement of the Harris County Appraisal District building located at 13013 Northwest Freeway in Houston, Texas.
B. Bids shall be placed in a sealed envelope and clearly marked on the outside with the following information:

Roof Replacement
Harris County Appraisal District Building
RFP 2018-03

C. Sealed Bids, mailed, emailed, or submitted directly, must be received in the purchasing office on 2nd floor of the Harris County Appraisal District before 10:00 a.m., on April 19, 2018. The sealed package or file should be addressed or transmitted to Ms. Tammy Argento, Purchasing Manager, Email: TArgento@hcad.org, 13013 Northwest Freeway, Houston, Texas 77040. Bids will be opened and read aloud at 2:00 p.m., in the 7th floor board room on same date.

PRE-BID CONFERENCE:
A. A tour of the subject area, building interior, and building exterior will be conducted on April 5, 2018, at 10:00 a.m., at the site at 13013 Northwest Freeway in Houston, Texas. This will be the only time that Bidders will be allowed access to the subject area during bidding. Bidders are required to attend the Pre-bid Conference as a condition of submitting a Bid.
B. Questions concerning the specifications, specified work, and/or Pre-bid Meeting should be directed to Mr. Karl Schaack, P.E., RRC, Price Consulting, Inc., 211 Highland Cross Drive, Suite 220, Houston, Texas 77073, 281/209-1PCI (1724); FAX: 281/209-2PCI (2724).

SCOPE:
A. Remove and properly dispose of existing built-up roofing, perlite insulation board, and sheet metal down to the existing concrete deck.
B. Remove and re-install lightning protection system.
C. Install tapered polyisocyanurate and secondary insulation set in foam adhesive followed by a two-ply modified bitumen roof membrane with white-colored surfacing.
D. Install new two-ply modified bitumen membrane flashings at parapet walls, risewalls, and curbs.
E. Install new sheet metal coping at parapet walls.
F. Install new sheet metal counter flashings at curbs, penetrations, and risewalls.
G. Install new expansion joint material at designated locations.
H. Install new pan flashing with pourable sealant and sheet metal bonnets at conduit, pipe, support, etc. roof penetrations.
HARRIS COUNTY APPRAISAL DISTRICT
13013 NORTHWEST FREEWAY
HOUSTON, TEXAS

I. Remove and replace existing safety tie-backs.
J. Raise, lower, or modify all utility lines, piping, equipment, or other items which affect the installation of the new roof system.
K. Raise curbs, equipment, etc., as necessary to achieve a minimum flashing height of 8-inches (200mm) above the finished roof.
L. Remove abandoned curbs and penetrations and repair opening in deck.
M. Install walk pads at designated areas.
N. Provide specified manufacturer and contractor warranties.

END OF DOCUMENT 00 11 16
DOCUMENT 00 21 13

INSTRUCTIONS TO BIDDERS

PART ONE - GENERAL

1.01 DEFINITIONS:
A. Bidding Documents include the Invitation for Bid, Instructions to Bidders, the Bid Form, other sample bidding and contract forms, and the proposed Contract Documents, including any Addenda issued prior to receipt of Bids. The Contract Documents proposed for the Work consist of the Contract for Construction (Agreement Between Owner and Contractor, General Conditions of the Contract, and Supplementary Conditions of the Contract), the Drawings, the Specifications, and Addenda issued prior to and modifications issued after execution of the Contract.
B. Definitions set forth in the General Conditions of the Contract for Construction, or in other Contract Documents, are applicable to the Bidding Documents.
C. Addenda are written or graphic instruments issued by the Consultant prior to the execution of the Contract which modify or interpret the Bidding Documents by addition, deletion, clarification, or correction.
D. A Bid is a complete and properly signed proposal to do the Work or designated portion thereof for the sums stipulated therein, submitted in accordance with the Bidding Documents.
E. The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the Base Bid, to which work may be added or from which work may be deleted for sums stated in Alternate Bids.
F. An Alternate Bid (or Alternate) is an amount stated in the Bid to be added or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.
G. A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials or services as described in the Bidding Documents or in the proposed Contract Documents.
H. A Bidder is a person or entity who submits a Bid.
I. A Sub-bidder is a person or entity who submits a Bid to a Bidder for materials or labor for a portion of the Work.

1.02 BIDDING PROCEDURES:
A. Prepare Bids in accordance with these Instructions to Bidders.
B. Each Bidder shall submit his Bid on the exact copy of the attached Bid Form. Blank spaces on the Form shall be filled out fully. Numbers shall be stated both in writing and in figures; signatures shall be in long hand; the completed Form shall be without interlineation, alteration, or erasures. If the Bidder is a Corporation, the Corporate Seal shall be affixed or impressed.
C. The Bid Form shall include the following Bid items:
   1. A single contract price for the Work as detailed and described in the Bidding
      Documents as the Base Bid.
   2. Acknowledgment and number of Addenda (Supplements).
   3. Number of calendar days to complete project or date required by Owner.
   4. Additional price for Performance and Payment Bonds.
   5. List of proposed subcontractors.
   6. Unit Prices.

D. A Bid is invalid if it has not been deposited at the designated location prior to the
   time and date for receipt of Bids indicated in the Advertisement to Bid or prior to any
   extension thereof issued to the Bidders.

E. Bids shall not contain any recapitulation of the Work to be done. No oral or
   telephone proposals or modifications will be considered.

F. The Bidder shall make no additional stipulations on the Bid Form nor limit or qualify
   his Bid in any other manner. Bids so qualified will be subject to disqualification.

G. Written instruction only will be binding and the Owner will not be responsible for any
   oral or telephone transmitted information.

H. Addenda issued during the time for bidding shall be covered in the proposal, and in
   closing the Contract they shall become a part of it.

I. Contractor shall field verify necessary dimensions and conditions to prepare and
   submit responsive Bid in compliance with the Contract requirements. Any
   discrepancies found between the Drawings and Specifications and site conditions or
   any errors or omissions in the Drawings or Specifications shall be immediately
   reported to the Owner's Representative, who shall promptly correct such error or
   omission in writing. Any work by the Contractor after discovery of such
   discrepancies, errors, or omissions shall be performed at the Contractor's risk.

J. The names of subcontractors and material suppliers proposed to be employed shall
   be submitted for approval by the Owner before they are employed, and such
   subcontractors and material suppliers must be concerns known to perform work of a
   high standard in their respective trades. If the Owner has reasonable objection to
   any such proposed person or entity and notifies the Bidder in writing of such
   objection, the Bidder shall provide an acceptable substitute person or entity.

1.03 QUALIFICATION OF BIDDERS:
   A. A Bidder shall submit to the Owner a properly executed Contractor's Qualification
      Statement included herein.
   B. Bidders may be disqualified and their Bids not considered for any of the following
      specific reasons:
      1. Reason for believing collusion exists among Bidders.
      2. The Bidder being interested in any litigation against the Owner.
      3. The Bidder being in arrears on any existing contract or having defaulted on a
         previous contract.
4. Lack of competency as revealed by the financial statement, experience, equipment, questionnaires, or qualification statement.
5. Uncompleted work which, in the judgment of the Owner, will prevent or hinder the prompt completion of additional work, if awarded.
6. Bidders having delinquent property taxes in Harris County will not be considered for award.

1.04 BIDDER'S REPRESENTATION:
A. Each Bidder has read and understands the Bidding Documents and that the Bid is made in accordance therewith.
B. Each Bidder has visited the site, familiarized with local and site conditions under which the Work is to be performed, correlated observations, and made provisions for such requirements in submission of Bid with the requirements of the proposed Contract Documents.
C. Each Bid is based upon the materials, systems, and equipment required by the Bidding Documents without exception.
D. During Bidding, written requests for substitutions will be considered, providing such requests are received by the Consultant at least seven days prior to date for receipt of Bids. Requests for substitutions shall be in accordance with requirements of the Substitution Request Form.
1. Where reference is made in the Specifications to manufacturers' specifications or standards of any technical society, governmental agency, or similar association, it is understood and agreed that such specifications or standards are a part of the Specifications as though fully repeated therein.
2. In interpreting any specification or standard referred to, terms such as "Purchaser", "Owner", and the like shall be understood to mean the person or the organization designated as the Owner in the Contract, acting by and through its duly constituted legislative body. Terms such as "Supplier" and the like shall mean the Contractor.
3. It is understood and agreed that the use or application of any specification or standard referred to shall not necessarily be restricted to that which may be named in the specification or standard, but shall be used or applied as set forth in these Specifications.
4. The Contractor shall secure copies of standards and specifications referred to herein. It is assumed that a contractor bidding this Work shall be qualified and experienced in the type of work involved and will have access to the specifications or standards referred to.

1.05 EXAMINATION OF EXISTING CONDITIONS:
A. Bidders shall visit existing building and thoroughly familiarize themselves with existing conditions.
B. Bidders shall examine existing building and daily operations and ascertain, by any reasonable means, conditions that affect the performance of the Work and make such provisions in Bid.
C. The proposed Contract Documents have been prepared on the basis of available information of the building and are intended to present an essentially accurate indication of existing conditions. This, however, shall not relieve the Bidder of the responsibility of being fully informed of the existing conditions.
D. Bidders shall verify quantities, types, condition, sizes, and locations of existing material being replaced by new material.
E. Bidders shall use existing building to determine quantities of materials required and to determine scope of work.

1.06 BID BOND:
A. A "Bid Bond" in the amount of 5% Gross Bid Amount is required for this project. Bidder shall forfeit its Bid Bond to Owner, if the bidder is selected as the successful bidder and fails to execute the contract and provide the required Performance and Payment Bonds and other required documents.

1.07 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND:
A. With the execution and delivery of the Contract, the successful Bidder will be required to furnish and file with the Owner, in the amounts herein required, the surety bonds listed below covering the faithful performance of the Contract and the payment of obligations arising thereunder. Only bonding companies approved and listed in the United States Treasury Department will be approved. The Bidder shall state on the Bid Form the cost for such bonds.
   1. Performance Bond (AIA Document A311): A good and sufficient construction or performance bond in an amount equal to 100 percent (100%) of total amount of the Contract, guaranteeing the full and faithful execution of the Work and performance of the Contract in accordance with the Contract Documents. This bond shall guarantee the repair and maintenance of defects due to faulty materials or workmanship that appear within a period of two years from date of completion and acceptance by the Owner.
   2. Payment Bond (AIA Document A311): A good and sufficient bond in an amount equal to 100 percent (100%) of the total amount of the Contract, guaranteeing the full and proper protection of claimants supplying labor and materials in the prosecution of the work provided for in said Contract and for the use of each such claimant.
B. Owner will not accept sureties from Bidders who are now in default or delinquent on any bonds or who are interested in any litigation against the Owner. Bonds shall be executed by not less than one corporate surety authorized to do business in the State of Texas and listed on the United States Treasury Department list of companies holding Certificates of Authority as acceptable sureties on Federal Bonds. Each bond shall be executed by the Bidder and the Owner. Should any surety on the Contract be determined unsatisfactory at any time by the Owner, notice will be given to the Contractor to that effect, and the Contractor shall immediately provide a new surety satisfactory to the Owner. The Contract shall not be operative nor will any payments be due or paid until approval of the bond has been made by the Owner.
C. The Bidder shall require the Attorney-in-Fact, who executes the required bonds on behalf of the Surety, to affix thereto a certified and current copy of his Power of Attorney, indicating the monetary limit of such power.

1.08 DISCREPANCIES AND AMBIGUITIES:
A. A Bidder finding discrepancies or omissions from the Bidding Documents or who is in doubt as to their exact meaning, shall at once notify the Consultant who will send written instructions to Bidders.

1.09 AWARD OF CONTRACT:
A. After Bids are opened, the Bids will be tabulated for comparison on the basis of the Bid prices and quantities shown in the proposal. The Owner reserves the right to withhold the award of the Contract for a period of ninety days from date of opening Bids and no award will be made until after investigations are made as to the responsibilities of the Bidders. Until final award of the Contract, the Owner reserves the right to reject any or all Bids or to proceed to do the Work otherwise in the best interest of the Owner. The Owner does not obligate himself to accept the lowest or any other Bid. The proposed successful bid will be presented to the board of directors at the May 16, 2018 meeting for approval. The meeting will be held in the board room on the 7th floor of the HCAD building at 9:30 a.m.
B. Owner shall have the right to accept Alternates in any order or combination and to determine the Bidder on the basis of the sum of the Base Bid and the Alternates accepted, which produce a total amount acceptable to the Owner.
C. The successful Bidder, upon notification of acceptance of Bid, shall provide to the Owner the required insurance policies within ten working days to prevent delays in awarding the Contract.

1.10 EXECUTION OF CONTRACT:
A. The person or persons, partnership, company, firm, association, or corporation to whom a Contract is awarded shall sign the necessary agreements entering into the required Contract with the Owner. No Contract shall be binding on the Owner until it has been executed by the Owner or duly authorized representative and delivered to the Contractor.

1.11 LIQUIDATED DAMAGES:
A. Contractor and the Contractor's Surety, if any, shall be liable for and shall pay the Owner the sums for liquidated damages as stipulated for each calendar day of delay until the Work is substantially complete, noting allowance for inclement weather.
B. Each Bidder must submit his Bid with the distinct understanding that, in case of its acceptance, time for completion shall be considered the essence of the Contract; and that the expense entailed on the Owner by delayed completion of the work covered by this Contract within the time stipulated therein shall entitle the Owner to a fixed sum of $500.00 per day as liquidated damages for each and every day of delay not caused by the Owner, provided, however, that the collection of any or all of the said money may be waived at the discretion of the Owner.
1.12 BIDDING DOCUMENTS:
   A. Bidder shall return Bid Form with all blanks filled in and properly executed. See Article 1.02 Bidding Procedures in these Instructions to Bidders.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF DOCUMENT 00 21 13
HARRIS COUNTY APPRAISAL DISTRICT  
13013 NORTHWEST FREEWAY  
HOUSTON, TEXAS

DOCUMENT 00 31 19

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 both the bid and the proposed manufacturer’s requirements.

1.02 ROOF CONSTRUCTION SUMMARY:
   A. The roof construction observed at core locations consists of the following: Main Roof and Penthouse Roof - gravel-surfaced asphaltic multi-ply built-up roof membrane, perlite insulation board adhered to concrete deck; Canopy Roof - gravel-surfaced asphaltic multi-ply built-up roof membrane, perlite insulation board, base sheet, lightweight insulating concrete fill, and metal form deck.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF DOCUMENT 00 31 19
1. OVERVIEW OF MAIN ROOF - AREA "A"

2. VIEW OF ROOF CORE ON AREA "A"
3. OVERVIEW OF PENTHOUSE ROOF - AREA "B"

4. VIEW OF ROOF CORE ON AREA "B"
5. OVERVIEW OF CANOPY ROOF - AREA "C"

6. VIEW OF ROOF CORE ON AREA "C"
The undersigned Bidder declares familiarity with the site, dimensions, and conditions affecting the work. After examining the Instructions to Bidders, Conditions of Contract, Supplementary Conditions, Specifications, Drawings, and Bidding Documents, Bidder accepts them as sufficient for the purpose and agrees to contract with Harris County Appraisal District, Owner, located in Houston, Texas to furnish labor, materials, and incidentals necessary to do the Work specified within these documents and indicated on the Drawings for the lump sum of:

**BASE BID:** Perform the roof replacement work as specified herein, including a 20-year warranty for the lump sum price of:

$__________________________

Performance and Payment Bond: Bidder DO NOT add this cost into your Bid costs.

Add the sum of ___________________________ Dollars ($___________) for a Performance and Payment Bond of the total work for Base Bid, if required by Owner.

The undersigned Bidder has based this Base Bid proposal on the following:

Roofing Manufacturer: _______________________

**ALTERNATE BID NO. 1:** Install specified fully adhered single ply membrane in-lieu of modified bitumen membrane.

$__________________________
ALTERNATE BID NO. 2: Replace existing roof-top safety tiebacks.

Add the following lump sum to the Base Bid:

____________________________________________________________________________
_______________________________________________________($___________________)

Subcontractors: The undersigned Bidder has predicated his Bid costs on and plans to use the following subcontractors:

- Sheet Metal Work: ____________________________
- Mechanical Work: ____________________________
- Electrical Work: ____________________________
- Other (Specify): ____________________________
- Other (Specify): ____________________________

Unit Prices: It is possible that certain items which require installation and/or replacement may be uncovered during the renovation activities. Please provide the following unit prices for installing and/or replacing noted items to be used to adjust the Contract amount:

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

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
   - b) Lightweight Insulating Concrete Repair: $_______ per square foot

3) Replace existing roof drain: $_______ each

4) Install new roof drain insert: $_______ each

5) Cast Iron Drain Piping (including all connections, fittings, hangers, and insulation): $_______ per linear foot
Project Completion: The above specified project shall be completed within ________ consecutive calendar days from date of Notice to Proceed. The undersigned Bidder agrees to pay liquidated damages to Owner for each calendar day of delay until work is substantially complete.

Insurance and Bonds: If the undersigned Bidder is notified within three weeks after Bid opening of the acceptance of this Bid and a contract to be awarded, Bidder agrees to provide the required insurance coverage within the following two weeks. In addition, Bidder agrees to execute the contract for the above-mentioned compensations on the standard forms referenced in the Bidding Documents and, if required, further agrees to execute a surety bond for the above work.

Acknowledgment of Addenda: Acknowledgment is hereby made of receipt of the following addenda:

Addendum No. 1 - Date Received: ___________________ Initial: ______________
Addendum No. 2 - Date Received: ___________________ Initial: ______________
Addendum No. 3 - Date Received: ___________________ Initial: ______________
Addendum No. 4 - Date Received: ___________________ Initial: ______________

Taxes: The Bid amounts as stated above include all sales taxes and any other taxes for all labor, materials, and appliances to and upon which the taxes are levied.

Yours truly,

______________________________
Firm Name

______________________________
Signature of Officer-Title

______________________________
Street Address

City       State       Zip

(____)____-____________________
(Area Code) Telephone Number

END OF DOCUMENT 00 41 13
STATEMENT OF QUALIFICATIONS

FOR

BID PROPOSALS

FOR

HARRIS COUNTY APPRAISAL DISTRICT

ROOF REPLACEMENT

Provide the information requested below in the sequence and format prescribed by this Qualification Statement form. Up to ten pages of supplemental materials may be attached where necessary to provide the information requested. Any pre-printed information or company brochures submitted will be considered as supplemental information and not as a substitute for completing this Statement of Qualifications. An original and three photocopies of this Statement of Qualifications are requested from each Proposer. Information may be hand-printed or typed.

1.01 IDENTIFYING INFORMATION:
   A. Name of firm:
   B. Address of main or home office (also provide local office address if different):
   C. Phone Number:
   D. EMail:
   E. This Statement of Qualifications submitted by:

1.02 ORGANIZATION:
   A. How many years has your organization been in business under its present name?
   Under what other or former names has your organization operated?
B. If your organization is a corporation, answer the following:
   1. Date of Incorporation:
   2. State of Incorporation:
   3. President's Name:
   4. Vice President's Name:
   5. Secretary's Name:
   6. Treasurer's Name:
C. If your organization is a partnership, answer the following:
   1. Date of Organization:
   2. Type of Partnership (if applicable):
   3. Name(s) of General Partner(s):
D. If your organization is individually owned, provide the following:
   1. Date of Organization:
   2. Name of Owner:
E. If the form of your organization is other than those listed above, describe the organization and name the principals involved:

1.03 LICENSING:

A. List jurisdictions and trade categories in which your organization is legally qualified to do business and indicate registration or license numbers, if applicable.

B. List jurisdictions in which your organization's partnership or trade name is filed.

1.04 EXPERIENCE:

A. List the categories of work that your organization may propose to perform with its own forces for this Project. Would you obtain competitive pricing from proposed subcontractors for any or all of these categories of work?

B. List any subcontractor trades in which your organization has some ownership and list the categories of work those subcontractors normally perform.
C. Claims and suits (if the answer to any of the questions below is yes, attach explanation).
   1. Has your organization ever failed to complete any work it was awarded?

   2. Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers?

   3. Has your organization filed any lawsuits or requested arbitration with regards to construction contracts within the last five years?

D. Within the last five years, has any officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a construction contract? (If the answer is yes, attach explanation).

E. On a separate sheet, list roof replacement projects your organization has in progress, giving the name of project, location, owner, architect/designer, contract amount, percent complete and scheduled completion date of similar scope of work.

   State total worth of work in progress and under contract:

F. On a separate sheet or sheets, list ten projects your organization has completed in the past five years, giving the name of project, location, owner, architect, contract amount, date of completion of project of similar type of building, scope of work, and utilizing same specified materials.

   State average annual amount of construction work performed during the past five years:

G. On a separate sheet, list the construction experience and present commitments of the key individuals of your organization that would be proposed for this project.

1.05 REFERENCES:

   A. For the most current and most-representative projects listed above, provide name, title, and current phone number for Architect/Engineer/Consultant and Owner Representatives familiar with the services performed by your company on the projects (on separate sheet).

   B. Name the bonding company you would propose for this Project, and the agent's name and current phone number.
1.06 **FINANCIAL INFORMATION:**
   A. Attach a financial statement, preferably audited, including your organization’s latest balance sheet and income statement showing the following items:
      1. Current Assets (e.g., cash, joint venture accounts, accounts receivable, notes receivable, accrued income, deposits, materials inventory and prepaid expenses);
      2. Net Fixed Assets;
      3. Other Assets;
      4. Current Liabilities (e.g., accounts payable, notes payable, accrued expenses, provision for income taxes, advances, accrued salaries and accrued payroll taxes);
      5. Other Liabilities (e.g., capital, capital stock, authorized and outstanding shares per values, earned surplus and retained earnings).
   B. Name and address of firm preparing attached financial statement, and date thereof:

   C. Is the attached financial statement for the identical organization named on page one?

   If not, explain the relationship and financial responsibility of the organization whose financial statement is provided (e.g. parent-subsidiary). Will the organization whose financial statement is attached act as guarantor of the contract for construction?

1.07 **PERSONNEL:**
   A. On a separate sheet, identify the Project Manager and the Field Superintendent who would be assigned to this Project. Provide a brief experience history for each individual.
1.08 IDENTIFICATION AND NOTARIZED SIGNATURE:
A. Name of Organization: __________________________________________
B. Address and Telephone: __________________________________________
__________________________________________________________________

By: ____________________________  _____________________________
(print name)              (signature)
Title: ___________________________

C. _________________________ being duly sworn deposes and says that the
information provided herein is true and sufficiently complete so as not to be
misleading.

Subscribed and sworn before me this _____ day of __________________, 2018.

Notary Public: ___________________________________________

My Commission Expires: ________________________________

END OF DOCUMENT 00 45 13
AGREEMENT

The Agreement (AIA Document A101, 2007 Edition) hereinafter referred to as the "Agreement" is hereby made part of the Contract Documents to the same extent as if reproduced in full.

Copies of the AIA Document A101, 2007 Edition, can be reviewed at the office of Price Consulting, Inc. and may be purchased at a nominal charge from any dealer in Architect's supplies and from the American Institute of Architects.

END OF DOCUMENT 00 52 00
DOCUMENT 00 73 16

INSURANCE REQUIREMENTS

The Bidder promises to deliver to the Purchasing Manager of HCAD, proof of insurance (certificate of coverage) for the duration of the project as outlined below on or before the 10th day after notification of award of the Contract. The Harris County Appraisal District shall be named as an additional insured on all coverages except Workers’ Compensation and Employers’ Liability.

1. Workers’ Compensation Coverage required by Section 406.096, Texas Labor Code for the Contractor and Subcontractors;
2. General liability with limits of not less than $1,000,000 for each occurrence, with an aggregate limit of $2,000,000 for bodily injury, personal injury, property damage, and products/completed operations;
3. Automobile liability with a limit of not less than $1,000,000 for any auto, hired autos, and non-owned autos;
4. Excess/Umbrella liability with a limit of not less than $1,000,000.

END OF INSURANCE REQUIREMENTS
DOCUMENT 00 73 46

MINIMUM WAGE SCALE

PART ONE - GENERAL:

1.01 REQUIREMENTS:
   A. Pay not less than the minimum wage scale and benefits indicated on the "Prevailing
      Wage Scale" schedule included herein.
   B. Wages listed are minimum rates for each listed trade.
   C. No claims for additional compensation will be considered by the Owner because of
      payments of wage rates in excess of the applicable rate contained in this contract.

1.02 APPLICABLE STATUTES:
   A. Vernon's Civil Statutes, Section 2 of Article 5159a which states as follows:

      "The Contractor shall forfeit as a penalty of the State, County, City and Country, City,
      Town, District or other political subdivision on whose behalf the Contract is made or
      awarded, ten dollars for each laborer, workman or mechanic, for each working day,
      or portion thereof, such laborer, workman or mechanic is paid less than the said
      stipulated rates for any such work done under said Contract, by him, or by any
      subcontractor under him, and the public body awarding the Contract shall cause to
      be interested in the Contract a stipulation to this effect."

1.03 PAYROLL:
   A. In compliance with Article 515a, Sections 2 and 3, and Article 5159d, Section II of
      the Revised Civil Statute referenced above, the Owner reserves the following rights:
         1. To receive weekly payroll records.
         2. To have the Contractor provide required earning statements to employees.

1.04 MINIMUM WAGE RATES:
   A. Pay prevailing basic wage listed, plus any applicable fringe benefits.
      1. This determination of prevailing wages shall not be construed to prohibit the
         payment of more than the rates named. Under no condition shall any laborer,
         workman or mechanic employed on this jobsite be paid less than the minimum
         wage scale.
      2. In execution of this Contract, the Contractor must comply with all applicable state
         and federal laws, including but not limited to laws concerned with labor, equal
         employment opportunity, safety, and minimum wage.

PART TWO - PRODUCTS

Not Used.
PART THREE - EXECUTION

Schedule of Prevailing Wages: Attached.
General Decision Number: TX180303 01/12/2018  TX303
Superseded General Decision Number: TX20170303
State: Texas
Construction Type: Building
County: Harris County in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.35 for calendar year 2018 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.35 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2018. The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number     Publication Date
0              01/05/2018
1              01/12/2018

ASBE0022-009 06/01/2017

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BOIL0074-003 01/01/2017

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CARP0551-008 04/01/2016

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<td>A. 6% under 5 years based on regular hourly rate for all hours worked. 8% over 5 years based on regular hourly rate for all hours worked.</td>
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<td>A. 6% under 5 years based on regular hourly rate for all hours worked. 8% over 5 years based on regular hourly rate for all hours worked.</td>
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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.
Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers
Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal
process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

https://wdol.gov/wdol/scafiles/davisbacon/tx303.dvb

3/9/2018
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
SUMMARY OF WORK

PART ONE - GENERAL

1.01 SECTION INCLUDES:

A. Roof replacement and roof related renovations of the existing facility known as Harris County Appraisal District building located at 13013 Northwest Freeway in Houston, Texas, 77040. Work includes, but is not limited to, the following:

B. Remove and properly dispose of existing built-up roofing, perlite insulation board, and sheet metal down to the existing concrete deck on designated roof areas.

C. Remove and re-install lightning protection system.

D. Install tapered polyisocyanurate and secondary insulation set in foam adhesive followed by a two-ply modified bitumen roof membrane with white-colored surfacing.

E. Install new two-ply modified bitumen membrane flashings at parapet walls, risewalls, and curbs.

F. Install new sheet metal coping at parapet walls.

G. Install new sheet metal counter flashings at curbs, penetrations, and risewalls.

H. Install new expansion joint material at designated locations.

I. Install new pan flashing with pourable sealant and sheet metal bonnets at conduit, pipe, support, etc. roof penetrations.

J. Remove and replace existing safety tie-backs.

K. Raise, lower, or modify all utility lines, piping, equipment, or other items which affect the installation of the new roof system.

L. Install new curbs, equipment, etc., as necessary to achieve a minimum flashing height of 8-inches (200mm) above the finished roof.

M. Install walk pads at designated areas.

N. Provide specified manufacturer and contractor warranties.

1.02 WEATHER PROTECTION:

A. Upon beginning work on the existing roof, Contractor shall patch and protect existing roofing as required to prevent leaks.

B. Contractor shall have at the work site, a sufficient amount of moisture proof coverings to provide quick temporary protection to exposed decking, unfinished roof, 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. Do not load structure with weight that will endanger structure.
D. Assume full responsibility for protection and safekeeping of products stored on premises.

E. Move stored products which interfere with operations of Owner.

F. Obtain and pay for use of additional storage or work areas needed for operations.

G. Coordinate use of premises under direction of Owner's Representative.

H. 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 3/4-inch (19mm) plywood protection over existing roof membrane at traffic and work areas.

I. 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.

J. 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.

K. Building Access:
   1. Access to roof construction areas shall be by way of designated stairwell.
   2. Contractor will not have access to building interior except as pre-arranged with Owner.
1.04 OWNER OCCUPANCY:
A. Owner will occupy premises during 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 35 16 for provisions on security, special sequence of Work, maintenance of access and operations, maintenance of existing utilities and services, and building access restrictions.

1.05 OVERTIME WORK:
A. Contractor shall include necessary overtime work on weekends and other times as required to complete the Work within the Contract Time.

PART TWO - PRODUCTS
Not Used.

PART THREE - EXECUTION
Not Used.

END OF SECTION 01 11 00
SECTION 01 21 00

ALLOWANCES

PART ONE - GENERAL

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

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

1.03 SELECTION OF PRODUCTS UNDER ALLOWANCES:
   A. Consultant’s Duties:
      1. Consult with Contractor in consideration of Products and suppliers or installers.
      2. Maintain log of unit pricing allowances and quantities.
      3. Make selection in consultation with Owner. Obtain Owner's written decision, designating:
         a. Product, model, and finish.
         b. Accessories and attachments.
         c. Supplier and installer, as applicable.
         d. Cost to Contractor, delivered to site or installed, as applicable.
         e. Manufacturer's Warranties.
   B. Transmit Owner's decision to Contractor.
      1. Prepare Change Orders as required.
   C. Contractor's Duties:
      1. Assist Consultant and Owner in determining qualified suppliers or installers.
      2. Obtain proposals from suppliers and installers when requested by Consultant.
      3. Make appropriate recommendations for consideration of Consultant.
4. Notify Consultant promptly of:
   a. Any reasonable objections Contractor may have against any supplier or party
      under consideration for installation.
   b. Any effect on Construction Schedule anticipated by selections under
      consideration.

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

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

1.06 CONSTRUCTION CONTINGENCY:
   A. Include in the Contract amount Construction Contingency Allowance in the amounts
      shown in Paragraph 3.01.
   B. Construction Contingency Allowance:
      1. Use only to cover cost of hidden, concealed, or otherwise unforeseen conditions
         that develop during project.
      2. Work which is clearly changed in scope shall be authorized and paid for only by
         means of change order executed in accordance with established Owner
         procedures.
3. Include in Base Bid, profit and overhead to cover amount of contingency, as each contingency authorization processed will not include any profit or overhead for Contractor.
4. Proceed with accomplishing work only after receiving properly executed contingency authorization executed by Owner.
5. Do not bill Owner for any work authorized by this procedure until work has been accomplished.
6. Return to Owner any part of contingency allowance that is not used during construction of project.
7. At completion of project, Contracting Officer will reconcile all work accomplished through properly executed contingency allowance authorizations and provide for refund of any unused portion of contingency to Owner through properly executed change order.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

3.01 SCHEDULE OF ALLOWANCES:
   A. Include an allowance to repair 100 square feet of concrete deck. Provide add/deduct unit price for material to adjust allowance for actual quantity of material installed/replaced.
   B. Include an allowance to repair 100 square feet of lightweight insulating concrete fill. Provide add/deduct unit price for material to adjust allowance for actual quantity of material installed/replaced.

END OF SECTION 01 21 00
SECTION 01 22 00

UNIT PRICES

PART ONE - GENERAL

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

1.02 MEASUREMENT AND PAYMENT:
   A. It is the intent of the 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:

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Wood Nailers:</td>
<td></td>
</tr>
<tr>
<td>2 x 4 wood nailer:</td>
<td>$_______ per linear foot</td>
</tr>
<tr>
<td>2 x 6 wood nailer:</td>
<td>$_______ per linear foot</td>
</tr>
<tr>
<td>2 x 8 wood nailer:</td>
<td>$_______ per linear foot</td>
</tr>
<tr>
<td>2 x 12 wood nailer:</td>
<td>$_______ per linear foot</td>
</tr>
</tbody>
</table>
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
   b. Lightweight Insulating Concrete Repair: $_______ per square foot

3. Replace existing roof drain: $_______ each

4. Install new roof drain insert: $_______ each

5. Cast Iron Drain Piping (including all connections, fittings, hangers, and insulation): $_______ per linear foot

3.02 AUTHORIZATION, RECORD KEEPING, AND PAYMENT FOR UNIT PRICE ITEMS:
A. Owner's 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 Owner's Representative.
B. Owner's 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.
SECTION 01 23 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: Install specified single ply membrane in-lieu of modified bitumen membrane.
   B. Alternate No. 2: Replace existing roof-top safety tie-backs.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 23 00
SECTION 01 33 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. Material manufacturer's roof assembly letter indicating roof system components, attachment methods, roof system criteria, length of warranty to be issued, and test reports for the proposed system.
   C. Shop drawings of details.
   D. Manufacturer's product data sheets and Safety Data Sheets (SDS) on each material proposed for usage.
   E. Sample of warranty that is to be issued upon project completion.
   F. Submit list of subcontractors.
   G. Detailed project schedule showing work phasing and proposed daily progress schedule together with annotated plan depicting phasing.
   H. Permits, notices, and approvals of governing bodies or agencies.

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.
   B. Prepare shop drawings for those details that are proposed for the project. 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, trim, and fascia units, downspouts, scuppers, and expansion joint systems.
1.04 PRODUCT DATA:
   A. Submit manufacturer's catalog sheets and other standard descriptive data for each
      material proposed for use in construction of roof assembly and related flashings and
      components.
      1. Clearly mark each copy to identify pertinent materials, products, or models.
      2. Show dimensions and clearances required.
      3. Show performance characteristics and capacities.
      4. Indicate the Specification Section that applies to each submittal.

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. Notify Consultant, in writing at time of submission, of deviations in submittals from
      requirements of Contract Documents.
   G. 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.
   H. Distribute copies after Consultant's approval.

1.07 SUBMISSION REQUIREMENTS:
   A. Schedule submissions to the Consultant immediately after Contract award.
   B. Submit five copies of submittals.
   C. Submit three of each sample 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 each set of 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. Consultant will retain two copies of approved or corrected submittals.
   B. Consultant will forward one copy of approved or corrected submittals to Owner.
   C. Consultant will return remaining copies to Contractor.
   D. Contractor shall distribute remaining copies of submittals which carry Consultant's stamp as required for construction, including Contractor's file, jobsite file, subcontractors, suppliers, and fabricators.

1.10 LIST OF SUBMITTALS:

SECTION 02 40 00 - MINOR DEMOLITION AND RENOVATION WORK
   • Product Data.

SECTION 07 22 16 - ROOF BOARD INSULATION
   • Product Data.
   • Samples, if requested.

SECTION 07 52 00 - MODIFIED BITUMEN MEMBRANE ROOFING
   • Product Data.
   • Shop Drawings.
   • Samples, if requested.

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM
   • Product Data.
   • Shop Drawings, where applicable.
   • Color Chart.

SECTION 07 72 27 - FALL PROTECTION DEVICES
   • Product Data.
   • Shop Drawings.
SECTION 07 92 00 - SEALANTS AND CAULKING

• Product Data.
• Samples, if requested.
• Color Chart.

SECTION 09 90 00 - PAINTING

• Product Data.
• Samples, if requested.
• Color Chart.

SECTION 26 41 00 - LIGHTNING PROTECTION SYSTEM

• Product Data.
• Shop Drawing/Layout.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 33 00
PART ONE - GENERAL

1.01  PRE-CONSTRUCTION CONFERENCE:
   A. A Pre-construction Conference will be held at the site at a time to be designated by Owner.
   B. Representatives of Contractor, including project superintendent, foreman, and all subcontractors, shall meet with Owner or his appointed representative.

1.02  AGENDA:
   A. As a minimum, the following items will be on meeting agenda:
      1. Designation of all personnel.
      2. Communication.
      3. Construction Schedule.
      4. Critical work sequencing and deck repair procedures.
      5. Existing facilities and maintenance of operation.
      7. Project record documents procedures.
      8. Processing Field and Change Orders.

1.03  AGENDA FOR PRE-CONSTRUCTION MEETING
   A. Attendance:
      1. Owner (Representative, if desired by Owner).
      2. Consultant and On-site Inspector.
      3. Contractor (Manager, Superintendent, and Foreman).
      4. Subcontractors.
      5. Material Suppliers (if required).
   B. Sign-in list for all attending including names, title, phone number, and company.
   C. Contract Review:
      1. Execution.
      2. Insurance certificates.
      3. Bid review.
      4. Schedule of values and progress payment processing.
      5. Notice to proceed and start date.
      6. Bond, lien, and permit requirements.
      7. Project communications and problem resolution.
      8. Change order and additional work order processing.
   D. Job Site Conditions and Requirements:
      1. Services (temporary):
         a. Water.
         b. Power (110, 220).
         c. Sanitary facilities.
         d. Parking areas.
e. Telephone access.
f. Review each of the above as to who shall furnish each, restrictions, and scheduling.

2. Site Access and Restrictions:
   a. Set-up areas, material storage, and handling.
   b. Protection of buildings, grounds, and building interior.

3. Working Area and Preparation:
   a. Review work flow and schedule.
   b. Preparation work by other trades.
   c. Protection of existing roof and deck.

E. Technical Sections:
   1. Review submittals.
   2. Function of on-site inspector and other on site personnel.
   3. Material storage methods.
   4. Roof drainage conditions.
   5. Coordination of work with other trades; and Owner.
   7. System review.
   8. Manufacturer inspections:
      a. Inspection scheduled.
      b. Final inspection and issuance of warranty.

F. Safety and Security - Review Contractor responsibilities, and establish Owner monitoring procedures.

G. Summary and Questions
H. Exchange phone numbers, business cards, and emergency and daily contacts.
I. Issue record of meeting minutes to all attendees.

1.04 AGENDA FOR PROJECT MEETING

A. Attendance:
   1. Owner (Representative, if desired by Owner).
   2. Consultant.
   3. Contractor (Manager, Superintendent, and Foreman).
   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. Change order and/or additional work.
   4. Review projected work flow and schedule against work completed to date.
   5. 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 work by other trades.
   4. Review quality of work to-date with Contractor and Manufacturer.
PART TWO - PRODUCTS
Not Used.

PART THREE - EXECUTION
Not Used.

END OF SECTION 01 31 19
SECTION 01 35 16
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. During A/C modification and roof vent handling operations.
   c. For project or medical emergency.
2. Access to roof construction areas shall be by way of contractor-provided exterior ladder for construction personnel.

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 01500 - 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 35 16
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. Utilize Owner's testing laboratory when services are necessary to assist Contractor in evaluating quality.
   F. 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.
   B. Notify manufacturer's representative a minimum of two weeks prior to date of final inspection. Manufacturer's representative shall conduct an inspection of the completed roof before the final inspection, or shall attend the final inspection.

PART TWO - PRODUCTS
Not Used.
PART THREE - EXECUTION

Not Used.

END OF SECTION 01 40 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 or other materials found to be improperly stored at the jobsite shall be considered wet at the discretion of Owner's Representative and shall be 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 may 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. Not more than two weeks supply of material shall be stored on a roof at any given time. 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. Provide portable generators where necessary for electrical service to complete work.
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.
F. Provide temporary 6-foot (2m) chainlink fence around kettle and setup areas.

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 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.
      b. Each temporary structure including construction office and storage and tool and workshop sheds.
   3. Contractor's superintendent or other assistant superintendents shall be appointed as project fire warden for entire construction period.
   4. Train workmen in proper use of each type fire extinguisher.
   5. Post telephone number of fire department, specific information regarding location of on-site fire fighting equipment, and procedures to be followed in event of fire.
   6. Maintain free access at all times to fire extinguisher equipment, street fire hydrants, and outside connections for standpipe hose systems.
   7. Maintain all exit facilities and access thereto, free of material and other obstructions.

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. Perform emergency repairs on roofing to stop leaks.
F. Take all necessary precautions to protect the roof from damage. Repair all new areas of damage at Contractor's expense.
G. Contractor is to be aware of the potential for roof leaks on the existing roof as a result of the work process, foot traffic, or material and equipment storage. As a result, Contractor is to take all necessary precautions to prevent damage to the existing roof. All damage to the existing roof that could result in roof leaks is to be repaired on a daily basis by Contractor.

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), 2012 edition; as amended by the City of Houston.
C. ASHRAE 90.1-2013; as amended by the City of Houston.
D. Occupation Safety and Health Administration (OSHA) requirements, as applicable.
E. United States Environmental Protection Agency (EPA) requirements, as applicable.
F. 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:
   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
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 Consultant that Project is substantially complete and schedule time for inspection.
   B. Consultant will make an inspection after notification.
   C. Should Consultant consider Work not complete:
      1. He will immediately notify Contractor, in writing, stating reasons.
      2. Contractor shall complete Work and send second written notice to Consultant certifying Project is substantially complete.
      3. Consultant will reinspect Work.

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

1.04 REINSPECTING COSTS:
   A. Should Consultant be required to perform subsequent inspections of the Work due to the failure of the Contractor to correct deficient work, Owner will compensate Consultant for additional services and deduct amount paid to Consultant from the final payment to Contractor.
1.05 CLOSE-OUT SUBMITTALS:
A. Evidence of compliance with requirements of governing authorities.
B. Warranties and Bonds: Refer to requirements of this Section.
C. Evidence of Payment and Release of Liens: Refer to requirements of General and Supplementary Conditions.

1.06 WARRANTY/GUARANTEE:
A. Submit original and duplicate copies of both Contractor's Warranty and Manufacturer's Guarantee to Consultant for review. After review, Consultant 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.

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

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

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

Not Used.

PART THREE - EXECUTION

Not Used.

END OF SECTION 01 70 00
SECTION 01 74 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. 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.

B. 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.

C. Contractor shall be responsible for the preservation of all private property, trees, fences, etc., along the adjacent street, right-of-way, etc., and shall use every precaution necessary to prevent damage or injury thereto. Use suitable precautions to prevent damage to pipes, conduits, and other structures.

D. If damage to any structures, utilities, or other improvement occurs by reason of Contractor's operations even though special precautions have been employed, Contractor shall be entirely responsible for such damage and shall make all repairs as required to the satisfaction of Owner.

E. Do not injure, destroy, or trim landscaping without authorization by Owner. Landscaping damage will be replaced by Contractor with new stock or with other stock satisfactory to Owner at the expense of Contractor.

3.02 FINAL CLEANING:

A. Employ skilled workmen for final cleaning.
B. Remove grease, mastics, adhesives, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior surfaces.
C. Repair, patch, and touch-up marred surfaces to match adjacent finishes.
D. Broom clean paved surfaces; rake clean other surfaces of grounds.
E. Clean stairwell, freight elevator, and loading dock area.
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 74 00
SECTION 02 40 00

MINOR DEMOLITION AND RENOVATION WORK

PART ONE - GENERAL

1.01 SECTION INCLUDES:
   A. Removing existing roofing, insulation, flashing, and sheet metal.
   B. Repairing decking.
   C. Modifying existing roof penetrations, equipment supports, curbs, reglets, piping, utility services, and exterior wall finishes to provide proper flashing height and flashing detail.
   D. Installing new nailers, blocking, and sheathing at designated locations.
   E. Performing other miscellaneous and incidental work required to install complete roofing system as specified and to obtain specified manufacturer's warranty.

1.02 RELATED SECTIONS:
   A. 06 01 10 - Rough Carpentry
   B. 07 22 16 - Roof Board Insulation.
   C. 07 52 00 - Modified Bitumen Membrane Roofing.
   D. 07 62 00 - Sheet Metal Flashing and Trim.

1.03 REFERENCES:
   B. Corps of Engineers (CRD).

1.04 PROJECT CONDITIONS:
   A. Environmental Requirements:
      1. Do not remove existing roofing and flashing in inclement weather or when rain is predicted with 30 percent possibility or greater.
      2. When ambient temperature is below 60 degrees Fahrenheit (15 degrees Celsius), expose only enough temperature sensitive materials required within four hour period.
      3. Do not expose materials to constant temperature in excess of 180 degrees Fahrenheit (82 degrees Celsius).
   B. Emergency Equipment: Maintain on-site adequate materials necessary to apply emergency temporary weather protection of incomplete work area in event of sudden storms or inclement weather.
   C. Smoking is prohibited on roof areas, in existing building, and Owner's property except at designated locations.
1.05 SEQUENCING AND SCHEDULING:
A. Sequence demolition and renovation with sequence of new work to maintain facility in dry, watertight condition on daily basis.
B. Coordinate roof work so that no more existing items are removed in one day than can be replaced with new materials in same day.
C. Coordinate work with Owner’s operational requirements.
D. Coordinate demolition work and removal with roofing work to maintain facility in dry, watertight condition on a daily basis.

1.06 WARRANTY:
A. Provide Contractor’s warranty covering defects in installed materials and workmanship for period of two years from date of final acceptance.

PART TWO - PRODUCTS

2.01 MATERIALS:
A. Wood Members, Nailers, and Blocking Lumber: Noncombustible Standard Grade Fir or No. 2 Southern Yellow Pine bearing UL label, Kiln-dried after treatment (KDAT), complying with American Lumber Standards of manufacturer’s association under whose rules lumber is produced, minimum size 2-inches (50mm) by 6-inches (150mm), nominal.
B. Treatment for Wood Members: Pressure-preservative treated in accordance with AWPA C2, C9 standards, Above Ground Contact Alkaline Copper Quat Type C (ACQ-C) or Copper Azole Type A (CBA-A) at 0.20 pcf.
C. Plywood: Exterior-grade sheathing; Grade: C – D; 1/2-inch, thickness.
D. Gypsum Sheathing/Roof Board: 1/2-inch (13mm) thick moisture resistant gypsum core roof board such as "Dens-Deck Prime" by Georgia Pacific or “SecuRock” by U.S. Gypsum.
E. Fasteners:
   1. Wood Substrate:
      a. Securement of metal flanged items such as flashing pans, metal edge/fascia, cleats, etc., shall be nails, No. 11 gauge, double hot-dipped galvanized, ASTM A153, steel or stainless steel wire with 3/8-inch (9mm) diameter head and ring shank fasteners for anchoring flanges of sheet metal fabrications shall be of sufficient length to achieve a minimum 1-1/4-inch embedment into solid wood substrate such as "R-103-A Stormguard Asphalt and Fiberglass Shingle Nail" by Maze Nails (800/435-5949).
      b. Securement of wood to wood shall be nails, No. 11 gauge, double hot-dipped galvanized steel or stainless steel wire nail with ring shank and 9/32-inch (7mm) diameter head such as "Stormguard PTL Anchor-Down Nail" by Maze Nails (800/435-5949); 10d or length required to provide 1-inch (25mm) penetration minimum into substrate.
      c. Securement of exposed items to wood substrate shall be No. 14 stainless steel screw with stainless steel washer and integral rubber seal; length required to provide 1-inch (25mm) penetration minimum into substrate.
d. Fasteners for securing roofing materials to wood substrate shall be a hardened stainless steel nail with a 1-inch (25mm) diameter round head and ring shank; length to provide 1-inch (25mm) penetration into substrate, as manufactured by Simplex Nail Co.

e. Fasteners for securing steel to wood substrate shall be No. 10 stainless steel wood screw with stainless steel washer and integral rubber seal, length to achieve 1-inch embedment into wood.

f. Fasteners for securing wood nailer to wood nailer in vertical position shall be 20 gauge galvanized steel plate, 2-inches wide by 4-inches long such as “MP 24 Mending Plate” by Simpson Strong-Tie Co., Inc. and “A34 Framing Anchor” by Simpson Strong-Tie Co., Inc. for corner connections.

2. Concrete Substrate:

a. Fasteners for securing sheet metal items such as surface-mounted counterflashings, termination/compression bars, etc., to concrete substrate shall be a pre-assembled drive anchor with a coated steel or steel alloy drive screw, a lead/zinc alloy expansion anchor body (1/4-inch (6mm) diameter, 1-1/2-inch [38mm] length) and a stainless steel washer with integral rubber seal (1-1/8-inch diameter) such as "Zamac Hammer-Screw" as manufactured by Powers Fasteners, Inc., or “Coated Drive Pin Fastener” by Firestone Specialty Products.

b. Fasteners for securing wood blocking to concrete substrate at roof perimeters shall be stainless steel sleeved stud expansion bolt, 1/2-inch (13mm) diameter (minimum), with 3/4-inch diameter stainless steel washer such as "Kwik Bolt II" by Hilti, "Tru Bolt Wedge" by ITW Ramset, or "Lok/Bolt" by Powers Fasteners, Inc. Fasteners for securing wood blocking to concrete substrate for miscellaneous applications shall be 1/4-inch diameter, 2-3/4-inch long coated screw with hex head such as "Tapcon" by ITW Buildex.

3. Masonry Substrate:

a. Fasteners for securing wood to solid masonry at roof perimeters shall be stainless steel expansion anchor, 3/8-inch (9mm) diameter (minimum), with 3/4-inch diameter stainless steel washer such as "Countersunk Kwik Bolt II" by Hilti. Fasteners for securing wood to solid masonry for miscellaneous applications shall be 1/4-inch diameter, 2-3/4-inch long coated screw with hex head such as "Tapcon" by ITW Buildex.

b. Fasteners for securing wood to hollow base masonry shall be 3/8-inch (9mm) diameter (minimum), stainless steel threaded rod, with 3/4-inch diameter stainless steel washer, nut, and screen tube such as "HIT C-20 Adhesive Anchor" by Hilti.

c. Fasteners for securing sheet metal items to concrete substrate shall be a pre-assembled drive anchor with a coated steel or steel alloy drive screw, a lead/zinc alloy expansion anchor body (1/4-inch (6mm) diameter, 1-1/2-inch [38mm] length) and a stainless steel washer with integral rubber seal (1-1/8-inch diameter) such as "Zamac Hammer-Screw" as manufactured by Powers Fasteners, Inc., or “Coated Drive Pin Fastener” by Firestone Specialty Products.
4. Steel Substrate:
   a. Fasteners for securing plywood to steel substrate shall be self-drilling, 1-1/2-inch long coated No. 10 screw with wafer head such as "Traxx Wood to Metal Fastener" by ITW Buildex. Fasteners for securing wood nailers/blocking to steel substrate shall be self-drilling coated heavy duty screw, 1/4-inch (6mm) diameter (minimum), with 5/8-inch (16mm) diameter washer such as "No. 14 Heavy Duty Screw" by OMG Roof Products.
   b. Fasteners for securing steel to steel substrate shall be self-tapping No. 14, 1-1/2-inch long stainless steel screw with stainless steel washer and bonded integral rubber seal.

5. Plywood Clip: 20 gauge galvanized steel H-clip such as "PSCL Panel Sheathing Clip" by Simpson Strong-Tie Co., Inc. (800/999-5099).

6. Receiver in Reglet: Soft, malleable lead sheet, size and shape to fit in joint and maintain compression against receiver.

F. Rust Inhibitive Primer: 100 percent acrylic resin primer such as "Metalclad Interior-Exterior Acrylic Latex Flat Primer & Finish #41702", Devoe & Raynolds Co.

G. 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. Metal Decking: Use same gauge, flute dimension, and spacing as existing.

H. Piping/Conduit Supports: Pre-manufactured assembly with molded plastic/rubber base, 10-inches by 16-inches (250mm by 400mm); 1/2-inch (13mm) threaded rods and accessory bar, "Type PP-10 with Strut" for conduit/condensate or "Type PP-10 with Roller" for steel/gas piping as manufactured by PHP System/Design, Houston, Texas (800/797-6585) or Models 48-R-AH and 24-R-AH by Miro Industries, Inc. (800/768-9678).

I. Roof Crossover Ramp: Pre-manufactured ramp 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 walk planks such as manufactured by PHP Design, Houston, Texas (800/797-6585).

J. Equipment Supports: Pre-manufactured supports constructed from 1-7/8-inch by 1-7/8-inch (47mm by 47mm) 12 gauge channel steel with rectangular support bases and steel angle supports. Provide threaded rod to connect supports such as "Type RTU-20" as manufactured by PHP System/Design, Houston, Texas (800/797-6585).

K. Non-shrink Grout: Quick-setting grout formula meeting Corps of Engineers specification CRD-C-621, Type D and ASTM C-1107, Grade C, such as "Five Star Instant Grout" by Five Star Products, Inc., "Sika Grout 212" by Sika Corp., or approved equal.

L. 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.
M. Roof Hatch Railing System: Power-coated steel tubular rail system complying with OSHA fall protection regulation 1910.23 with self-closing gate such as "Roof Hatch Safety Rail" by SafePro LP, or "PRS Roof Hatch Protection System" by Premier Rail Systems, www.premierrailsystems.com.

N. Splash Blocks: Pre-cast concrete; minimum size of 2-inches (50mm) thick by 18-inches (450mm) by 30-inches (750mm).

PART THREE - EXECUTION

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

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

3.03 MINOR DEMOLITION OPERATIONS:
   A. Execute demolition in careful and orderly manner with least possible disturbance or damage to adjoining surfaces and structure.
   B. Avoid excessive vibrations in demolition procedures that would be transmitted through existing structure and finish materials.
   C. Roof Removal:
      1. Remove existing roofing, insulation, and flashings; abandoned and obsolete equipment; metal flashings, vents, curbs, and other such items; and sheet metal down to roof deck.
      2. Trim existing counterflashing as required for installation of new materials.
      3. Do not stockpile debris on roof surface. Promptly dispose of obsolete equipment and debris at authorized disposal site each day. Use chutes to transfer debris from roof surface to dumpsters.
      4. Provide protective method, such as plywood set on minimum 1-inch (25mm) EPS insulation, when hauling debris over existing roof membrane.
3.04 MINOR RENOVATION WORK:
A. Prepare substrates in accordance with roofing manufacturer's recommendations.
B. 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 3-inch by 3-inch by 3/8-inch steel angles secured 12-inches on-center. Install metal deck attached to steel angles with self-tapping screws at 6-inches on-center. Attach new gypsum sheathing to steel deck with plates and screws spaced one fastener per 2 square feet. Install new decking so gypsum sheathing is flush with top surface of concrete deck. Provide finish on bottom side of opening to match adjacent finish in exposed areas.
   2. Lightweight Insulating Concrete Decking:
      a. Perform repairs to lightweight insulating concrete fill in accordance with patching material manufacturer's recommendations.
      b. Remove loose and defective 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.
   3. Metal Decking:
      a. 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. Mechanically fasten new decking or plate with screws spaced 6-inches (150mm) on-center.
      b. Repair holes or openings greater than 12-inches (300mm) in diameter with new deck material. Extend new decking 18-inches (300mm) minimum past nearest bar joist or support member. Mechanically fasten new decking or plate with screws spaced 6-inches (150mm) on-center.
c. Remove loose rust or other foreign material from existing deck that would prohibit proper installation of new materials.

d. Remove rust by wire brushing or other appropriate method. Apply rust inhibitor over prepared areas of metal deck.

e. Secure existing metal roof deck to existing steel framing with self-drilling #14 screws spaced 12-inches on-center.

C. Nailers:
1. Replace wood nailers and curbs with new nailers and curbs as required.
2. Install wood nailers to match height of new insulation board.
3. Secure 2X6 base nailer into structure and/or substrate for anchorage of cleats and/or fascias of sheet metal fabrications, width as necessary to extend beyond horizontal flange of sheet metal fabrication.
4. Clean and prepare existing surfaces to receive wood nailers and curbs.
5. Install 2 X 6 wood nailer, minimum, as base nailer at perimeters or tops of parapet walls. Nailers shall match width of wall and provide minimum 1-inch per foot slope toward roof.
6. Install wood nailers and curbs continuously with 1/4-inch (6mm) gap between each section. Set level and true. Pre-drill nailers prior to attachment. Countersink fastener in base nailer so that washer and head of fastener or nut are recessed below top of nailer.
7. Securely fasten to structure with appropriate fasteners to resist minimum 175 pounds per linear foot (780N per 300mm) force in any direction and spaced 12-inches on-center. Use of powder-actuated fasteners is prohibited. Place a fastener within 3-inches (75mm) of each end of each section of wood blocking.
8. Secure nailers to concrete deck with appropriate fasteners spaced 24-inches (600mm) on-center. Secure nailer with a minimum of two fasteners per nailer.
9. Stagger joints in subsequent layers of nailers from joints in underlying layer of nailers a minimum of 12-inches (300mm).
10. Install nailers so that ends and sides of adjoining nailers are aligned to form right angles (nominal) at corners.
11. Weave ends of subsequent layers of nailers at corners so that ends of nailers do not align.
12. Secure nailers to wood substrate using nails 24-inches (600mm) on-center, staggered. Install nails on an angle.
14. If attaching wood nailer to concrete masonry block, install stainless steel threaded rod spaced 12-inches (300mm) on-center in fully grouted cell/core of CMU.
15. Reduce fastener spacing 50 percent at a distance of 10 feet (3m) from each corner.
16. Secure new nailer to existing nailer or curb when increasing curb height utilizing appropriate fasteners, gusset plates positioned 12-inches on-center, and framing anchors positioned at corners.
D. Plywood/Gypsum Sheathing:
1. Install new sheathing at walls, curbs, and over unsuitable substrates to receive new roofing. Replace damaged, deteriorated, or non-salvageable existing sheathing.
2. Secure sheathing to substrate with flat head fasteners (type appropriate for substrate) spaced 12-inches (300mm) on-center.
3. Secure sheathing to wood substrate with nails spaced 6-inches (150mm) on-center.
4. Install new sheathing at roof hatches and metal curbs. Secure sheathing to substrate with flat head fasteners (type appropriate for substrate) spaced 12-inches (300mm) on-center. Trim exposed ends of screws on inside of hatch/curb.

E. Equipment and Curb Renovation:
1. Remove, retain, and reinstall existing equipment as required to facilitate new flashing.
2. Securely fasten equipment on curbs after new flashing is installed with grommetted screws spaced 12-inches on-center, minimum, two per each side of equipment.
3. Curb flashing height shall be 8-inches (200mm) minimum above newly finished roof surface.
4. Include raising of curb to provide minimum 8-inch (200mm) flashing height.

F. Rooftop Equipment:
1. Move and elevate air conditioning units and other rooftop equipment as required to install roofing materials complete and in accordance with plans and specifications.
2. When units or equipment are to be moved, disconnect and move to protected area to prevent damage to parts or components. Reset and reconnect at Contractor's expense.
3. Disconnection and reconnection shall be performed by mechanical and/or electrical company licensed to perform such work and approved by Owner's Representative.
4. Install equipment on top of curb or pre-manufactured support. Secure equipment to curb with grommetted fasteners spaced 12-inches (300mm) on-center, minimum two fasteners per side. Set equipment on top of pre-manufactured support and secure to support. Install support on a layer of heavy-duty protection pad on top of a cut section of modified bitumen protection pad.
5. Install set of sheet metal strapping in opposing directions over top of equipment housing and secure into sides of curb cap flashing.

G. Curbs and Ducts:
1. Secure and modify curbs, ducts, and other work which pass through roof as required to receive new roofing system.
2. Seal joints in sheet metal ducts and vent hoods with reinforcing fabric and elastomeric coating. Apply elastomeric coating to exposed surfaces of ducts and vent hoods.
H. Condensate Lines: Raise and reroute existing condensate lines and supports as required. Provide positive drainage of piping. Reinstall existing and install new condensate lines at existing or new units where discharge is directed onto roof. Route lines to discharge into nearest drainage medium (i.e. drain, gutter, etc.).

I. Piping and Conduit Modifications:
   1. Schedule piping and unit downtime for equipment modifications to coordinate with Owner's operations. Switchover time shall be limited to meet Owner's requirements.
   2. Replace existing supports for units and associated piping with new supports.
   3. Provide temporary supports to maintain unit and piping in operational condition except during switchover.
   4. Furnish new fittings, piping, and accessories to match existing to replace deteriorated, damaged, or non-functional components or to accommodate new unit elevation, where necessary.
   5. Provide auxiliary make-up air units to supply HVAC needs during equipment downtime, when required.
   6. Upon completion of roof installation, paint steel piping and replace or clean aluminum jacketing of insulated pipe.

J. Piping Supports:
   1. Furnish and install new supports for piping (conduit, gas, water, condensate, etc.).
   2. Install supports at maximum spacing of 10 feet (3m) on-center and within 2 feet (600mm) of changes in plane or direction. Space supports for piping 10-inches (250mm) in diameter or larger and multiple pipes 8 feet (2.4m) on-center.
   3. Install over a layer of heavy-duty protection pad set on top of a layer of modified bitumen protection pad adhered to roof surface.

K. Existing Roof Drains:
   1. Secure and modify drains to receive new roofing system.
   2. Verify drain bowls and pipes are properly secured and sealed.
   3. Remove, replace, lower, or raise drain bowl as required to accommodate new roofing system, including insulation and deck conditions.
   4. Replace damaged, missing, or otherwise non-salvageable drain components with new components. Replace plastic strainers with cast iron units.
   5. Drill and tap existing drain bowls as required for complete assembly of drain. Secure clamp rings with stainless steel bolts and washers. Clamp rings to be secured throughout project. Wire brush, clean, and paint existing cast iron clamp rings and strainers to be reinstalled.
   6. Paint new strainers and clamp rings prior to installation.
   7. Water test each roof drain with inflatable plug. Position plug in leader so test will cover connection of pipe to bowl. Extend “test” water on top of roof membrane beyond clamping ring. Maintain “test” water for one hour while performing interior observations for water leakage. Replace drain bowl assemblies that cannot be made watertight during leak test.
L. 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.
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 sheet metal fabrications as required for permanent watertight installation.
   4. Paint sheet metal with metal primer.
N. Duct Vent Supports: Install supports at minimum spacing of 5 feet (2.4m) on-center.
O. Roof Hatch:
   1. Trim sheet metal flashing on hatch to receive new flashing.
   2. Secure plywood/sheathing to hatch curb.
   3. After installation of flashing, secure counter flashing to metal flashing flange on hatch with appropriate screw fasteners spaced at 6-inches on-center.
   4. Paint interior and exterior of hatch curb and cover.
   5. Attach safety railing system to exterior of hatch.
P. 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.
      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.
   3. Install new nailers to construct new threshold.
   4. Install new stainless steel cap over top of threshold with new door step.
   5. Relocate low hinges as required.
   6. Reinstall door and install new weatherstripping for permanent seal.
Q. Scuppers:
   1. Saw-cut existing through-wall scuppers to enlarge to create a minimum 12-inch wide by 8-inch high rough opening in wall.
   2. Saw-cut with appropriate equipment to achieve straight edge finishes.
R. Ramp Platforms: Remove existing wooden platform and install new ramp access platform in designated locations to provide access over elevated curb mounted expansion joints. Set platform on protection pads on surface of new roof.

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 40 00
SECTION 04 01 20
MASONRY RESTORATION

PART ONE - GENERAL

1.01 SECTION INCLUDES:
   A. Removing and salvaging existing masonry, installing new through-wall flashings, and reinstalling salvaged or new masonry at designated rooftop rise walls.

1.02 RELATED SECTIONS:
   A. 02 40 00 - Minor Demolition and Renovation Work
   B. 07 62 00 - Sheet Metal Flashing and Trim
   C. 07 92 00 - Joint Sealants.

1.03 REFERENCES:
   B. Brick Institute of America (BIA).

1.04 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.

1.05 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 effects of 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.

1.06 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. Work masonry surfaces only when air temperatures are 40 degrees Fahrenheit (4 degrees Celsius) and above and will remain so at least seven days after masonry work and until masonry has dried out.

G. 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.

H. 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.

I. Protect sills, ledges, and projections from mortar droppings.

J. Shore and/or temporarily support existing masonry as required to complete the work. 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.

1.07 SEQUENCING AND SCHEDULING:
A. Perform masonry restoration work in following sequence.
   1. Rake out and remove existing mortar from joints to be sealed or re-pointed.
   2. Repair loose brick masonry.
   3. Route out and seal masonry cracks to be repaired.
   4. Clean existing masonry surfaces.

1.08 WARRANTY:
A. Provide contractor's warranty for labor and material to reinstall any work not performing as intended for a period of two years after Substantial Completion.

PART TWO - PRODUCTS

2.01 MORTAR MATERIALS:
A. Portland Cement:
   1. ASTM C 150, Type I.
   2. Provide non-staining 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 MASONRY UNITS:
A. Units to match existing in shape, size, color, texture, and material; ASTM C216, Grade SW.
B. Building Brick: Provide building brick complying with ASTM C 62 of same vertical dimension as face brick for masonry work concealed from view.
C. 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 as approved by the Owner's Representative.
D. 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.
3. Match color of existing mortar as approved by the Owner's Representative.

2.03 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 Contracting Officer’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.

2.04 THRU-WALL FLASHING:
   A. Sheet Metal, Type 304, stainless steel sheet, No. 2D (dull, cold rolled) finish; 24 gauge; reference Section 07 62 00.

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 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 MASONRY:
   A. Clean masonry as necessary to return to original condition upon completion of through-wall flashing and other masonry restoration work.
   B. Determine method of cleaning based upon adjoining materials, site conditions, and manufacturer's requirements.
   C. Use hand-cleaning method or other approved method to clean masonry substrate.
   D. Verify surfaces to be restored are clean, free of efflorescence, stains, mildew, grime, dirt, tar, oil, grease, or other foreign matter.

3.03 MASONRY REMOVAL AND REBUILDING:
   A. Masonry Removal:
      1. Carefully remove by hand, masonry which are damaged, spalled, and at locations to install new through-wall flashings. Cut out full units from joint to joint in manner to permit salvage and replacement with full size units.
      2. Support and protect masonry to remain that surrounds removal area.
      3. Salvage as many whole, undamaged masonry units as possible.
      4. Remove mortar, loose particles, and soil from salvaged masonry units by cleaning with brushes and water. Store salvaged masonry units for reuse.
      5. Clean remaining masonry units at edges of removal areas by removing mortar, dust, and loose debris in preparation for rebuilding.
      6. Replace damaged or missing existing brick ties and dampproofing on backup wall and structure.
B. Masonry Rebuilding:
   1. Prepare and apply new dampproofing to existing backup wall, where required.
   2. Install new thru-wall flashing as required, transitioning with back-up wall and as specified in Section 07 62 00.
   3. Layout replacement brick units in a grid pattern to locate brick ties at mortar joints, at spacing no less than 16-inches vertically and horizontally.
   4. Install new or salvaged masonry units to replace removed masonry units. Fit replacement units into existing bonding and coursing pattern. If cutting is required, use motor driven saw designed to cut masonry with clean, sharp unchipped edges.
   5. Lay replacement masonry units with filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet clay brick which have ASTM C 67 initial rates of absorption (suction) of more than 30 grams per 30 square inches per minute. Use wetting methods that ensure units are nearly saturated but surface dry when laid. Maintain joint width for replacement units to match existing.
   6. Tool exposed mortar joints in repaired areas to achieve smooth concave profiles.
   7. Repoint new mortar joints in repaired area to comply with requirements for repointing existing masonry.
   8. Install new through-wall flashings at designated rise wall locations and as outlined in Section 07 62 00.
   9. Install weeps at through-wall flashings, spaced 24-inches on-center or every third brick by omitting mortar in full head joint.

3.04 FINAL CLEANING:
   A. Thoroughly clean exposed masonry 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.

3.05 ADJUSTING AND CLEANING:
   A. Correct damage to other work by cleaning, repairing or replacing as directed by Contracting Officer. 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 01 20
SECTION 06 01 10
ROUGH CARPENTRY

PART ONE - GENERAL

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

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

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

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

PART TWO - PRODUCTS

2.01 MATERIALS:
A. Wood Members, Nailers, and Blocking Lumber: Noncombustible Standard Grade Fir or No. 2 Southern Yellow Pine bearing UL label, Kiln-dried after treatment, complying with American Lumber Standards of manufacturer’s association under whose rules lumber is produced, minimum size 2-inches (50mm) by 6-inches (150mm), nominal.
B. Treatment for Wood Members: Pressure-preservative treated in accordance with AWPA C2, C9 standards, Above Ground Contact Alkaline Copper Quat Type C (ACQ-C) or Copper Azole Type A (CBA-A) at 0.20 pcf.
C. Plywood:
   1. Exterior Sheathing:
      a. Thickness: 1/2-inch, nominal.
      b. Grade: C - D.
      c. Exterior grade.

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

PART THREE - EXECUTION

3.01 INSTALLATION:
A. Nailers:
   1. Replace wood nailers and curbs with new nailers and curbs as required.
   2. Install wood nailers to match height of new insulation board.
   3. Secure 2X base nailing into structure and/or substrate for anchorage of cleats and/or fascias of sheet metal fabrications, width as necessary to extend beyond horizontal flange of sheet metal fabrication.
   4. Clean and prepare existing surfaces to receive wood nailers and curbs.
   5. Install 2 X 6 wood nailing, minimum, as base nailer at perimeters or tops of parapet walls. Nailers shall match width of wall and provide minimum 1-inch per foot slope toward roof.
   6. Install wood nailers and curbs continuously with 1/4-inch (6mm) gap between each section. Set level and true. Pre-drill nailers prior to attachment. Countersink fastener in base nailing so that washer and head of fastener or nut are recessed below top of nailing.
7. Securely fasten to structure with appropriate fasteners to resist minimum 175 pounds per linear foot (780N per 300mm) force in any direction and spaced 12-inches on-center. Use of powder-actuated fasteners is prohibited. Place a fastener within 3-inches (75mm) of each end of each section of wood blocking.

8. Secure nailers to concrete deck with appropriate fasteners spaced 24-inches (600mm) on-center. Secure nailer with a minimum of two fasteners per nailer.

9. Stagger joints in subsequent layers of nailers from joints in underlying layer of nailers a minimum of 12-inches (300mm).

10. Install nailers so that ends and sides of adjoining nailers are aligned to form right angles (nominal) at corners.

11. Weave ends of subsequent layers of nailers at corners so that ends of nailers do not align.

12. Secure nailers to wood substrate using nails 24-inches (600mm) on-center, staggered. Install nails on an angle.


14. If attaching wood nailer to concrete masonry block, install stainless steel threaded rod spaced 12-inches (300mm) on-center in fully grouted cell/core of CMU.

15. Reduce fastener spacing 50 percent at a distance of 10 feet (3m) from each corner.

16. Secure new nailer to existing nailer or curb when increasing curb height utilizing appropriate fasteners, gusset plates, and framing anchors.

B. Plywood/Gypsum Sheathing:

1. Install new sheathing at walls, curbs, and over unsuitable substrates to receive new roofing. Replace damaged, deteriorated, or non-salvageable existing sheathing.

2. Secure sheathing to substrate with flat head fasteners (type appropriate for substrate) spaced 12-inches (300mm) on-center.

3. Secure sheathing to wood substrate with nails spaced 6-inches (150mm) on-center.

4. Install new sheathing at roof hatches and metal curbs. Secure sheathing to substrate with flat head fasteners (type appropriate for substrate) spaced 12-inches (300mm) on-center. Trim exposed ends of screws on inside of hatch/curb.

3.02 CLEAN UP:

A. Premises shall be kept in a neat and orderly condition.

B. After installation of all rough carpentry, contractor shall remove all construction debris and equipment from job site.

END OF SECTION 06 01 10
SECTION 07 22 16

ROOF BOARD INSULATION

PART ONE - GENERAL

1.01 SECTION INCLUDES:
   A. Installation of flat stock layers of insulation, tapered insulation crickets, and secondary/cover board insulation.

1.02 RELATED SECTIONS:
   A. 02 07 20 - Minor Demolition and Renovation.
   B. 07 52 00 - Modified Bitumen Membrane Roofing.
   C. 07 62 00 - Sheet Metal Flashing & Trim.

1.03 REFERENCES:
   B. FM Global Approval Guide.

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, general requirements of NRCA, and as supplemented by these documents.
      2. Consider roof system manufacturer's technical specifications part of this Specification and use as reference for specific application procedures.
      3. Install roof system in manner to resist minimum wind uplift pressures of 90 psf for the field of the roof, 120 psf in 12-feet wide perimeter zones; and 180 psf for 12-foot by 12-foot corner zone, and in accordance with approved tested assembly requirements. Pressures are based on ASCE 7-2010 and assuming 150 mph wind speeds, Exposure B, Risk Category III/IV, and a Safety Factor of 1.2.
1.05 DELIVERY, STORAGE, AND HANDLING:
   A. Store materials in accordance with manufacturer's recommendations.
   B. Outdoor Storage:
      1. Tarp and shield insulation from moisture and exposure to sun.
      2. Elevate insulation above substrate 4-inches minimum.
      3. Secure insulation to resist high winds.
      4. Do not use insulation which has been determined "wet" or which has been wet and has dried.
      5. Distribute insulation stored on roof deck to prevent concentrated loads that would impose excessive stress or strain on deck or structural members, or impede drainage.
      6. Remove manufacturer plastic shrink wrapping from materials prior to covering with protective tarps/canvas.

1.06 SUBMITTALS:
   A. Product Data: Submit manufacturer's product data sheets, providing descriptive data, dimensions, LTTR values, and other pertinent criteria for each material proposed for use in construction of roof assembly.
   B. Samples: Provide physical examples of materials/components proposed for use to comprise the specified roof system.

1.07 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.

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

PART TWO - PRODUCTS

2.01 ROOF INSULATION:
   A. Flat Stock Base Layer Insulation: Rigid, closed cell polyisocyanurate rigid board insulation utilizing non-chlorine/non-ozone depleting blowing agent, bonded to non-asphaltic coated fiberglass facers. Maximum board size is 4 feet by 4 feet, 3-1/2-inch thickness; such as "ACFoam-III" by Atlas Roofing Corp, "FlintBoard ISO Cold" by Certainteed, "Resista" by Firestone, "ENRGY3 CGF" by Johns Manville, "Paratherm CA" by Siplast, or approved equal.
B. Tapered Insulation: Rigid, closed cell tapered polyisocyanurate rigid board insulation utilizing non-chlorine/non-ozone depleting blowing agent, bonded to non-asphaltic coated fiberglass facers. Maximum board size is 4 feet by 4 feet, tapered to provide 1/4-inch per foot resulting slope, such as "Tapered AC Foam III" by Atlas, "Tapered FlintBoard ISO Cold" by Certainteed, "Tapered Resista" by Firestone, "Tapered ENRGY 3 CGF" by Johns Manville, or approved equal.

C. Cover Board: Moisture-resistant, 1/2-inch thick gypsum core roof board such as “SecuRock” by US Gypsum, “DensDeck Prime” by Georgia Pacific, or approved equal.

D. Tapered Edge Strip: Tapered perlite 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 such as “Tapered Fesco Edge Strip” by Johns Manville.

2.02 RELATED MATERIALS:
A. 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.

B. 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.

C. 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 Adhesive” by Johns Manville, or approved equal.

D. Insulation Fasteners: CR-10 fluorocarbon coated meeting or exceeding FM 4470, self-tapping heavy duty screws of sufficient length to penetrate the steel deck a minimum of 3/4-inch (19mm), minimum 3-inch (75mm) diameter steel plates with recessed #3 Phillips screw head for use with insulation, such as "#14 Heavy Duty Roofing Fastener" as manufactured by OMG, “PerLock Heavy Duty Fastener” by DerbiGum, “Parafast HD Fastener” by Siplast, “All Purpose Fastener” by Johns Manville, or as approved by manufacturer to achieve the designated uplift criteria.

PART THREE - EXECUTION

3.01 EXAMINATION:
A. Roof system manufacturer's representative shall inspect roof deck and associated substrates and provide written acceptance of conditions.

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

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

3.03 PREPARATION:
A. Do not install insulation until defects in roof deck and substrates are corrected in order to meet roof system manufacturer's requirements and to ensure that deck conditions will not restrict roof drainage.
B. Broom sweep and clean areas to receive new insulation.

3.04 INSTALLATION:
A. Insulation - General:
1. Install insulation to achieve a minimum R-value of R-25 continuous across the roof deck in general accordance with manufacturer's guidelines.
2. Stagger end joints of insulation boards 1/2 of overall length of board.
3. Butt joints tightly allowing no more than 1/4-inch (6mm) wide gaps between units. Fill joints between adjacent boards with like insulation or foam adhesive.
4. Do not use warped, bent, or otherwise damaged insulation boards.
5. Field cut and fit insulation at penetrations, curbs, and walls.
6. After installation of initial layer of insulation, install subsequent layers of insulation directly over preceding layer.
7. Stagger all joints (side and end) between layers of insulation.
8. Install tapered insulation in field of roof to achieve a resulting 1/4-inch per foot (minimum) slope on designated roof areas.
9. Field cut tapered insulation boards to create crickets at upslope sides of curbs, along walls, between drains, and to form sumps at drains to direct water to drainage medium.
10. Install tapered edge strips at changes in elevations, edges of crickets, and other locations to create monolithic and uniform substrate for installation of roof membrane.
B. Mechanically Attached Insulation:
   1. Mechanically attach insulation to metal form deck as appropriate for the
      proposed roof assembly.
   2. Install insulation with longitudinal joints continuous and end joints staggered.
   3. Mechanically fasten insulation layer to substrate in accordance with
      manufacturer's criteria to meet the specified wind uplift pressures.
   4. Fully engage and seat fasteners. Do not overtighten or strip threads. Bent,
      deformed, or unseated fasteners or plates are unacceptable.
   5. Fasteners must penetrate through substrate 3/4-inch (18mm), minimum. Do not
      overdrive fasteners. Remove and replace overdriven, stripped, or non-engaged
      fasteners.
   6. Properly seat mechanical fasteners and keep heads flush with plates. Remove
      and replace cupped plates or unseated screw heads.
   7. Do not rupture or deform surface of the insulation by mechanical fastening.
   8. Install fasteners to penetrate through the top flanges or ribs of the fluted steel
      deck.

C. Adhered Layers of Insulation:
   1. Adhere base layer or subsequent layers of insulation to roof deck, insulation, or
      substrate.
   2. Stagger end joints of insulation boards 1/2 of overall length of board. Stagger
      joints of subsequent insulation layers from underlying insulation layer.
   3. Butt joints of base and tapered insulation layers tightly allowing no more than 1/4-
      inch (6mm) wide gaps between units. Fill joints or gaps greater than 1/8-inch
      between adjacent boards with low-rise foam adhesive.
   4. Do not use warped, bent, or otherwise damaged insulation boards. Discard
      damaged boards.
   5. Field cut and fit insulation boards at penetrations, curbs, and walls. Field cut
      tapered insulation boards to create crickets at upslope sides of curbs, along
      walls, and to form sumps at drains.
   6. Ribbon Application of Low-rise Foam Adhesive: Dispense 3/4-inch to 1-inch
      (19mm to 25mm) diameter continuous ribbon of adhesive placed 3-inches
      (75mm) inside each edge/side of the insulation board in picture-frame fashion.
      Dispense remaining ribbons of adhesive between “picture-frame” placed
      adhesive ribbons spaced 12-inches (300mm) on-center in the field of the roof,
      spaced 6-inches (150mm) on-center within an 8-feet wide area along the roof
      perimeters, and spaced 3-inches on-center within an 8-feet by 8-feet area at
      corners of roof.
   7. Firmly set insulation boards in the ribbons of foam adhesive following application
      of the adhesive when adhesive has risen to proper height and walk-in the
      insulation to spread the adhesive ribbons, ensuring maximum contact. Do not
      push or slide insulation into position. Set weighted objects on sides, ends, and
      corners of boards until insulation is firmly attached (approximately 20 to 45
      minutes).
   8. On additional insulation layers, dispense ribbons of adhesive in direction
      perpendicular to the direction of the beads that were dispensed on the underlying
      layer.
9. Fill voids or open joints in top layer of insulation with spray-foam adhesive to provide monolithic surface to receive new membrane.
10. 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).
11. Install cover board over insulation in accordance with these specifications and manufacturer's guidelines.

D. Heat Exhaust Vents:
1. Install heat resistant insulation around existing heat exhaust flue, vent pipes, or other penetrations that experience elevated operation temperature.
2. Install new sheet metal base around insulation and strip flange into new roof.

E. Insulation Filler: Install compressible fiberglass insulation at openings in deck at penetrations, perimeters, expansion joints, and/or curbs.

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

3.06 ADJUSTING:
A. Remove damaged insulation and install acceptable new units before installation of roof system.

3.07 PROTECTION:
A. Provide special protection from traffic on completed work.

END OF SECTION 07 22 16
SECTION 07 52 00

MODIFIED BITUMEN MEMBRANE ROOFING

PART ONE - GENERAL

1.01 SECTION INCLUDES:
   A. Installation of two-ply modified bitumen roof membrane and related flashings.

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

1.03 REFERENCES:
   B. FM Global Approval Guide.
   F. Cool Roof Rating Council (CRRC).

1.04 QUALITY ASSURANCE:
   A. Application:
      1. Approved by manufacturer of accepted roofing system.
      2. A single applicator with a minimum of five years previous successful experience in installations of similar systems.
      3. Demonstrated successful installation in three other comparable historic buildings will be preferred. Submit subcontractor qualification statement.
   B. Manufacturer Requirements:
      1. Roof Membrane Assembly: Classified by Underwriters’ Laboratories, Inc. as a Class A roof covering with no slope limitations.
      2. Roof Membrane Assembly: Classified by FM Global as a Class 1, approved assembly and Class 1-SH (Severe Hail) exposure.
      3. Manufacturer to have direct actual in-house experience in the manufacturing of the specified or similar products for a period of a minimum of twenty years.
      4. Manufacturer to have documented project history of installation of the specified or similar products in the United States for a period of a minimum of twenty years.
      5. Manufacturer to provide authorized documentation of the physical/mechanical properties from the testing laboratory of Manufacturer of the actual materials utilized for the project indicating compliance with applicable ASTM standards D 5147 and D 6298.
6. Manufacturer's top membrane ply product shall be tested by CRRC and meet the following requirements: Initial Solar Reflectance of 0.70 (minimum) and Thermal Emittance of 0.75 (minimum).

7. Manufacturer's products shall comply with the following standards:
   a. Polyester/Fiberglass composite reinforcement SBS modified bitumen sheet, ASTM D 6162, Grade S or G, Type 1 – 3.
   b. Fiberglass-reinforced SBS modified bitumen sheet, ASTM D 6163, Type 1 – 3, Grade S or G.
   c. Polyester-reinforced SBS modified bitumen sheet, ASTM D 6164, Type 1 – 3, Grade S or G.
   d. Polyester-reinforced APP modified bitumen sheet, ASTM D 6222, Type 1 or 2, Grade S or G.

8. Proposed roof membrane system meets the requirements of ASTM D 5849 Resistance to Cyclic Joint Displacement (fatigue) at 14 degrees Fahrenheit (-10 degrees Celsius). Passing results shall show no signs of membrane cracking or interply delamination after 500 cycles in an unaged specimen and 200 cycles in a specimen after heat conditioning.

C. Regulatory Requirements:
   1. Classified by Underwriters' Laboratories, Inc. as a Class A roof covering.
   2. Classified by FM Global as a Class 1A assembly.
   3. Follow local, state, and federal regulations, safety standards and codes.
   4. Install roof system in manner to resist minimum wind uplift pressures of 90 psf for the field of the roof, 120 psf in 12-feet wide perimeter zones, and 180 psf in 12-feet by 12-feet corners. Pressures are based on 150 mph wind speed, Exposure B, Risk Category III/IV, and a Safety Factor of 1.2.
   5. Refer to applicable building codes for roofing system installation requirements and limitations. When a conflict exists, the more restrictive document will govern.
   6. Provide tested and approved system to meet or exceed the specified wind uplift pressures.

D. Laboratory Testing and Samples:
   1. At Owner's request, obtain field samples of the completed roof membrane, laps, and/or assembly.
   2. Take samples at locations designated by Owner's Representative and test for compliance with the requirements of the Contract Documents and with manufacturer's published performance criteria.
   3. Assume all costs for extraction and patching of all samples. Owner shall assume all costs for testing of field samples.
   4. Correct all deficiencies in accordance with the manufacturer's recommended procedures at no cost to Owner.
   5. If for any reason, areas that are tested by Owner fail to meet manufacturer's requirements, then all subsequent expense for retesting of those areas will be borne by Contractor.
E. Installation:
   1. Install in accordance with the manufacturer's current published application procedures, the general recommendations of the National Roofing Contractor's Association, and as supplemented by these documents.
   2. Follow Underwriters Laboratories requirements acceptable for use with specified products or systems.
   3. During installation and upon completion of installation, an inspection shall be conducted by a technical representative of the manufacturer to certify that roofing system has been installed according to manufacturer's most current published specifications and details.
   4. All roofing shall be as described in this Section and shall be provided and/or approved by roof system manufacturer.
   5. Obtain written approval from the manufacturer for any materials not manufactured or provided by manufacturer stating that materials are acceptable and are compatible with other materials and systems required.
   6. Personnel designated to utilized propane torching equipment to install roofing materials must have current CERTA safety certification issued by MRCA.
F. Make no deviations from this Specification or the approved shop drawings without the prior written approval of the Architect, Owner's Representative, and roof membrane manufacturer.
G. Perform entire work of this Section in accordance with the best standards of practice relating to the trades involved.

1.05 DELIVERY, STORAGE AND HANDLING:
A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.
B. Store materials in accordance with manufacturer's recommendations. Store rolled goods on end on clean raised platforms. Store other materials in dry area, protected from water and direct sunlight, and maintain at a temperature of 60 to 80 degrees Fahrenheit (16 to 27 degrees Celsius).
C. Provide continuous protection of materials against deterioration.
D. Materials Stored on Roof Levels:
   1. Distribute materials stored on roof to prevent concentrated loads that would impose excessive strain on deck or structural members or impede drainage. Position materials stored on roof over structural support beams and/or columns.
   2. Positively secure materials and protective covers to prevent displacement by wind.
   3. Tarp for protection from exposure.
   4. Cut and remove manufacturer's plastic "shrink wrapping" from materials during storage.
1.06 SUBMITTAL:
A. General:
1. Material manufacturer's roof system letter indicating the following: proposed roof system components; general installation requirements (adhesive coverage rate, fastener pattern layout, etc.); roof system uplift pressure resistance; and warranty coverage to be provided.
2. Material manufacturer’s written approval/acceptance of specified roof system and issuance of specified warranty for project.
3. Shop drawings of details.
4. Manufacturer’s product data sheets with 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. Shop drawings which illustrate the Work, showing fabrication, layout, setting, or installation details.
2. Prepare shop drawings for details that are proposed for the project. Indicate on a roof plan, the proposed location of detail presented on shop drawing.
3. Indicate joints, types, and locations of fasteners, shapes, sizes, expansion joints, special conditions, and installation procedures for each flashing condition. Note critical dimensions, gauge, and finish of sheet metal for each flashing condition.
4. Submit shop drawings showing layout, joining, profiles, and anchorages of fabricated work.
5. Provide drawings depicting insulation board attachment for field, perimeter, and corner zones.
C. Product Data: Submit manufacturer's catalog sheets, providing descriptive data for each material proposed for use in construction of roof assembly and related flashings and components.
D. Samples: Provide physical examples of materials/components proposed for use to comprise the specified roof system.

1.07 PROJECT CONDITIONS:
A. Existing Conditions: Examine existing building and existing roofing and decking to determine physical conditions that affect removal of existing roofing and installation of new roofing and decking.
B. Environmental Requirements:
1. Apply roofing in dry weather.
2. Do not remove existing roofing and flashing in inclement weather or when rain is predicted (30% or more possibility).
3. Do not apply materials when ambient temperature is below 40 degrees Fahrenheit (5 degrees Celsius).
4. Do not expose material to a constant temperature in excess of 180 degrees Fahrenheit (82 degrees Celsius).
C. Protection:
   1. Provide special protection or avoid heavy traffic on completed work when ambient temperature is above 80 degrees Fahrenheit (27 degrees Celsius).
   2. Restore to original condition or replace work or materials damaged during handling or roofing materials.
D. Emergency Equipment: Maintain on-site equipment necessary to apply emergency temporary edge seal in the event of sudden storms or inclement weather.

1.08 SEQUENCING AND SCHEDULING:
A. Do not remove more existing roofing in one day than can be replaced with new roofing and flashing in same day.

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

PART TWO - PRODUCTS

2.01 MANUFACTURER:
A. Acceptable SBS Modified Bitumen Roofing Manufacturers:
   1. Siplast.
   2. Soprema.
   3. Firestone.
   5. Or approved equal.
B. Acceptable APP Modified Bitumen Roofing Manufacturers:
   1. Derbigum.
   2. Certainteed.
   3. Firestone.
   4. Or approved equal.
2.02 SHEET MATERIALS:
A. SBS Membrane System:
1. Membrane Base Ply: Smooth-surfaced, polyester-reinforced, SBS modified bitumen sheet, suitable for application with cold-adhesive and/or heat-welding/torching methods such as "Paradiene 20 PR TG" or "Paradiene 20 PR" by Siplast, "Sopralene Flam 180" or "Sopralene 180 PS" by Soprema, "SBS Poly Torch Base" or "SBS Poly Base" by Firestone, or "DynaWeld 180S" or "DynaBase PR" by Johns Manville, or approved equal.
3. Base Flashing System: One-ply of specified membrane base ply and one ply of specified top ply or other white-colored granule surfaced polyester-reinforced SBS modified bitumen flashing sheet such as "Parafor 30 TG BW" by Siplast.
B. APP Membrane System:
1. Membrane Base Ply: Smooth-surfaced, polyester-reinforced APP modified bitumen sheet suitable for application with cold adhesive and/or heat welding/torching such as "DerbiBase HV" by DerbiGum, "Flintlastic STA" by Certainteed, or "APP 160" by Firestone.
2. Membrane Top Ply: White-colored surfacing, polyester-reinforced, APP modified bitumen sheet suitable for application with cold adhesive and/or heat welding/torching methods such as "DerbiColor P CR FR" by DerbiGum, "Flintlastic GTA-FR with Cool Star" by Certainteed, or "APP 180 FR UltraWhite" by Firestone.

2.03 RELATED MATERIALS:
A. Asphalt Primer: ASTM D 41.
B. Edge Sealant: Rubberized asphaltic plastic roof cement that is gun-grade version for sealing terminations of cap sheet such as "PerFlash" by DerbiGum, "Elastomastic 209" by Henry Co, or "#19 Ultra Rubberized Flashing Cement" by Karnak.
C. Elastomeric Plastic Roof Cement: Rubberized plastic roof cement such as "PerFlash" by Performance or "#19 Ultra Rubberized Flashing Cement" by Karnak to be used for temporary seals of flashings, embedding flanged sheet metal flashings, and three coursing of seams, termination bars, and cuts in modified bitumen sheets.
D. Cold Process Adhesive: Asphaltic blend cold-process rubberized adhesive that can be applied with sprayer, squeegee or roller and classified as low VOC not exceeding 220 grams/liter VOC limits, such as "Permastic" by DerbiGum, "PA 311M" by Siplast, "MBR Bonding Adhesive", by Johns Manville, or approved equal.
E. Cant Strip: 3-5/8-inches (92mm) by 1-1/2-inches (38mm) composite cant strips of perlite such as "FesCant Plus" by Johns Manville or "Energy Guard Perlite Cant Strip" by GAF with field-cut strips of cover board with chamfered ends or triangular-shaped modified bitumen cant strip comprised of cut sections of DerbiGum GP, 2-1/4-inch X 2-1/4-inch X 3-1/4-inch in size such as "Double DerbiCant" by DerbiGum.

F. Walk Pads/Protection Pads: Pre-manufactured sheet or cut sections of granule surfaced polyester-reinforced modified bitumen sheet, extending minimum 2-inches (50mm) beyond edge of overlying element, with rounded corners and to have contrasting granule color from top ply such as "DerbiGum FR" by DerbiGum, "ParaTred" by Siplast, "DynaTred" by Johns Manville, or approved equal.

G. Heavy-duty Protection Pad: Asphaltic composite board with mineral surfacing, 3/4-inch thick, (3’ X 3’) (3’ X 5’) size to suit application, such as "Whitewalk" by W.R. Meadows (2555 N.E. 33rd Street, Fort Worth, Texas 76111, 817/834-1969) or panel composed of recycled rubber particles such as "Roof-Gard Pads" by Humane Manufacturing, LLC (805 Moore Street, Baraboo, Wisconsin 53913, 800/369-6263), "Duo-Pad" by W.R. Meadows (1/2-inch by 30-inch by 4 foot) (3/4-inch by 33-inch by 4-foot), or "Walkway Roof Pads" by RB Rubber Products, Inc. (904 N.E. 10th Avenue, Portland, Oregon 97128, 503/472-4691).

H. Liquid Flashing System: Fluid-applied reinforced flashing system to apply around roof penetrations, low-profile flashing substrates, at roof drains, or other suitable locations that would be included in the warranty coverage for the roof membrane system and match color of finish ply such as "SeamFree" by Johns Manville, "Parapro" by Siplast, "DerbiFlash" by Derbigum, "Alsan" by Soprema, or approved equal.

I. Elastomeric Roof Coating: Acrylic-based elastomeric coating, 50% solids by volume, minimum, with primer/base coat bleed-blocker suitable to apply to modified bitumen sheet and to be included in the specified warranty such as "TopGuard" or "CR Seam Coating" by Johns Manville, "PermaCool" by DerbiGum, "PC 227 Elastomeric Coating" by Siplast, or approved equal.

2.04 MISCELLANEOUS MATERIALS:
A. Best grade or quality approved by the manufacturer for the specific application.

PART THREE - EXECUTION

3.01 EXAMINATION OF SURFACES:
A. Examine substrate, roof deck, and related surfaces, and verify that there are no conditions such as inadequate anchorage, foreign materials, moisture, ridges, or other conditions that would prevent satisfactory installation of the roofing system.

B. Correct or complete any condition requiring correction or completion prior to installation of the roofing system. Notify Owner's Representative in writing of unacceptable conditions.

C. Verify the location of all interior ducts, electrical lines, piping, conduit, and/or similar obstructions. Perform all work in such a manner as to avoid contact with the above-mentioned items.
D. Verify insulation is installed correctly.
E. Start of work under this Part Three constitutes acceptance of deck substrate and site conditions.

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

3.03 APPLICATION:
A. Prior to roof membrane installation, seal all openings, projections, and penetrations in the substrate to prevent material or debris entry into the building. Correct damage to the building or interior components caused by work at Contractor’s sole expense.
B. Membrane Installation - General:
   1. Apply roofing in accordance with roofing system manufacturer's instructions and the following requirements. Apply roofing immediately following application of insulation as a continuous operation.
   2. The overall appearance of the finished roof application is a standard requirement for this project. Make necessary preparations, utilize recommended application techniques, apply specified materials, and exercise care to ensure finished application is acceptable to Consultant and Owner.
   3. When applicable, install sheet materials using adhesives applied to substrate for adhering the field of the sheet. Side laps and end laps shall be fused together using electric-operated hot-air welding equipment suitable for use with modified bitumen materials such as provided by Cadillac Products, Leister, or other suitable equipment.
   4. Prime top and bottom of metal surfaces, concrete surfaces, and masonry surfaces to receive roofing with a uniform coating of asphalt primer, at a nominal rate of one-gallon (3.8 liters) per 100 square feet (9.29 square meters).
   5. Place cant strips on top of substrate to form continuous monolithic substrate at walls and curbs. Nail wood cants to nailer and to wall or vertical nailer, where possible. Secure fibrous cants by embedding in ribbons of low-rise foam adhesive. Miter cut cant strips to form continuous substrate at corners. Adhere cut piece of roof cover board in low-rise foam adhesive over top of fibrous cant.
   6. Lay all layers of roofing free of wrinkles, creases, or fishmouths. Exert sufficient pressure on the roll during application to ensure prevention of air pockets.
   7. Lay layers of roofing perpendicular or parallel to the slope of the deck as recommended by manufacturer.
   8. Install roof system configuration and components as required to meet the requirements of the testing assembly for the respective proposed roof material manufacturer.
C. Membrane Application - Base Ply:
   1. Cold Adhesive Application Option: Apply two plies of modified bitumen base ply over substrate in uniform continuous application of cold process adhesive. Apply adhesive at a nominal rate of 1-1/2 gallons to 2-1/2 gallons (5.71 liters to 9.5 liters) per 100 square feet (9.29 square meters), depending on the substrate (base sheet or insulation). Keep the adhesive applicator in close proximity to the material roll, maximum 2 feet (.7m). Exert sufficient pressure on roll during application. Roll field of sheet after initial installation of base ply with weighted lawn/linoleum roller. Heat-fuse the side and end lap seams of base ply with controlled hot-air equipment.
   2. Heat-Fusing Application Option: Apply one ply of modified bitumen base ply over substrate using heat-fusing methods with hot-air gun equipment suitable for modified bitumen sheets. Apply heat evenly across the front face and full width of the roll while pulling roll forward and unrolling roll uniformly with an even downward pressure. Apply heat to roll until the bitumen back coating reaches the desired application temperature, resulting in complete melting of the burn-off film, a glossy appearance of the back coating, and an approximate 1/4-inch (6mm) to 1/2-inch (13mm) bitumen flow from edge of sheet. Exert sufficient pressure on roll during application. Do not stand on the subject sheet during the installation process.
   3. Fully adhere membrane base ply to base sheet or insulation and have a minimum of 3-inch (75mm) side laps and 6-inch (150mm) end laps. Stagger end laps of adjacent sheets of membrane base ply a minimum of 3 feet. Extend field sheet of membrane base ply to top edge of cant.
   4. Complete membrane base ply application over respective roof area prior to application of membrane top ply. Apply additional ply of membrane base ply in low areas or areas that may be subjected to ponding water or to promote positive drainage.
   5. Apply a patch over areas of base ply with areas of physical damage or other defects. Patch to be the full width of membrane base ply and extend a minimum of 2-inches (50mm) beyond the defect in each direction.
   6. Check lap seams and seal unbonded or discontinuous seams using a heated steel trowel.

D. Base Flashing Application - Base Ply:
   1. Install and complete application of base ply of flashing each day base ply of membrane is installed. Install base ply flashings at curbs and parapet walls.
   2. Install first ply of base flashing extending horizontally 4-inches (100mm) beyond edge of cant or sheet metal flashing flange and vertically to top edge of curb, wall, or minimum 4-inches (100mm) above the top of the cant.
   3. Length of base flashings shall be maximum 6-feet (2m). Lap ends of base flashings 4-inches (100mm), minimum. Seal top edge of base flashing on a daily basis with a continuous troweling of elastomeric roof cement.
   4. Check lap seams and seal unbonded or discontinuous seams using a heated steel trowel.
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, attached 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 roll length in half approximately 15-foot lengths. Lay cut sections of top ply with underside exposed to allow the sheet to relax prior to application. Prior to application, re-roll "relaxed" sheet using insert provided with roll.
2. Beginning at the low point on the roof, fully adhere membrane top ply to membrane base ply with minimum of 3-inch (100mm) side laps or width of selvage edge and 6-inch (150mm) end laps. Extend membrane top ply to top edge of cant. Apply each sheet directly behind applicator. Stagger side laps of top ply a minimum of 12-inches (300mm) from side laps of base ply.
3. Cold Adhesive Application: Apply modified bitumen top ply in uniform continuous application of cold process adhesive. Apply adhesive at a nominal rate of 1-1/2 gallons to 2-1/2 gallons (5.71 liters to 9.5 liters) per 100 square feet (9.29 square meters). Keep the adhesive applicator in close proximity to the material roll, maximum 2 feet (.7m). Exert sufficient pressure on roll during application. Roll field of sheet after initial installation of top ply. Heat-fuse the side and end lap seams of the cap sheet with hot-air gun equipment.
4. Heat-Welding/Fusing Application: Apply heat evenly across the face and full width of the roll while unrolling roll uniformly with an even downward pressure. Apply heat to roll using hot-air equipment until the bitumen back coating reaches the design application temperature, resulting in complete melting of the burn-off film, a glossy appearance of the back coating, and an approximate 1/4-inch (6mm) to 1/2-inch (13mm) bitumen flow from edge of sheet. Roll lap seams with steel roller immediately upon fusing/mating of the sheets.
5. While installing membrane top ply, provide proper protection or method during application to prevent contamination, soiling, charring, or marring the finish surfacing of previously installed sheet. Exert sufficient downward pressure on roll during application.
6. During end lap application, trim the inside corner along the selvage edge of the underlying sheet at the end of the roll. The trimmed area shall be the width of the selvage edge and extend downward from the end of the roll to the outer side of the roll in a linear direction approximately 5-1/2-inches (138mm) from end of roll. Trim outside corner of membrane top ply at end laps to provide rounded finished corner. Remove surfacing or de-granulate areas of underlying top ply to receive overlapped portion of adjacent sheet. Pre-heat the subject area of the underlying sheet so that surfacing material can be removed or that granules can be "depressed" or sunk into the compound and the bitumen compound exudes up through the granules to result in a bituminous material-to-bituminous material contact.

7. Embed white-colored granules into bituminous bleed-out along edges of cap sheet to provide monolithic surface color.

8. Install membrane top ply so that end laps of every other sheet are aligned.

9. Apply a patch over areas of membrane with displaced/dislodged granules/surfacing or other surface discoloration or defects. Patch shall be the full width of membrane top ply and extend a minimum of 2-inches (50mm) beyond the defect in each direction. Round corners of membrane patches.

10. Apply additional finish material, color to match top ply, over stains, soiling, and other areas of the top ply with displaced or discolored surfacing.

11. Check lap seams and seal unbonded or discontinuous seams using a heated steel trowel.

12. Apply membrane top ply and terminate at the rise in the metal component. Apply a continuous bead of edge sealant along edge terminations of modified bitumen sheet (i.e. flashing flanges, exhaust vents, metal edge, etc.). Bead of edge sealant shall match height of top sheet surfacing and shall be "canted" to shed water. Embed loose granules or coat with elastomeric coating, color to match top ply, into newly installed edge sealant.

G. Base Flashing Application - Top Ply:
1. Apply top ply of flashings only after membrane top ply is in place at curbs and parapet walls.

2. Remove surfacing or de-granulate granulated surfaces on top ply sheet of membrane and flashings to receive flashing top ply. Pre-heat the subject area of the underlying surfaced sheet so that surfacing can be removed or so that granules can be "depressed" or sunk into the compound and the bitumen compound exudes up through the granules to result in a bituminous material-to-bituminous material contact.

3. Cut modified bitumen flashing membrane to extend a minimum of 4-inches (100mm) above the top of the membrane top ply covering the cant. The overall minimum height of the top of the flashing membrane above the top of the roof surface is 8-inches (200mm). Extend flashings to full height of vertical substrate.

4. Extend the flashing membrane horizontally 4-inches (100mm) onto the field of the roof surface beyond the bottom edge of the cant strip.

5. Cut flashing from roll using selvage edge as lap seam for adjacent sheets, resulting in sheet lengths of nominal 3 feet (1m). Lap ends a minimum of 4-inches (100mm) and stagger laps from laps of underlying plies.
6. Fully adhere and conform top ply of flashing to substrate. Extend bleed-out of applied base flashing a minimum of 1/2-inch (13mm) beyond the side or end lap. "Broom-in" foil-faced flashing ply immediately upon installation using a damp sponge mop. Embed granules or coat bleed-out with aluminum dust/elastomeric coating, to match finish surfacing.

7. Walls: Mechanically attach top edge of modified bitumen membrane flashing with termination bar and appropriate fasteners spaced 6-inches (150mm) on-center. Apply three-coursing consisting of an initial continuous troweling of elastomeric plastic roof cement, embedded reinforcing fabric, and a secondary application of elastomeric plastic roof cement along and concealing the top edge of base flashing and termination bar. Utilize duct/masking tape, or similar tape, to provide line of demarcation for three-coursing located parallel and 2-inches below termination bar.

8. For wall substrates greater than 12-inches (300mm) in height, install base flashing to a height of 12-inches (300mm) as specified. For remaining wall height, Adhere modified bitumen flashing to substrate and overlap wall flashing on top edge of base flashing a minimum of 4-inches (100mm). Install appropriate fasteners in vertical lap seams spaced 6-inches (150mm) on-center. Apply three-coursing over completed lap seams.

9. Apply cut section of modified bitumen over corners of curb flashings to conceal cuts in flashing material at corner laps.

10. Install flashing sheets on adjoining perpendicular sides (outside corners) of curbs or walls so that outside corners of flashing sheet align and are rounded.

11. Curbs: For curbs with non-removable hoods/covers/units, extend flashing to full height of curb, secure with termination bar and appropriate fastener, and apply three-coursing of plastic cement and reinforcing fabric over top edge of sheet. Utilize duct/masking tape, or similar tape, to provide line of demarcation for three-coursing located parallel and 2-inches below termination bar. For curbs with removable hoods/covers/units, wrap flashing sheet over top of curb and secure to top or inside of curb with angle termination bar and appropriate fasteners spaced 6-inches (150mm) on-center.

H. Metal Flanged Flashings:
1. Apply membrane top ply and terminate at the rise in the metal component.
2. Apply a target around penetrations or utilize flashing method to conceal cuts in the membrane top ply.
3. Apply a continuous bead of edge sealant along edge terminations of modified bitumen sheet (i.e. flashing flanges, exhaust vents, metal edge, etc.). “Cant” bead of edge sealant to shed water. Embed loose granules in newly installed edge sealant and apply coating to match finish of top ply, where applicable.

I. Liquid-Flashings
1. Apply liquid flashing systems in accordance with the manufacturer’s application guidelines at select and designated locations where conventional flashings cannot be installed to meet manufacturer’s warranty requirements and around roof drain sump areas.
2. Clean penetrating element or approved substrate to receive liquid flashing system.
3. Apply masking tape on substrate to create straight-edge terminations of the liquid flashing system.
4. Embed reinforcing fabric in the liquid flashing system to form monolithic flashing with the finished roofing membrane. Apply finish surfacing on the liquid flashing system to match the color of the finished top ply of the roof membrane or substrate to which the coating is applied as approved by Architect.

J. Elastomeric Roof Coating:
1. Apply elastomeric roof coating over bituminous bleed-out along edges of modified bitumen membrane and base flashing top ply as required to achieve monolithic surface color.
2. Apply elastomeric roof coating over blemishes, soiled, or other areas of the modified bitumen membrane and base flashing top ply surfacing that are otherwise marred and/or diminished.
3. Apply elastomeric roof coating utilizing method to achieve monolithic coverage and appearance without holidays, voids, puddles, excessive accumulations, or visible directional application lines and extending full width of the ply sheet with straight line terminations.

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

L. Daily Fire Watch: Contractor personnel to perform daily “Fire Watch” a minimum of two-hours upon completion of heat-fusing installation methods. Contractor to utilize an infrared-sensing thermometer or similar equipment that can provide instant detection of elevated and/or different temperatures of roofing materials. If elevated or suspect temperatures or underlying conditions are detected, contractor to remove necessary materials and perform necessary actions to alleviate the noted condition. Maintain appropriate number of fire extinguishers on roof during installation of roofing, minimum one per application location.
3.04 PROTECTION PADS:
A. Install equipment and pipe supports over layer of heavy-duty protection pad loose laid on top of cut section of modified bitumen protection pad adhered to roof surface. Size of protection layers shall be minimum 2-inches longer in each direction through base of support with rounded corners.
B. Install protection pads, adhered to capsheet, in locations where items are to be installed on roof surface.

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

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

3.07 CLEANING:
A. Remove debris, adhesives, and sealants from surfaces.
B. Remove debris and material waste from project site.

END OF SECTION 07 52 00
SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART ONE - GENERAL

1.01 SECTION INCLUDES:

A. Shop or field-formed sheet metal work for moisture protection.
B. Types of work specified in this Section include:
   1. Roof penetration sleeves and bonnets.
   2. Receivers.
   3. Counter flashings.
   4. Expansion joint covers.
   5. Roof drains.
   7. Curb cap flashings.
   8. Exhaust vents.
   10. Metal edge flashing.
   11. Through-wall scuppers.
   12. Collector head and downspouts.
   13. Through-wall flashing.

1.02 RELATED SECTIONS:

A. 02 07 20 - Minor Demolition and Renovation Work.
B. 07 52 00 - Modified Bitumen Membrane Roofing.
C. 07 92 00 - Sealants and Caulking.

1.03 REFERENCES:

B. Federal Specifications (FS).

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.
1.05 PERFORMANCE REQUIREMENTS:
   A. Roof edge sheet metal flashing shall be certified by the manufacturer or shop-fabricator to comply with ANSI/SPRI Standard ES-1 for 150 mph wind speed and horizontal design pressure and vertical design pressure applicable for the eave height of the subject building. ANSI/SPRI ES-1 Test Method RE-2 Pull-Off Test for Fascia: The fascia system shall be tested in accordance with the ANSI/SPRI ES-1 Test Method RE-2. ANSI/SPRI ES-1 Test Method RE-3 Test for Copings.
   B. The sheet metal coping product shall be UL Classified by Underwriters Laboratories, Inc. or other third-party verification of compliance with the ANSI/SPRI ES-1 Wind Design Standard.
   C. Provide base sheet metal that is manufactured in the United States and incorporates some percentage of recycled content. Provide documentation from manufacturer/supplier supporting this information.

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

PART TWO - PRODUCTS

2.01 MANUFACTURERS:
   A. Acceptable Pre-finished Sheet Metal Manufacturers:
      2. Peterson Aluminum Corporation (PAC CLAD).
      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/m^2) 0.0391-inches (1mm) thick minimum as used for sanitary vent flashing, 4 pounds per square foot (140n/m^2) 0.0625-inches (1.6mm) thick minimum as used for roof drains.
D. Stainless Steel Sheet Metal:  ASTM A240, Type 304, ASTM A480, No. 2B/2D Mill Finish, gauge as scheduled.

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 40 20 – Minor Demolition and Renovation Work.
   2. Washers: Steel washers with bonded rubber sealing gasket.
   4. Rivets: Stainless steel material for the head and stem, closed end, color to match sheet metal items being adjoined.

2.04 RELATED MATERIALS:
A. Solder:
   1. ASTM B 32, alloy grade 58, 50 percent tin, 50 percent lead.
   2. For Use with Stainless Steel: 60-40 tin/lead solder, ASTM B 32.
B. Flux:
   1. Phosphoric acid type, manufacturer's standard.
   2. For Use with Steel or Copper: Rosin flux.
   3. For Use with Stainless Steel: Acid-chloride type flux, except use rosin flux over tinned surfaces.
C. Underlayment/Flexible Through-wall Flashing: Self-adhering butyl-rubber, modified bitumen or elastomeric sheet, 40-mils thick, suitable for high temperature of 180 degrees Fahrenheit and three month exposure such as "WIP 300 HT" by CCW.
D. Adhesives: Type recommended by flashing sheet manufacturer for waterproof and weather resistant seaming and adhesive application of flashing sheet.
E. Metal Accessories: Sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gauge required for performance.
F. Sealant:
   1. Type A: One component polyurethane sealant such as "Sikaflex 1a" by Sika Corp. or “Sonolastic NP1" by BASF, color to match finish of metal.
   2. Type B: Low 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.

G. Base Material for Flashing Pans:
1. Flashing Pans 12-inch by 12-inch and Smaller: Quick-setting grout formula meeting Corps of Engineers specification CRD-C-621, Type D and ASTM C-1107, Grade C, such as “Five Star Instant Grout” by Five Star Products, Inc., “Sika Grout 212” by Sika Corp., or approved equal.
2. Flashing Pans Larger than 12-inch by 12-inch: Spray-foam such as “FrothPak” by InstaFoam.

H. Pourable Sealer: Single-component pourable polyurethane sealer such as "Pourable Sealer" by JM, "1-Part Pourable Sealer" by Chem-Link, or approved equal.

I. Termination Bar: 1/8-inch (3mm) thick, 1-inch (25mm) wide extruded aluminum bar with flat profile, factory punched oval holes (1/4-inch by 3/8-inch [6mm by 9mm]) spaced 6-inches (150mm) on-center, such as "TB 125" by The TruFast Corp. or “Heavy Flat Bar” by OMG.

J. Stainless Steel Clamp: Stainless steel banding with worm-drive tightening, sized for application such as "Make-A-Clamp Kit" by Dynamic Fastener, 800/821-5448.

2.05 FABRICATION – GENERAL:
A. Fabricate work in accordance with SMACNA Architectural Sheet Metal Manual and other recognized industry practices and approved shop drawings.

B. Comply with material manufacturer's instructions and recommendations for forming material.

C. Shop fabricate work to greatest extent possible. Fabricate inside and outside corners for metal edge flashings and copings from single piece with equal length legs, minimum 3 feet. Notch, lap, and seam inside and outside corners of counter flashings.

D. Fabricate for waterproof and weather resistant performance with expansion provisions for running work sufficient to permanently prevent leakage, damage, or deterioration of work. Form work to fit substrates.

E. Make angle bends and folds for interlocking metal with full regard for expansion and contraction to avoid buckling.

F. Form materials with straight lines, sharp angles, smooth curves, and true levels. Avoid tool marks, buckling, and oil canning.

G. Fold back edges of exposed ends of sheet metal edge to form hem, 1/2-inch minimum.

H. Lap joints 1-inch (25mm) minimum. Rivet and solder joints on parts that are to be permanently and rigidly assembled for copper, stainless, aluminum, and galvanized sheet metal. Install rivets, spaced 1-inch (25mm) on-center and apply solder to secure and seal exposed edge of sheet metal in a uniform continuous bead with smooth top finish. Clean residue upon completion of soldering process. Fabricate sheet metal assemblies so that adjoining sections are nested to achieve continuous metal-to-metal contact.
I. Seams:
1. Fabricate non-moving seams in sheet metal with flat-lock seams.
2. Pre-finished Galvanized Sheet Metal: Seal pre-finished metal seams with rivets, spaced 1-inch (25mm) on-center, and silicone sealant, color to match metal finish.
3. Metal Other than Aluminum: Tin edges to be seamed, form seams, and solder.

J. Expansion Provisions: Where lapped 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 sealant concealed within joints.

K. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant in compliance with SMACNA standards.

2.06 FABRICATED ITEMS:
A. Receivers and Counter Flashings: Minimum 24 gauge prefinished or stainless steel sheet metal formed in maximum 10 foot (3m) lengths; fabricate “S”-shaped receiver to engage counter flashing a minimum of 1-inch; fabricate counter flashing with broken fascia of length to extend over top edge of base flashing a minimum of 4-inches with 1/2-inch hemmed drip edge.
B. Wind Clips: Minimum 24 gauge prefinished sheet metal, 1-inch (25mm) wide, length to engage counter flashing a minimum of 1/2-inch (13mm).
C. Roof Penetration Flashing Pan and Bonnet: Minimum 24 gauge stainless steel sheet metal. Fabricate pan with 1/4-inch (6mm) hem at top edge, 4-inch (100mm) wide horizontal flanges with rounded corners; to provide installed minimum clear inside perimeter dimension of 2-inches (50mm) on each side of penetrating element and 6-inch height. Fabricate bonnet in two-piece adjustable construction with 1/2-inch caulk trough along top edge and a skirt, with hemmed edge, of length to extend over top edge of pan a minimum of 2-inches (50mm).
D. Expansion Joint Cover: 24 gauge stainless steel sheet metal with 1-inch high standing seam at joints.
E. Cleats/Clips:
1. Concealed Cleats/Clips: Continuous strips, 22 gauge sheet metal, same metal type and fascia profile as adjacent metal item, with 3/4-inch drip edge formed at a 30 degree angle with vertical wall.
2. Exposed Cleats/Clips: 24 gauge prefinished or stainless steel sheet metal.
F. Angle Termination Bar: 1-inch by 1-inch (25mm by 25mm) 24 gauge galvanized sheet metal.
G. Sanitary/Plumbing Vent Pipe: 2-1/2 pound lead preformed flashing sleeve with 4-inch flanges and of proper size/height to fold down inside of vent pipe a minimum of 1-inch (25mm).
H. Roof Drain: 4 pound lead, size 30-inch by 30-inch (750mm by 750mm).
I. Pipe Box (Base, Hood, and Face Plate): 24 gauge stainless steel sheet metal. Base shall be 8-inches in height, with 4-inch wide flanges with rounded corners and sized to provide minimum 2-inch clearance between pipes and box.
J. Heat Exhaust/Gravity Vent/Turbine Vent: 24 gauge stainless steel sheet metal. Base shall be 8-inches in height with 4-inch wide horizontal flanges with rounded corners and hoods to conceal top of base.

K. Coping:
   1. Shop-fabricated Option: 24-gauge pre-finished sheet metal with 6-inch (150mm) wide cover 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 complying with ANSI/SPRI ES-1 Standard.
   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 complying with ANSI/SPRI ES-1 Standard.

L. Collector Head and downspout: 24 gauge pre-finished sheet metal.


N. Curb Cap Flashing: 24 gauge stainless steel sheet metal with 4-inch vertical fascias.

O. Goose-neck Vent: 24 gauge stainless steel sheet metal. Base shall be 8-inches in height with 4-inch wide horizontal flanges with rounded corners.

P. Metal Edge/Fascia System:
   1. Pre-manufactured Option 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.
   2. Shop-fabricated Option: 24 gauge pre-finished sheet metal with 4-inch wide nailing flange and 6-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.

Q. Fascia Extender: 24 gauge pre-finished sheet metal with 1/2-inch stiffening rib at mid-span with 3/4-inch drips with 5/8-inch returns at 30-degree angle with vertical wall at bottom end formed in 10-foot lengths.


PART THREE - EXECUTION

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

A. Install sheet metal with lines, arises, and angles sharp and true, and plane surfaces free from objectionable wave, warp, or buckle. Exposed edges of sheet metal shall be folded back to form 1/4-inch (6mm) hem on concealed side from view. Finished work shall be free from water retention and leakage under all weather conditions. Install prefabricated corners or transitions at changes in direction, elevation or plane, and at intersections. Locate field joints not less than 12-inches (300mm), nor more than 3 feet (1m) from actual corner. Laps for all metals, except for prefinished metal, shall be 1-inch (25mm) wide, fastened with rivets spaced 1-inch (25mm) on-center and soldered.

B. Anchor units of work securely in place to prevent damage or distortion from wind or buckling. Provide for thermal expansion of metal units; conceal fasteners where possible; and set units true to line and level as indicated. Install work with laps, joints, and seams permanently watertight and weatherproof.

C. Install fabricated sheet metal items in accordance with manufacturer's installation instructions and recommendations and with SMACNA Architectural Sheet Metal Manual.

D. Separations: Provide for separation of metal from non-compatible metal or corrosive substrates by coating affected surfaces with zinc chromate or other permanent liquid-applied or sheet product separation at locations of contact.

E. Continuous Cleat: At exposed edges of metal edge flashings, fascias, copings, and where required, attach continuous cleat at 6-inches (150mm) on-center with appropriate fasteners positioned on the vertical face and fastened into 2X blocking, concrete/masonry substrate, metal or steel substrate. At a distance of 10 feet (3m) from each direction of corner, install fasteners 3-inches (75mm) on-center. Install cleat so fascia extends a minimum of 1-inch (25mm) below top of exterior wall finish.

F. Counter Flashings:
   1. Install new counter flashings under equipment housing flanges and existing or new receivers along rise or parapet walls to extend a minimum of 4-inches below top edge of base flashing.
   2. Secure counter flashing at 6-inches (150mm) on-center with self-tapping screws.
   3. Saw-cut Reglet Mounted Assemblies: Saw cut new joint, 1/2-inch by 1-inch deep, in existing masonry/concrete where required and to install new receiver. Clean and prepare joint surfaces to receive sealant and insert receiver into joint. Secure new receiver in place with lead wedges spaced 12-inches (300mm) on-center wedged into joint. Install backer rod into saw-cut reglet and apply a continuous bead of sealant, Type B, along reglet and top edge of receiver and tool sealant to provide outward sloping finished surface. Secure counter flashing to receiver utilizing self-tapping grommetted screws spaced 6-inches (150mm) on-center.
4. Surface-mounted Assemblies: Secure two-piece surface-mounted receiver and counter flashing assemblies along concrete substrates. Install sealant tape, Type C, between receiver and substrate. Secure receiver to substrate with termination bar and appropriate fasteners spaced 12-inches on-center. Install a continuous bead of sealant, Type B, along caulk trough/top edge of receiver and tool sealant to provide outward sloping finished surface. Secure counter flashing to receiver utilizing grommeted self-tapping screws spaced 6-inches (150mm) on-center.

5. Install new receivers extending behind wall finish and secure vertical flange of receiver 6-inches on-center to back-up wall or metal wall panels. Extend underlayment and/or dampproofing material over vertical flange of receiver, where applicable.

6. Lap adjacent sections of receivers and counter flashings a minimum of 4-inches (100mm). Apply a continuous bead of sealant, Type B in lap.

7. Trim existing counter flashings at curbs and walls that are to remain to receive new flashings. Secure new counter flashing to trimmed existing flashing utilizing self-tapping screws spaced 6-inches (150mm) on-center.

8. Install wind clips to termination bar spaced 24-inches (600mm) on-center and engage drip edge of counter flashing a minimum of 1/2-inch (13mm).

9. Fabricate the counter flashing to form an integral closure at terminations.

G. Penetration Pans:
1. Install compressible fill insulation between penetrating element and deck.
2. Prime tops and bottoms of flanges of penetration pans.
3. Pop rivet and fully solder joints in pan and flanges.
4. Install penetration pan with flanges set in a uniform troweling of plastic roof cement on membrane base ply, secure flange with appropriate fasteners spaced 6-inches on-center, staggered, and strip-in flanges.
5. Fill penetration pan to within 1-inch (25mm) of top of pan with non-shrink grout. Clean surfaces of pan and penetrating element and fill remainder of pan with pourable sealer.
6. Install sheet metal bonnet or hood to conceal the top of the penetration pan.

H. Roof Penetration Hoods and Bonnet:
1. Install sheet metal hood or bonnet on penetrating element to cover the top of the penetration pans.
2. Round or Pipe Penetrations:
   a. Set bonnet in sealant, Type C; utilize Type B sealant at heat sensitive areas.
   b. Install stainless steel draw band and tighten to secure to penetration.
   c. Seal top of bonnet with sealant, Type B.
3. Square Penetration:
   a. Secure bonnet to penetration with termination bar and self-drilling screws.
   b. Set bonnet in sealant, Type C.
   c. Seal top of bonnet with sealant, Type B.
4. Angle or Structural Steel Penetration:
   a. Attach bonnet to structural steel member by welding.
   b. Paint assembly after installation.
I. Roof Drains:
   1. After membrane installation, prime bottom of lead flashing sheet and set in uniform bed of plastic roof cement on membrane base ply at roof drain locations.
   2. Extend lead flashing into drain bowl or pipe a minimum of 2-inches (50mm) and over top of piping/ bowl connection, if possible. Apply a continuous bead of sealant, Type A, at intersection of pipe and drain bowl.
   3. Mold lead flashing to conform to drain bowl assembly utilizing appropriate hand-held mallet/ hammer.
   4. Prime top surface of lead flashing sleeve to receive strip-in membrane.

J. Pipe Box:
   1. Pop rivet and fully solder joints and seams in sheet metal base and hood.
   2. Prime top and bottom of flanges of base.
   3. Install with flanges or embed in plastic roof cement on base ply, secure flanges with appropriate fasteners spaced 6-inches on-center, staggered, and strip-in.
   4. Fill base with grout or spray foam to a height of 3/4 of the total pan height.
   5. Fill remaining height of base with pourable sealer.
   6. Install hood over base, securing to each side with self-tapping screws, and sloping down toward front of box.
   7. Install face plate to cover box opening around pipe penetrations and apply sealant, Type B, around pipe configuration at face plate.

K. Sanitary/Plumbing Vent Pipe:
   1. Prime top and bottom flanges of lead flashing sleeve. Set flange or embed in uniform troweling of plastic roof cement on base ply. 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. Paint exposed lead flashing with elastomeric coating to match color of membrane top ply.

L. Area Divider:
   1. Construct new curbs utilizing wood blocking and/or sheet metal. Secure insulation layers and wood nailers to sheet metal curb.
   2. Secure sheet metal cover on top of curb with new grommetted fasteners spaced 6-inches (150mm) on-center. Lap joints in cover 4-inches with sealant sandwiched in lap joint.
   3. Provide sheet metal counter flashings at walls to conceal the expansion joint terminations.

M. Heat Exhaust/Gravity Vent/Turbine Vent/Goose-neck Vent:
   1. Prime top and bottom of flanges of base.
   2. Install with flanges set in heat-softened APP base ply or embed in plastic roof cement on base ply, secure flanges with appropriate fasteners spaced 6-inches on-center, staggered, and strip-in.
   3. At heat exhaust vents, install sheet metal bonnet secured to vent pipe with stainless steel draw band and apply sealant, Type B, along top edge of bonnet and tool sealant to provide outward sloping finished surface.
N. 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 cover plate centered over coping joint in continuous beads of sealant,
      Type B, placed approximately 1-inch (25mm) from cover edges.
   5. Install appropriate fastener through neoprene washer and cover plate between
      coping segments.
   6. Accommodate building wall expansion joints by terminating coping joints and
      cleats either side of expansion joint. Do not run coping or cleats continuous
      across joints. Install coping cover plate to span across joint and lap coping on
      each side of joint a minimum of 4-inches (100mm). Fasten cover plate on one
      side of joint only.
   7. Fabricate transitions of changes in direction, wall size, or elevation from one-
      piece with sealed and riveted lap seams.
   8. 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.
   9. At terminations occurring at rise walls, install end coping section with upward
      vertical flange (4-inch height) and fascias that extend a minimum 4-inches onto
      wall. Install counter flashing/closure set in saw-cut reglet and extend over
      flanges of coping end cap.

O. Scupper:
   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. Attach metal face plate or collector head to scupper insert. Secure face plate to
      wall and apply sealant around perimeter of face plate.

P. Curb Cap Flashing:
   1. Install new wood nailers on top of curb to provide substrate to receive cap
      flashing.
   2. Install and adhere underlayment/modified bitumen flashing over top of curb
      extending a minimum 4-inches below top of curb and overlapping top edge of
      base flashing.
   3. Install metal cap flashing over curb. Install appropriate fasteners through the
      fascia spaced 12-inches on-center.
   4. Reinstall equipment on top of cap flashing on top of vibration isolator pads.
Q. Metal Edge:
   1. Extend modified bitumen sheet to minimum 1-inch (25mm) below bottom edge of nailer or top of exterior wall finish.
   2. Install fascia extender in locations where indicated prior to installation of fascia/edge flashing system. Secure clip and fascia extender to wood nailers with appropriate fasteners at 6-inches on-center.
   3. 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.
   4. Secure horizontal flange of metal edge to wood nailer with appropriate fasteners spaced 3-inches (75mm) on-center, staggered.
   5. Install back-up plates 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.
   6. Provide and install prefabricated on-piece inside and outside corners of metal edge flashing.
   7. Prime top metal surface of flange to receive strip-in membrane.
   8. At rise walls, extend horizontal flange up onto cant strip and install sheet metal cover/closure that conceals end of cant and base flashing, extending a minimum of 4-inches beyond edge of wall.

R. Through-wall Counterflashing:
   1. Remove and retain brick as outlined in Section 04 01 20 Masonry Restoration.
   2. Install new through-wall flashing/receiver and fasten to back-up substrate with appropriate fasteners spaced 12-inches on-center.
   3. Adhere flexible through-wall flashing membrane to sheet metal through-wall flashing.
   4. Strip-in top of through-wall counterflashing with a three course application of roof cement and fabric.
   5. Overlap adjacent sections of through-wall flashing a minimum of 4-inches (100mm), sandwich sealant in lap, pop rivet, and solder.
   6. Provide continuous through-wall flashing in stair-step configuration when installed in sloping fashion parallel to face of brick. Provide end dams at terminations or penetrations in through-wall flashing.
   7. Install end dams, extending vertically upward a minimum of 1-inch (25mm), at terminations and penetrations in through-wall flashing.
   8. Re-install brick in accordance with general guidelines of the Brick Institute of America and Section 04 01 20.
   9. Install new counter flashings into through-wall receivers and fasten with grommeted self-tapping screws spaced at 12-inches (300mm) on-center.
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 with elastomeric coating, metal flashings that have been soiled with bitumen. Use medium nap roller to apply paint to surfaces to achieve monolithic finished color.

END OF SECTION 07 62 00
SECTION 07 92 00
SEALANTS AND CAULKING

PART ONE - GENERAL

1.01 SECTION INCLUDES:
A. Sealant application to counterflashing, reglets, roofing related sheet metal, and additional sealant application as required to provide complete watertight roofing system.
B. Replacing sealants at joints at perimeter edge detail.

1.02 RELATED SECTIONS:
A. 02 40 00 - Minor Demolition and Renovation Work.
B. 07 62 00 - Sheet Metal Flashing and Trim.

1.03 REFERENCES:
B. Federal Specifications (FS).

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

1.05 QUALITY ASSURANCE:
A. Product Labels: Include manufacturer's name, type of sealant, and color on labels of containers.
B. Single Source Responsibility for Joint Sealer Materials:
   1. Obtain joint sealer materials from single manufacturer for each different product required.
   2. Provide primers, joint sealers, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by testing and field experience as supplied and warranted by one manufacturer.
   3. Provide joint sealers that have been produced and installed to establish and maintain watertight and airtight continuous seals.
C. Installer Qualifications: Installer having not less than five years successful experience in comparable projects and employing personnel skilled in operations required for project.
D. Field Sample: Upon directions of Owner, prepare 12-inch (300mm) samples in presence of Owner demonstrating removal and cleaning process and application of sealant.

E. Use test methods standard with manufacturer to determine if priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealers to joint substrates under environmental conditions that will exist during actual installation.

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

G. Owner reserves the right to perform testing of the installed work in accordance with AAMA 501.2-83, “Field Check of Metal Curtain Walls for Water Leakage”. 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 labels intact.
   B. Store materials in a single lockable area of project site.
   C. Protect materials from extreme temperatures and exposure. Store in accordance with manufacturer’s recommendations.
1.07 **PROJECT CONDITIONS:**
   A. Environment: Comply with sealant manufacturer's recommended minimum and maximum installation temperatures and other weather protection.

1.08 **SEQUENCING AND SCHEDULING:**
   A. Do not remove more sealant than can be replaced in same day.

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.

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**PART TWO - PRODUCTS**

2.01 **SEALANT:**
   A. Sealant:
      1. Type A: One component polyurethane sealant ASTM C-920, Type S, Grade NS, Class 35 such as "SikaFlex-1a" by Sika Corp. or "Sonolastic NP1" by BASF, color to match finish of adjoining surface.
      2. Type B: Low modulus silicone sealant for sealing metal-to-metal surface (i.e. metal edge, cover plates) ASTM C-920, Type S, Grade NS, Class 50 such as "Sikasil WS 290" or "WS 295" by Sika Corp., "795 Silicone Building Sealant" or "790 Silicone Building Sealant" by Dow Corning, or "GE Silpruf SCS 2000" by Momentive Performance Technologies; color to match finish of adjoining surface.
      3. Type C: One-component, moisture cure polymer sealant available in over 175 standard colors to match sheet metal flashings in exposed applications such as "Tite Bond Weather Master Sealant" by Franklin International.
      4. Type D: Self-adhering preformed 100% solids elastomeric butyl tape, 1/4-inch thick by 3/4-inch wide, such as "TremPro 691" by Tremco.
      5. Type E: One-part gun grade butyl rubber sealant such as "TremPro 651" by Tremco.

2.02 **RELATED MATERIALS:**
   A. Cleaner: Noncorrosive, nonstaining type, compatible with joint forming materials as recommended by sealant manufacturer.
   B. Backer Rod: Round flexible polyolefin foam rod with non-absorbing outer skin and interior network of both open and closed cells; ASTM C 1330, Type B; over-sized 30 to 50 percent for joint size, compatible with sealant, sized and shaped to provide proper compression upon insertion in accordance with manufacturer's recommendations such as "SoffRod" by Construction Foam Products, a Division of Namaco.
   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.

2.03 MIXING:
A. Mix multi-component products as directed by manufacturer.

PART THREE - EXECUTION

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

3.02 APPLICATION:
A. Joint Backing:
   1. To achieve required joint depths, restrict depth of joints by use of joint backer rod.
   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.
4. Apply sealant over fastener heads securing items, completely concealing fastener with sealant.

C. Tooling:
1. Tool joints to required configuration in accordance with manufacturer's recommendations.
2. Sealant Tape:
   a. Provide continuous uniform bed of sealant tape on horizontal bearing surfaces. Butt adjacent sections end-to-end.
   b. Prior to mating surfaces, remove backing paper from the installed tape.
   c. Firmly press or clamp assembly upon removal of backing paper.
3. Tooling Non-sag Sealants:
   a. Immediately after sealant application and prior to time skinnning or curing begins, tool sealants to form smooth, uniform beads of configuration required.
   b. Eliminate air pockets and ensure contact and adhesion of sealant with sides of joint.
   c. Remove excess sealant from surfaces adjacent to joint.
   d. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by manufacturer.

D. Remove masking immediately after tooling without disturbing joint sealant.

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

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

3.05 PROTECTION:
A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion.
3.06 SCHEDULE:
A. Sealant A:
   1. Sealant work in conjunction with roofing.
   2. Counter flashings.
   3. Penetration umbrellas.
B. Sealant B:
   1. Metal-to-metal joints (coping cover plates, counter flashing lap joints, etc.).
   2. Heat sensitive applications.
C. Sealant C:
   3. Applications for special color match.
D. Sealant D:
   4. Surface-mounted counter flashings.
   5. Between penetration and bonnets.

END OF SECTION 07 92 00
SECTION 07 72 27
FALL PROTECTION DEVICES

PART ONE - GENERAL

1.01 SUMMARY:
   A. Section Includes: Roof tie-down system of fall restraint and fall arrest for worker safety.

1.02 RELATED SECTIONS:
   A. Section 02 40 00 – Minor Demolition and Renovation Work.
   B. Section 06 01 10 – Rough Carpentry.
   C. Section 07 52 00 – Modified Bitumen Roofing.

1.03 REFERENCES:
   B. American National Standard Institute (ANSI):
      2. ANSI Z359.6-2009 – Specifications and Design Requirements for Active Fall Protection Systems.
   C. Occupational Health And Safety Administration (OSHA):

1.04 SYSTEM PERFORMANCE:
   A. General: Provide structural fall restraint and fall arrest system capable of withstanding loads and stresses within limits and under conditions specified in OSHA and other applicable safety codes. Provide fall protection anchors permanently attached to roof structure.
   B. Design Requirements: Anchors and accessories comprising system of following types:
      1. For individual workers capable of withstanding a 5,000 pound load or safety factor of 2 meeting the requirements of OSHA 1926.502(d)(8).
   C. Performance Requirements: System and components tested for the resistance of the following loads:
      1. Fall Arrest: 1 User in the directions permitted by the system.
      2. Fall Restraint: 2 Users in the directions permitted by the system.
      3. When used in combination with horizontal lifeline systems, it may support a maximum of 2 users in fall arrest or 4 users in fall restraint. The maximum end anchor loads must be limited to 2,500 lbs. or less to maintain a 2:1 factor of safety.
4. Capacity range is 130-310 lbs., or up to 420 lbs. if used in combination with equipment explicitly certified for such use.

1.05 SUBMITTALS:
A. Product Data: For each type of device specified, including manufacturer's standard fabrication details and installation instructions.
B. Shop Drawings: Show layout, profiles, and anchorage details. Submit engineering calculations demonstrating compliance with the references of Section 1.02.
C. Maintenance Data: Written instructions for maintenance of fall prevention safety devices to be included in the operation and maintenance manual.
D. In-house Test Reports: Indicate anchor fabrication compliance with performance requirements.

1.06 QUALITY ASSURANCE:
A. Manufacturer Qualifications: Firm having at least 10 years continuous experience in manufacturing fall safety equipment similar to systems specified and exhibiting records of successful in-service acceptability and performance. Firm must employ personnel dedicated to provide regularly scheduled Authorized and Competent Person Training courses as mandated by OSHA 1926 and 1910 for owner's authorized safety personnel.
B. OSHA Standards: Comply with Occupational Safety and Health Administration Standards for the Construction Industry 29 CFR § 1926.500 Subpart M (Fall Protection), and with applicable State Administrative Code safety standards for Fall Restraint and Fall Arrest.
C. Source Limitations: Obtain all roof anchors through one source from a single manufacturer.

1.07 COORDINATION:
A. Contractor to coordinate placement of roofing system, insulation and flashing to ensure water-tight integrity to roof.

1.08 WARRANTY:
A. Provide manufacturer’s standard warranty to guarantee products will be free from defects for a period of 2 years.

PART TWO – PRODUCTS

2.01 MANUFACTURER:
A. Guardian Fall Protection Inc.
B. Roof-Top Anchor, Inc.
C. Pro-Bel, Inc.
D. Or approved equal.
2.02 MATERIALS:
A. Structural steel plates, angles, rods: ASTM A36, grade 36.
B. Pipe: ASTM A501, min = 36 ksi.
C. Welds: select AWS electrode wire for metal alloy welded to equal the strength of the base metal, min.
D. Tie-Back Anchor: hot dipped galvanized steel post (HSS) 1/4-inch (6mm) wall thickness x 5-inch dia. x 12-inch high welded to 5/8-inch x 8-inch x 8-inch 44W base plate prepared to receive four 3/4-inch dia. Type 18-8 stainless steel threaded rods as adhesive anchor bolts using Hilti “Quik-Bolt” or “HIT HY-150” adhesive anchor.

PART THREE – EXECUTION

3.01 EXAMINATION:
A. Examine framing and substrate and verify conditions comply with structural requirements for proper system performance.
B. Proceed with installation of roof anchors only after verifying conditions are satisfactory.

3.02 FABRICATION:
A. Shop fabricate life line anchors in accordance with drawings.
B. Fabrication, detailing and installation of all structural steel shall be in accordance with the AISC specification for the design, fabrication and erection of structural steel for buildings.
C. All welding shall be in accordance with AWS code by certified welders.
D. Tightly clamp all fabrication components together before welding. Miter-cut and weld all corners. Chamfer components as required to perform bevel and groove-type welds.
E. Anchor assemblies to be hot-dip galvanized after fabrication.

3.03 INSTALLATION:
A. Roof Anchors
   1. Field verify all dimensions, quantities, conditions, etc. before performing work or fabricating new members.
   2. Perform all work in accordance with local, state and federal codes and regulations (IBC, OSHA, etc.), good industry practice and all applicable manufacturer’s instructions and/or specifications.
   3. Install assemblies at locations indicated on roof plan drawing, dated position of assembly may be adjusted slightly to accommodate existing conditions.
   4. Install anchors or equipment in accordance with manufacturer’s printed instructions, shop drawings and as specified.
   5. Ensure anchors or equipment is installed under the direct supervision of a Professional Engineer and/or Roofing Consultant.
   6. Where necessary, provide protection against deterioration due to contact of dissimilar materials.
7. Where bolting is used for fastening anchors, no fewer than two stainless steel threads is to be exposed and the nut is to be positively locked by deforming threads, welding, pinning or equivalent method.

8. Anchor base plates to existing concrete deck using specified anchor bolts. Predrilled holes, embedment length and tightening shall be in strict conformance with anchor bolt manufacturer’s written recommendations and industry standards.

9. After installation, touch-up scratches, welds, and other bare areas with cold galvanizing compound.

10. Ensure work is inspected and approved prior to application of roofing.

3.04 FIELD QUALITY CONTROL:
A. Comply with the requirements of Section 01 40 00 - Quality Control.
B. All anchor work to be inspected by a qualified testing agency, Professional Engineer and/or Roof Consultant upon completion of work.

3.05 ADJUSTING AND FINAL INSPECTION:
A. Verify that all manufactured units have been installed in accordance with specifications and details, and will function as intended. Adjust any items where necessary to ensure proper operation.
B. Provide necessary documentation certifying system is acceptable for service.

3.06 CLEANING:
A. Clean manufactured units using materials and methods approved by manufacturer. Do not use cleaners or techniques which could impair performance of the roofing system.

END OF SECTION 07 72 00
SECTION 09 90 00

EXTERIOR PAINTING

PART ONE - GENERAL

1.01 SECTION INCLUDES:
   A. Painting of rooftop equipment hoods, steel equipment supports, roof hatches, utility piping, steel penetrating elements, heat exhaust stacks, and other miscellaneous rooftop items.

1.02 RELATED SECTIONS:
   A. 02 40 00 - Minor Demolition and Renovation Work.
   B. 07 62 00 - Sheet Metal Flashing & Trim.
   C. 07 92 00 - Joint Sealants.

1.03 DESCRIPTION OF WORK:
   A. Painting exterior materials and surfaces of roof-top items.
   B. "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.
   C. Unless otherwise indicated, metal surfaces of anodized aluminum, stainless steel, copper, and bronze will not require finish painting.

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

1.05 QUALITY ASSURANCE:
   A. Product Labels: Include manufacturer's name, type of paint, stock number, color, and label analysis on label of containers.
   B. Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.
   C. Match existing color(s) and provide selected color(s) as approved by Owner.
   D. Review with Owner, 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 Substantial Completion.

PART TWO - PRODUCTS

2.01 MANUFACTURERS:
   A. Except as otherwise specified, materials shall be products of the following manufacturers:
      1. Tnemec Co., Inc.
      2. Sherwin-Williams Company.
      3. Or approved equal.
   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(s) and provide selected color(s) as approved by Owner.
   C. Paint Material List
      1. Equipment Hoods, hatches, & piping:
         a. Lusterless (Flat) Acrylic Finish: Two coats over filler coat or primer coat
            1) Primer: Acrylic Primer - "ProIndustrial Acrylic Primer" by Sherwin Williams.
            2) Finish Coat: "ProIndustrial Acrylic Paint" by Sherwin Williams.
      2. Steel Elements:
         a. Primer: Low VOC Primer - "Series V10" by Tnemec Co., Inc.
         b. Finish Coat: Low VOC Paint - "Series 113" by Tnemec Co., Inc.

PART THREE - EXECUTION

3.01 REPAINTING:
   A. Where surfaces are required to be repainted due to patching or alteration work, carry repainting to an internal or external corner using scheduled last coat only over present painted surfaces. Similarly, repaint reused and reinstalled painted metal items with one coat of paint using scheduled last coat for new items. Paint all exposed existing painted surfaces in colors as directed by Owner.
3.02 PREPARATION OF SURFACES:
   A. Do not apply finishing materials to surfaces that are not in physically sound, good condition. Remove all foreign matter, corrosion, rough spots, prime coat paint runs, etc., and clean surfaces of dirt, rust, grease, etc. Wire brush miscellaneous steel and iron surfaces and, if necessary, sand smooth metal surfaces to have an enameled finish.
   B. If surfaces are not in suitable condition for painting and finishing and cannot be put in such condition by customary preparatory methods, promptly notify Owner 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.

3.03 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.
   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.

3.04 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 90 00
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.
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 grommeted 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
HARRIS COUNTY APPRAISAL DISTRICT OFFICE BUILDING
13013 NORTHWEST FREEWAY
HOUSTON, TEXAS 77040

ROOF REPLACEMENT PROJECT

PREPARED BY
PRICE CONSULTING, INCORPORATED
211 HIGHLAND CROSS, SUITE 220
HOUSTON, TEXAS 77073
(281) 209-1724
TX P.E. FIRM F-8814

INDEX TO DRAWINGS

1.00 COVER SHEET
1.01 GENERAL NOTES
2.00 EXISTING ROOF PLAN
2.01 NEW ROOF PLAN
5.01 DETAILS
5.02 DETAILS
5.03 DETAILS
5.04 DETAILS
5.05 DETAILS
5.06 DETAILS
5.07 DETAILS
5.08 DETAILS
5.09 DETAILS
5.10 DETAILS
5.11 DETAILS
5.12 DETAILS
5.13 DETAILS
5.14 DETAILS
5.15 DETAILS
5.16 DETAILS
5.17 DETAILS
GENERAL NOTES: ROOF REPLACEMENT.

1. All dimensions, equipment, and penetration locations presented on the drawings are considered approximate. Contractor shall 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.
4. Typical detail designation:

<table>
<thead>
<tr>
<th>SHEET NUMBER</th>
<th>DETAIL NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
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</table>
5. Unless indicated by the term "existing", items presented on detail drawings are considered to be new and furnished by contractor.
6. Typical existing roof construction encountered at PCI core locations is as follows:

   **Areas A and B:**
   - Gravel-surfaced built-up roof membrane, perlite insulation, over concrete deck.
   - Modified bitumen cap sheet.
   - Modified bitumen base ply.
   - Cover board insulation.
   - Two layers of ISO insulation layer.
   - Existing concrete deck.

7. Provide new wood blocking/headers as designated on drawings. Blocking/headers and/or combination with plywood sheathing to match thickness of new roof system at representative locations, and width to extend beyond edge of metal flange where applicable.
8. Typical new roof construction is as follows:

   **Two Layers (2.0-inch and 2.5-inch) of Polyisocyanurate Insulation Complying with BC Section 1508 and Table 1508.2, to achieve minimum R-value of R-25, with roof cover board, and a two-ply modified bitumen roof membrane with one ply of smooth surfaced base ply & one ply of cap sheet with reflective gravel surface complying with BC Section 1507.11, Section 1505.2; Class "A" fire classification and to have minimum solar reflectance of 0.70 as tested per ASTM E1354, E1175, E1918, or E1919 and a minimum thermal emittance of 0.70 as tested per ASTM C835, C1371, or E408. Install taped insulation on area "B".
9. Raise or lower all equipment, utility lines, penetrations, piping, etc. as required for installation of new roof system. Provide necessary disconnect/reconnect, extensions and misc. components.
10. Provide liquid flashing system for steel pipes, angles, tube posts & other similar penetrations through the roof system.
11. Install walk pads at roof access points, around serviceable equipment, and other high-traffic areas.
12. Facilities will be occupied during construction. Contractor shall take all necessary precautions to protect the facility, contents, and occupants. The building shall be watertight at the end of each day's work and when inclement weather threatens.
13. Site & work areas shall be cleaned on a daily basis and materials/equipment secured at the end of each work day.
14. Protect building exterior and grounds including surfaces, grass, plants, trees, shrubs, and other landscaping, and return the site and any damaged items to original or better condition. Any surfaces stained, marrred, or damaged by the work shall be returned to original or better condition, and match adjacent surfaces.
16. Install new membrane flashings at penetrations, curbs, parapet walls, and ridges.
17. Install new metal flashings at walls, curbs, and penetrations.
18. Install new underlayment & sheet metal coping at designated location(s).
19. At penthouse redwall, remove/reuse existing masonry (replace and match where necessary). Install new stainless steel sheet metal through-wall flashing and flexible flashing. Install masonry to achieve proper flashing height for new roof.

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CONSTRUCTION MATERIAL SYMBOLS LEGEND

- Brick
- Asphalt Shingle
- Steel
- Sheet Metal
- Wood Block
- Mortar/GROUT
- Plywood
- Wood Framing
- Pourable Sealer
- Concrete
- Polyisocyanurate Insulation
- Epoxy Roofing
- Girt Strip
- CMU

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OWNER/CLIENT:
HARRIS COUNTY APPRAISAL DISTRICT OFFICE BUILDING
13013 NORTHWEST FREEWAY
HOUSTON, TEXAS 77040

PROJECT:
HARRIS COUNTY APPRAISAL DISTRICT OFFICE BUILDING
13013 NORTHWEST FREEWAY
HOUSTON, TEXAS 77040

REVISIONS:
NOTE PAGE

OWNED BY DATE
R1.01
EXISTING PIPE VENT, BASE TO MINIMUM 2" HEIGHT ABOVE NEW FINISHED ROOF SURFACE WHERE NECESSARY

LEAD FLASHING, PRIME TOP AND BOTTOM OF FLANGE AND SET IN PLASTIC CEMENT. PAINT EXPOSED LEAD FLASHING SLEEVE WITH ELASTOMERIC COATING AFTER ROOF INSTALLATION

COVER BOARD INSULATION
EDGE SEALANT WITH DRIED/DRIED GRANULES
MODIFIED BITUMEN TOP PLY
MODIFIED BITUMEN BASE PLY
4" MIN.
4" MIN.

BASE INSULATION LAYER
EXISTING CONCRETE DECK
COMPRRESSIBLE INSULATION

ADD ON PIPE SECTION (DIAMETER AND PIPE MATERIAL TO MATCH EXISTING PIPE VENT) SET IN SEALANT, TYPE A, ON TOP OF EXISTING PIPE. INSTALL SHOE NEEDED TO ACHIEVE PROPER FLASHING HEIGHT

STAINLESS STEEL CLAMP
NO-HUB COUPLING

EXISTING PIPE VENT

COLLECTOR HEAD AND DOWNSPOUT (NOT TO SCALE)

PLYWOOD SHEathing
EXISTING MASONRY PARAPET

SILICONE SEALANT
24 GA. PREFINISHED COVER PLATE
SILICONE SEALANT

MODIFIED BITUMEN CAP SHEET
WIND SLABBRING ATTACHED TO DECK
SCUPPER SLEEVE

SPINDLE SUPPORTS

PLUMBING VENT

SCUPPER WITH COLLECTOR HEAD

COLLECTOR HEAD

3/21/18

REVISIONS
OWN/CLIENT: HARRIS COUNTY APPRAISAL DISTRICT
HARRIS COUNTY APPRAISAL DISTRICT OFFICE BUILDING
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OWNER/CLIENT: HARRIS COUNTY APPRAISAL DISTRICT
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SCALE: AS NOTED

DRAWN BY: KARL A. SCHMIDT
DATE: 3/31/18
SHEET: R5.07

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ABANDONED PENETRATION REPAIR

DURING END LAP APPLICATION, TRIM THE LOWER INSIDE CORNER OF THE UNDERLYING SHEET AT THE END OF THE ROLL AS SHOWN IN DIAGRAM #1, FIGURE A. TRIM THE UPPER OUTSIDE CORNER OF THE OVERLAPPING SHEET AS SHOWN IN DIAGRAM #1, FIGURE B. INSIDE CORNER SHALL BE TRIMMED ON AN ANGLE 5-1/2" LONG FROM END OF ROLL TO OUTSIDE EDGE. WIDTH OF TRIM SHALL BE 3" OR WIDTH OF SELVAGE EDGE OF CAP SHEET. OUTSIDE CORNER SHALL BE TRIMMED IN A ROUNDED MANNER EXTENDING 3" FROM CORNER ALONG BOTH THE SIDE AND END. TRIMMED INSIDE CORNERS SHALL BE COMPLETELY COVERED BY APPLICATION OF SUCCESSING COATINGS. REMOVE TOP PLY SURFACING TO REMOVE OVERLAPPING PIECE OR "DE-GRANULATE" BY PROPER TORCHING METHOD. EMBLEM LOOSE GRANULES IN BITUMINOUS BLEED OUT ALONG SIDE AND END LAPS OR APPLY ELASTOMERIC COATING TO BLEED OUT.

"DE-GRANULATE" OR REMOVE SURFACING ON AREAS OF UNDERLYING SHEET

DIAGRAM #1 - END LAP TRIM PATTERN BEFORE APPLICATION.

DIAGRAM #2 - FINISHED END LAP DETAIL

CAP SHEET END LAP CONSTRUCTION

OWNER/CLIENT:
HARRIS COUNTY APPRAISAL DISTRICT
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PHONE: (281)209-1724 FAX: (281)209-2724

REVISIONS:

FILE NAME: 05.01-05.17
SCALE: AS NOTED

DATE: 3/21/18

SIGNATURE:

KARL A. SCHAEFFER
NOTE:
ADD APPROVED COUPLING AND ALL-THREAD ROD TO EXTEND HEIGHT OF CONNECTOR ROD, WHERE NEEDED.
WOOD 2 X NAILERS ARE DEPICTED FOR INFORMATION PURPOSES ONLY, CONTRACTOR TO INSTALL NECESSARY QUANTITY OF WOOD NAILERS TO MATCH HEIGHT OF INSULATION.
END LAP DETAIL

DURING END LAP APPLICATION, TRIM THE LOWER INSIDE CORNER OF THE UNDERLYING SHEET AT THE END OF THE ROLL AS SHOWN IN DIAGRAM #1, FIGURE A. TRIM THE UPPER OUTSIDE CORNER OF THE OVERLAPPING SHEET AS SHOWN IN DIAGRAM #1, FIGURE B. INSIDE CORNER SHALL BE TRIMMED ON AN ANGLE 5 1/2" LONG FROM END OF ROLL TO OUTSIDE EDGE WITH OF TAM SHALL BE 3" OR WIDTH OF SELVAGE EDGE OF CAP SHEET. OUTSIDE CORNER SHALL BE TRIMMED IN A ROUNDED MANNER EXTENDING 3" FROM CORNER ALONG BOTH THE SIDE AND END. TRIMMED INSIDE CORNERS SHALL BE COMPLETELY COVERED BY APPLICATION OF SUCCEEDING COURSES.

GRANULE SURFACING TO RECEIVE OVERLAPPING PIECE SHALL BE PRIMED "DE-GRANULATED" BY PROPER TORCHING METHOD. LOOSE GRANULES SHALL BE BROADCASTED AND EMBEDDED IN TINNANIOUS BLEED OUT ALONG SIDE AND END LAPS.

Diagram #1 - End Lap Trim Pattern Before Application.

Diagram #2 - Finished End Lap Detail

Diagram #3 - Overlapping Sheet

Diagram #4 - Underlying Sheet

Diagram #5 - Rounded Outside Corner

Diagram #6 - Brazed Inside Corner

Diagram #7 - Selvage Edge (Typ.)

Diagram #8 - Brazed Inside Corner

Diagram #9 - Selvage Edge (Typ.)

Diagram #10 - Brazed Inside Corner

Diagram #11 - Selvage Edge (Typ.)

Diagram #12 - Brazed Inside Corner

Diagram #13 - Selvage Edge (Typ.)