Central Connecticut State University
1615 Stanley Street - New Britain, CT 06050

DR. ZULMA R. TORO
PRESIDENT

DR. RICHARD R. BACHOO
CHIEF ADMINISTRATIVE OFFICER

MR. SAL CINTORINO
ASSISTANT CHIEF ADMINISTRATIVE OFFICER

PROJECT MANUAL

ENERGY CENTER
ROOF REPLACEMENT
and ASSOCIATED WORK

February 27, 2018
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BIDDER NOTIFICATION

EACH BIDDER IS HEREBY NOTIFIED OF A SEPARATE DOCUMENT PACKAGE ENTITLED "PURCHASING DEPARTMENT INSERT DOCUMENT PACKAGE" ISSUED BY THE PURCHASING OFFICE OF THE CCSU BUSINESS OFFICE WHICH IS PUBLISHED SPECIFICALLY FOR THIS PROJECT AND CONTAINS ESSENTIAL BID DOCUMENTS. SAID DOCUMENTS MUST BE PROPERLY EXECUTED BY EACH BIDDER AND RETURNED TO THE CCSU PURCHASING DEPARTMENT AS A NECESSARY PART OF THE BID PROCESS. THE "PURCHASING DEPARTMENT INSERT DOCUMENT PACKAGE" IS INSERTED IMMEDIATELY FOLLOWING THIS NOTIFICATION SHEET AND SHALL BE CONSIDERED A PART OF THESE DOCUMENTS AS THOUGH BOUND HEREIN.
1.01 DEFINITIONS

Whenever the following terms, or pronouns are used in lieu of them, the intent and meaning shall be as follows:

A. Agency: Central Connecticut State University
   1615 Stanley Street
   New Britain, CT 06050

   A.1 Agency Representative: Mr. Sal Cintorino
       Assistant Chief Administrative Officer
       Central Connecticut State University
       1615 Stanley Street, East Hall
       New Britain, CT 06050

   A.2 Project Coordinator: Mr. Henry Altman
       Coordinator of Capital Projects and Facilities Planning
       Central Connecticut State University
       1615 Stanley Street, East Hall
       New Britain, CT 06050
       Tel: 860/832-0180
       Fax: 860/832-2329

B. Project, CCSU ENERGY CENTER ROOF REPLACEMENT AND ASSOCIATED WORK -
   STATE PROJECT #BI-RC-401 CCSU Project #43-46, with document date of February 27, 2018.

1.02 COMMENCEMENT, DELAY, AND COMPLETION OF THE WORK

A. The Contractor shall begin work under this Contract on the Project Start Date as indicated herein, and only after the Agency's issuance of a Purchase Order for the Project. In the event that the issuance of the Purchase Order is delayed for reasons beyond the control of the Agency, the Agency may issue a Letter of Intent to the Contractor indicating the Agency's desire to proceed with the project. The Contractor may elect to commence work upon receipt of said Letter of Intent, pending receipt of a formal Purchase Order from the Agency. In all cases, the Contractor shall complete all Work required by this Project within the time limits stated in the Form of Proposal.

B. Should the Contractor be denied a Workday, as specified in Article 1.34 of these GENERAL CONDITIONS, or delayed in the execution of the Contract by what the Contractor believes to be, a valid cause beyond its control, such as fire, rain, flood or other acts of God, the Contractor may submit a claim for an extension of the Project's Date of Substantial Completion. To receive consideration, each claim must be filed in writing, with a full statement of the reasons therefore, with the Project Coordinator, within seven (7) days of the occurrence of the delay.

1.03 COOPERATION OF TRADES

A. The Contractor shall be responsible for the control of the activities of its subcontractors. The Contractor hereby warrants that they shall consult, cooperate and coordinate with one another and other general contractors requested by others and the Contractor shall lay out and install its work in a manner that will avoid any delays in, or interference with, the work of others.

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of others. Any increase in the cost of, or delay in the Project incurred by the failure of the Contractor to insure the cooperation of its subcontractors, shall be borne by the Contractor.

1.04 PREVAILING WAGE RATES

A. On all new projects in excess of $400,000.00 and on all renovation or repair projects in excess of $100,000.00; the wages paid to any mechanic, laborer or workman employed upon the Work, herein contracted to be done, shall be equal to the rate of wages specified in the Schedule of Prevailing Rates a part of the "Minimum Rates and Classifications for Building Construction", specifically published for this Project by the State of Connecticut Labor Department.

Should this Project be estimated to cost in excess of that specified above, a copy of the Schedule of Prevailing Wage Rates will be enclosed in the Purchasing Department Insert.

Each Contractor, who is awarded a contract on or after October 1, 2002, shall be subject to provisions of the Connecticut General Statues, Section 31-53, as amended by Public Act 02-69, “An Act Concerning Annual Adjustments to Prevailing Wages”. These provisions should be used in determining bid price. Wage rates will be posted each July 1st on the Department of Labor website: www.ctdol.state.ct.us. Such prevailing wage adjustment will not be considered a matter for an annual contract amendment.

B. In the event it becomes necessary for the Contractor or any subcontractor to employ any mechanic, laborer or workman in a trade or occupation for which no minimum wage rate is set forth, the Contractor must immediately notify the Agency, who will ascertain the minimum applicable wage rate and thereupon notify the Contractor accordingly. The rate so determined will be applicable from the time of the initial employment of the person affected and during the continuance of such employment.

C. The Contractor shall submit to the Labor Department a properly executed "CONTRACTOR'S WAGE CERTIFICATION FORM", with a copy to the Agency, certifying the Contractor's compliance with the prevailing wage rates for this Project. A copy of said form is enclosed in the Purchasing Department Insert.

D. The Contractor shall, in accordance with Public Act 93-392, submit monthly to the Agency, a certified payroll and compliance statement on form FOW-CP 1 available from the Connecticut State Department of Labor, Regulation of Wages Division, 200 Folly Brook Boulevard, Wethersfield, CT 06109. The certified payroll and compliance statement shall be considered a public record, and every person shall have the right to inspect and copy such records in accordance with the provisions of Section 1-15 of the State's General Statutes. Federal certified payroll forms do not meet the requirements of this public act and are not acceptable.

E. The Contractor shall post, at a conspicuous point on the wall of the job trailer, or the Job Site(s); the schedule specifying all wage rates and authorized deductions, if any, from all wage categories required for this Project.

1.05 CONTRACTOR'S PAYMENT OBLIGATION TO SUBCONTRACTORS

A. The following section of the general statutes is inserted as information concerning the bonds furnished under Section 49-41 of the general statutes and under the Notice to Bidders section of the Project Manual:
1. Sec. 49-41a. Enforcement of payment by the General Contractor to subcontractor.
   a. When any public work is awarded by a contract for which a payment bond is required by Section 49-41, the contract for the public work shall contain the following provisions: (1) A requirement that the General Contractor, within thirty days after payment to the Contractor by the State or a municipality pay any amounts due any subcontractor, whether for labor performed or materials furnished, when the labor or materials have been included in requisition submitted by the Contractor and paid by the State or a municipality; (2) a requirement that the General Contractor shall include in each of its subcontracts a provision requiring each subcontractor to pay any amounts due any of its subcontractors, whether for labor performed or materials furnished, within thirty days after such subcontractor receives a payment from the General Contractor which encompasses labor or materials furnished by such subcontractor.

   b. If payment is not made by the General Contractor of any of its subcontractors in accordance with such requirements, the subcontractor shall set forth its claim against the General Contractor and the subcontractor of a subcontractor shall set forth its claim against the subcontractor through notice by registered or certified mail. **Ten days** after the receipt of that notice, the General Contractor shall be liable to its subcontractor for interest on the amount due and owing at the rate of **one per cent** per month.

   In addition, the General Contractor, upon written demand of its subcontractor, shall be required to place funds in the amount of the claim, plus interest of one per cent, in an interest-bearing escrow account in a bank in this state, provided the General Contractor or subcontractor may refuse to place the funds in escrow on the grounds that the subcontractor has not substantially performed the Work according to the terms of its or its employment. In the event that such General Contractor or subcontractor refused to place such funds in escrow, and the party making a claim against it under this section is found to have substantially performed its work in accordance with the terms of its employment in any arbitration or litigation to determine the validity of such claim, then such General Contractor or subcontractor shall pay the attorney's fees of such party.

   c. No payment may be withheld from a subcontractor for work performed because of a dispute between the General Contractor and another contractor or subcontractor.

   d. This section shall not be construed to prohibit progress payments prior to final payment of the Contract and is applicable to all subcontractors for material or labor whether they have contracted directly with the General Contractor or with some other subcontractor on the work.

1.06 **SUIT ON BOND**

   A. The following section of the General Statutes is inserted as information concerning the bonds furnished under Section 49-42 of the general statutes and under the Notice to Bidders section of the Project Manual:

   1. Sec. 49-42. Suit on bond; when and how brought.
a. Every person who has furnished labor or material in the prosecution of the work provided for in such contract in respect of which a payment bond is furnished under the provisions of Section 49-41 of the Connecticut General Statutes and who has not been paid in full therefor before the expiration of a period of ninety days after the day on which the last of the labor was done or performed by him or material was furnished or supplied by him for which claim is made, may enforce its right to payment under the bond by serving a notice of claim within one hundred eighty days after the date of which the Contractor performed the last of the labor or furnished the last of the material for which the claim is make, on the surety that issued the bond and a copy of the notice on the contractor named as principal in the bond. The notice of claim shall state with substantial accuracy the amount claimed, the name of the party for whom the labor was performed or to whom the materials were furnished and shall provide a detailed description of the bonded public project for which the labor or materials were provided. Within ninety days after service of notice of claim, the surety shall make payment under the bond and satisfy the claim, or any portion of the claim which is not subject to good faith dispute, and shall serve a notice on the claimant denying liability for any unpaid portion of the claim.

b. The notices required under this section shall be served by registered or certified mail, postage prepaid in envelopes addressed to any office at which the surety, principal or claimant conducts its business, or in any manner in which civil process may be served. If the surety denies liability on the claim, or any portion thereof, the claimant may bring action upon the payment bond in the superior court for such sums and prosecute the action to final execution and judgment. An action to recover on a payment bond under this section shall be privileged with respect to assignment for trial. The court shall not consolidate for trial any action brought under this section with any other action brought on the same bond unless the court finds that a substantial portion of the evidence to be adduced, other than the fact that the claims sought to be consolidated arise under the same general contract, is common to such actions and that consolidation will not result in excessive delays to any claimant whose action was instituted at a time significantly prior to the motion to consolidate. In any such proceeding, the court judgment shall award the prevailing party the costs for bringing such proceeding and allow interest at the rate of interest specified in the labor or materials contract under which the claim arises or, if no such interest rate is specified, at the rate of interest as provided in section 37-3a upon the amount recovered, computed from the date of service of the notice of claim, provided, for any date of service of the notice of claim, such interest shall be computed from the date such portion became due and payable. The court judgment may award reasonable attorney’s fees to either party if upon reviewing the entire record it appears that either the original claim, the surety’s denial of liability or the defense interposed to the claim is without substantial basis in fact or law. Any person having direct contractual relationship with a subcontractor but no contractual relationship express or implied with the contractor furnishing the payment bond shall have a right of action upon the payment bond giving written notice of claim as provided in this section.

c. Every suit instituted under this section shall be brought in the name of the person suing, in the superior court for the judicial district where the contract was to be performed, irrespective of the amount in controversy in the suit, but

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no such suit may be commenced after the expiration of one year after the day on which the last of the labor was performed or material was supplied by the claimant.

d. The word "material" as used in sections 49-41 to 49-43, inclusive, includes the rental of equipment used in the prosecution of work provided for in the Contract.

END OF THE GENERAL CONDITIONS
A. Gale Associates, Inc. is referred to in the Contract Documents as Architect, Engineer, or Architects or by pronouns which imply them. As information for the Contractor, the Architect/Engineer’s status is defined as follows:

1. The Architect/Engineer will not make interpretations or decisions directly to the Contractor. Interpretations or decisions will be relayed through CCSU to the Contractor.
2. As an agent of the Agency, the Architect/Engineer is responsible for review of Shop Drawings, material and equipment intended for the Work, in accordance with the Contract Documents.

Wherever the Architect/Engineer is mentioned in the Documents in connection with an administrative function, it will include the CCSU in that function.

B. The Work of this Project comprises all work specified in the Contract Documents entitled Energy Center Roof Replacement and Associated Work dated February 27, 2018, The Project is located in the campus of Central Connecticut State University, 1615 Stanley Street, New Britain, Connecticut.

B. The Scope of the Work is defined by the Contract Documents, including labor and material. The Scope of Works includes, but will not be limited to the following:

- Removal and replacement of the existing stone ballasted EPDM membrane roof system with a fully adhered 90-mil black EPDM membrane, coverboard, thermal insulation and vapor retarder system on the existing properly prepared concrete/steel composite roof deck.
- Restoration and repairs to integral EPDM lined gutter, fascia edge metal, Server Room roof (internal to building) and existing copper roof/wall panels is also included.
- Roofing scope includes temporary protection of critical interior occupancies and equipment.
- Mechanical/electrical scope includes temporary disconnect and reconnect of rooftop equipment to accommodate re-roofing operations, including shut down of roof top condensing units and coordinating, providing, and maintaining temporary cooling for the Server Room.

The following items to be provided by CCSU:

1. Sub-consultant proposal for de-commissioning and commissioning of the four (4) roof top condensing units that service the Server Room. Refer to Allowance No. 1. This work will be carried by the bidders and included in the Base Bid Scope of Work.
2. Sub-consultant proposal for communication equipment relocation, meeting attendance, submittal review and general coordination with roofing project. Refer to Allowance No. 3. This work will be carried by the bidders and included in the Base Bid Scope of Work.
3. CCSU will provide Boiler shutdown while roof work in ongoing above. The Contractor and CCSU will coordinate directly to determine work locations and needed temporary shut downs and start-ups. Contractor will provide temporary covers over the existing exhaust grates.

4. Sub-consultant proposal for fire suppression system and electrical work, Refer to Allowance No. 4. This work will be carried by the bidders and included in the Base Bid Scope of Work.

C. The Contractor will include in his bid, all items required in order to carry out the intent of the work as described, shown, and implied in the Contract Documents.

D. It shall be the Contractor's responsibility upon discovery to immediately notify the Construction Administrator, in writing, of errors, omissions, discrepancies, and instances of noncompliance with applicable codes and regulations within the documents, and of any work which will not fit or properly function if installed as indicated on the Contract Documents. Any additional costs arising from the Contractor's failure to provide such notification shall be borne by the Contractor.

01012 PROJECT DOCUMENTS

A. The Specifications and Drawings describe and illustrate the materials and labor necessary for the Work of this Project.

B. The Contract Documents generally describe the materials, systems and procedures required to complete the Work. They are not inclusive and are meant to guide the Contractor in the prosecution of the Work.

C. The GENERAL CONDITIONS and SUPPLEMENTARY GENERAL CONDITIONS apply to each Section of the Specification. The Contractor will insure that each and every Subcontractor and Material Supplier is so informed. Additional provisions of the Specifications are supplementary, and in any case where general conditions are modified, remaining portions of the general article will remain in effect.

01013 DOCUMENTS FURNISHED

A. The Agency will provide an electronic version of the Contract Documents for the Contractor's use. If hard copies of the Contract Documents are required, the Contractor will bear all the costs incurred in their provision.

01014 EXISTING CONDITIONS AND DOCUMENTS

A. It is not the intent of the Contract Documents to show all existing conditions. All Bidders are required to examine the Site prior to submitting bids. Failure to do so will in no way relieve the Contractor from completing the Work as required.

B. The Contractor will make a pre-construction survey of the conditions of the Site and all adjacent areas in the vicinity of the Site which may reasonably be expected to be affected by the Work.
C. Prior to beginning the Work, the Contractor will advise the Architect/Engineer, in writing, of all existing conditions which may affect the Work.

D. Where existing objects or conditions are uncovered and exposed, subsequent to the issuance of the Purchase Order, the Contractor and the Project Coordinator will jointly inspect these conditions and their findings will be recorded in writing by the Contractor. All corrective measures jointly agreed upon will be recorded in detail sufficient to prevent confusion and conflict at a later date.

E. The Contractor will proceed with the Work in these areas, taking into consideration these newly exposed conditions, and will adjust its working procedures to compensate for these conditions.

F. The Agency will make available for the Contractor’s information, certain documents relating to the existing Site as it relates to the Work required under this Contract. These documents were not prepared for the purpose of providing information to the Contractor regarding the Work required by this Contract. They were prepared for other purposes, and do not form a part of this Contract. The Agency and the Architect/Engineer make no representation or guarantee as to, and will not be responsible for, their accuracy, completeness, or pertinence and, in addition, will not be responsible for the conclusions to be drawn therefrom. They are made available to the Contractor as they exist, whether or not such information may be accurate, complete, or pertinent or of any value to the Contractor. The Contractor must interpret all information shown per its own judgement. The Contractor will conduct such investigations as the Contractor deems necessary to verify the information shown as it affects the Work.

01015 CONTRACTOR’S USE OF PREMISES

A. The Contractor will confine its operations to the immediate area of the construction site within the Contract Limit area as directed by CCSU and shown on Contract Documents. The Contractor will confine its storage of materials, supplies and equipment to the areas specified by the Project Coordinator.

B. “Plan of Use”: The Contractor shall prepare a “Plan of Use” for the Project which shall describe in detail the Contractor’s proposed use of the Site, both inside and outside the Contract Limit Area. The Contractor shall prepare the Plan of Use on a 1” =20’ scale plan of the Project Site. The Plan of Use shall include, but not be limited to the following: proposed vehicle and equipment access routes, scaffold and ladder locations, locations of proposed staging and storage areas, office trailer and dumpster locations, location of perimeter construction fencing and gates, other ground level protection measures around the building(s) (scaffold frames & planks), proposed pedestrian traffic flows around each building, proposed building access points, proposed protection measures for trees, shrubs and plantings. The Contractor shall submit the “Plan of Use” to the agency for approval within three (3) days of the issue of the PURCHASE ORDER, and Work on the Project shall not commence until an acceptable “Plan of Use” has been approved by the Agency.
Any delay in the Project caused by the Contractor’s failure to submit an acceptable “Plan of Use” shall not alter the Contractor’s responsibility to complete the Work in the specified number of calendar days as set for in the FORM OF PROPOSAL.

C. The Contractor will keep the Building(s) in a clean and orderly condition. The Contractor will keep the Building(s) accessible to Agency Maintenance Personnel at all times.

D. Existing walks, driveways, access routes to each building, adjacent lawn and parking areas are to be kept free of construction materials and debris for the Contract Term.

E. The Contractor will keep each roof area and surrounding premises clean and will pick up construction debris DAILY, and will comply with all requirements of Section 10569 “Cleaning”.

F. The Contractor will move any stored products, under the Contractor’s control, which interfere with the operations of the Agency. The Contractor will obtain and pay for the use of additional storage or work areas as needed to carry out the Contract.

01016 OCCUPANCY

A. The building will be occupied and in use during the construction project.

B. This building houses critical infrastructure for campus operations and life safety communications. The Contractor will provide the greatest level of care in protecting these vital areas and systems during construction. Contractor will need to be on call 24/7 to respond to any issues arising from these construction activities, to remedy issues immediately. CCSU will back-charge the Contractor for any emergency measures undertaken to correct field deficiencies.

C. Weather must be considered both in short and long-term schedule approach. By undertaking this project, the Contractor understands that they will need to install the roof systems as required by the documents and manufacture’s requirements. The Contractor will need to consider the approaching fall/winter weather. No extra costs will be considered due to cold (or otherwise adverse) weather conditions. Contractor will incorporate all provisions necessary to complete the work within 120 days of Contract Award. This includes overtime, temporary heat, temporary protective measures, and any other aspects required to execute work.

D. The Contractor will notify the Project Coordinator immediately of any operation likely to affect or interrupt a primary system in any building on campus.

01017 SUPERVISION

A. The Contractor will submit a resume for the proposed Project Superintendent and all other pertinent information required to obtain the Agency’s written approval of the Project Superintendent. The Project Superintendent will be approved by the Agency and will be on the Site whenever work is being performed. The Contractor will not change the Project Superintendent without the written consent of the Agency. The Project Superintendent will

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attend all scheduled project meetings. The Contractor will list "Field Supervision" as a separate line item on the Schedule of Values. The Agency reserves the right to withhold money from the Contractor's monthly Application for Payment for any unauthorized deviation from the full-time supervision requirement set forth above.

01018 EMERGENCY RESPONSE

A. The Contractor shall designate a 24-hour emergency contact person for the duration of the project and shall provide the Project Coordinator with the name, address, and telephone number of that individual. The individual, or firm, so named will respond within thirty (30) minutes of an emergency call. The Contractor will be capable of rectifying any problem that pertains to the Work of this Project. The Contractor will have the authority to enter into a contract with other individuals as may be required to resolve the problem creating the emergency, to the satisfaction of the Agency's Representative at the scene of the emergency.

1. The Contractor will post the individual's name and telephone number and appropriate clarification of all emergency response procedures, in a waterproof transparent display, on the door of the Job trailer, and in the immediate vicinity of the current area(s) of work.

01019 ALLOWANCES

A. The Contractor will include in the Lump Sum Bid Proposal each Allowance stated in the Contract Documents. Items covered by Allowances will be supplied for such amounts and by such persons or entities as the Agency may direct.

B. The general provisions of the Contract Documents, including GENERAL CONDITIONS and GENERAL REQUIREMENTS, apply to each listed Allowance item.

C. Unless otherwise provided in the Contract Documents:

1. Materials and equipment under the Allowance will be selected promptly by the Agency to avoid delay in the Work.

2. Allowances will cover the cost to the Contractor of materials and equipment delivered to the site and all required taxes, less applicable trade discounts.

3. The Contractor's costs for unloading and handling, labor, installation costs, overhead and profit and other expense related to the Allowance item will be included in the Lump Sum Bid Price and not in the Allowance.

4. The Contractor will insure that the Work performed under the Allowance section is complete and operable in every respect.

5. If the actual cost of an Allowance item is more or less than the given amount, the Contract Sum will be adjusted by a Change Order.

D. Schedule of Allowances:

Refer to Specification Section 01 21 00 Allowances for additional information.
1. Allowance No. One (1): Include the Stipulated sum of $3,760.00 (plus applicable taxes) for Schneider Electric IT Corporation for decommissioning and recommissioning (labor only) of four (4) existing rooftop condensing units (RTCU) per proposal dated August 7, 2017 (attached) (Quote No. 1-3RZQGVC/1).

2. Allowance No. Two (2): Include the Stipulated sum of $2,500.00 (including applicable taxes) for parts, equipment, temporary measures, or any other costs associated with completing the decommissioning and recommissioning of four (4) existing rooftop condensing units to achieve a finished installation.

3. Allowance No. Three (3): Include the Stipulated sum of $5,406.00 (plus applicable taxes) for Apogee Advanced Resnet Services (Apogee) to provide labor, parts, equipment, or any other costs associated with completing the relocation of the existing rooftop communication equipment. The sum includes coordination meetings, submittal review, 1.5x premium time per proposal dated August 28, 2017 and August 31, 2017 (attached) (authored by Al Piehl).

4. Allowance No. Four (4): Include the Stipulated sum of $4,860.00 (plus applicable taxes) for The Stuart L. White Company and McPhee Electric, Ltd. to provide labor, parts, equipment, or any other costs associated with the fire suppression system and electrical work per proposal dated September 26, 2017 (attached) (authored by Ed Kozak).

01020 EMERGENCY REPAIRS

A. Should the individual designated for emergency response in the above article fail to respond in the specified period of time, or fail to effect adequate repairs in a timely manner, the Project Coordinator may take whatever action necessary to alleviate the problem, repair any damage incurred and/or clean up the immediate and adjacent areas. The cost of the corrective measures specified above, including the Agency Representative's or Coordinator's time and expenses, will be billed directly to the Contractor. Should the Contractor not bear the cost of these measures, they will be assigned to the Project and its Contract Sum will be reduced by that amount.

01030 SUPPLEMENTAL BIDS

Refer to Specification Section 01 23 13 Supplemental Bids and the Contract Drawings for additional information.

A. Supplemental Bid No. 1: Includes, but may not be limited to the following:

1. Access and review the existing stainless-steel drip pans over the switch gear units for re-application of butyl sealant at penetrations through the pan.

2. Apply new butyl tape flashing at each penetration in the existing stainless-steel drip pans.

3. Existing EPDM roof covering to remain at the server room. Install EPDM Strip flashings over the existing seams.
4. At the server room roof, extend new EPDM flashing up onto the column penetration a minimum of 8”.
5. Prepare the existing EPDM roof covering and new seam stripping and apply an elastomeric coating over the entire roof surface.
6. Existing conduit supports to remain at the server room roof. Temporary shifting of supports is permitted for roofing work.

B. Supplemental Bid No. 2: Includes, but may not be limited to, the provision and installation of the following:
   1. Gutter lining repairs including membrane seam stripping and fluid applied coatings;
   2. Gable end coping cap repairs including joint sealants, general cleaning and application of water repellant;
   3. Gable end masonry repairs including the modification of reglet flashing, masonry re-pointing and general cleaning;
   4. Closure flashing at exposed pre-cast concrete bands (2 locations);
   5. Roofing, blocking and flashing work associated with the northeast low slope EPDM roof area; and
   6. Tightening of snow retention system rails.

C. Supplemental Bid No. 3: Includes, but may not be limited to, the provision and installation of the following:
   1. Remove three (3) existing, abandoned mechanical units including curbs and blocking.
   2. Prepare the existing steel and apply direct-to-metal primer/paint.
   3. Provide new framing and roof fill with steel decking and insulation boards. Include cell closures for the steel deck edges.

D. Supplemental Bid No. 4: Includes, but may not be limited to, the provision and installation of the following:
   1. Fabricate and install a new, elevated, galvanized steel communication platform structure using HSS and W sections with skewed base plates to account for existing deck slope.
   2. Provide galvanized steel grating for platform deck, secured to the platform structure.
   3. Provide six (6) galvanized steel posts mounted to the grating with sandwiched steel plates.

01040 COORDINATION

A. The Contractor will coordinate the Work of the several trades to assure the efficient and orderly sequence of installation of construction elements.

B. The Contractor will verify that characteristics of interrelated equipment are compatible. The Contractor will coordinate work of various Sections having interdependent responsibilities for installing, connecting, and placing equipment in service.
C. The Contractor will coordinate space requirements and installation of mechanical work; follow routing shown for pipes, ducts, and conduits as closely as practicable; make runs parallel with lines of building; use spaces efficiently to maximize accessibility for other installations and for maintenance repairs.

D. The Contractor shall coordinate work to avoid interruption or interference to any utility line servicing any building on campus.

E. See also Article 1.03 of the GENERAL CONDITIONS.

1045 CUTTING AND PATCHING

A. Openings and chases may not be shown on the Drawings. It is the responsibility of the Contractor to examine the Drawings and to provide openings where needed.

B. The Contractor will install sleeves, inserts and hangers furnished by the trades needing same.

C. After installing work into openings, the Contractor will close same. If finishes are to be restored, the new work will match the original and will be done by the trade customarily responsible for the particular kind of work.

D. The Contractor will obtain permission from the Project Coordinator before cutting beams, arches, lintels, or other structural members.

E. The Contractor will perform all cutting and patching to integrate elements of work, uncover ill-timed, defective, and non-conforming work. The Contractor will provide necessary penetrations of existing surfaces, seal penetrations through floors, walls, ceilings, and roofs, as applicable and restore or preserve fire-rated and smoke barrier construction. Construction and finishes will match original work. The Contractor will provide any necessary samples for testing.

01050 SURVEY/LAYOUT AND RECORD DOCUMENTS DURING CONSTRUCTION

A. Survey/Layout: Not Applicable

B. Record Drawings during Construction:
   1. Contract Documents: The Contractor will maintain at the Site, one copy of the Contract Documents, Addenda, approved Shop Drawings, Change Orders, etc., in good order, with up-to-date project information. The Contract Documents will be available to the Architect/Engineer and Project Coordinator at all times.
   2. Record Drawings: The Contractor will maintain at the Project Site one set of the Contract Documents which will be entitled "Record Drawings", on which the Contractor will record any and all changes to the Contract Documents, as soon as they occur. The Record Drawings will be updated on a weekly basis, at a minimum, and will be available to the Architect/Engineer and Project Coordinator at all times.
The Contractor will carry a separate line item for "Record Drawings" on the Schedule of Values. The Contractor's failure to update the "Record Drawings" will result in a reduction in the Contractor's monthly Application for Payment.


01052 DIMENSIONS AND MEASUREMENTS

A. The Contractor and each Subcontractor will verify all new and existing dimensions for all built-in work and/or work adjoining that of other trades, before ordering any material or doing any work. They will be responsible for the correction of all dimensions found to be in error. Any discrepancy in dimensioning will be submitted, in writing, to the Project Coordinator for transmittal to the Architect/Engineer for its consideration, before proceeding with the Work.

01054 CONSTRUCTION STAKES

A. Not Applicable.

01056 "CALL BEFORE YOU DIG"

A. The Contractor will notify "Call Before You Dig" at 1-800-922-4455 at least three (3) full working days before any proposed excavation activity. The Contractor will provide the Project Coordinator with written evidence of a Dig Number and Start Date prior to commencing any excavation work. The Agency's "Call Before You Dig" representative is Jose Pezo, Tel: 860-832-0180, Fax: 860-832-2329.

B. The Contractor will have full responsibility for maintaining and protecting original utility mark-outs and for periodically notifying "Call-Before-You-Dig" in accordance with state requirements. Should the Contractor require additional mark-out as a result of the Contractor's failure to adequately protect the original marks-outs, the Agency will provide that service as a back charge to the Contract.

01090 STANDARDS, CODES, AND SPECIFICATIONS

A. For products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. References to standard specifications and codes refer to the editions current at the Bid Due Date. References include their addenda and errata, if any, and will be considered a part of these specifications as if they were printed herein in full.

C. The manufacturers' standard warranties or guarantees will apply when their products are used on this project.
01095  SUBCONTRACTOR LIST

A. Upon request by the Agency, the Contractor will submit a list of all Subcontractors on the Project, including all Subcontractors previously listed during the Bid Phase. The Contractor will include the following information for each Subcontractor: a) company name & address; b) telephone and fax numbers; c) contact person; d) division section; e) subcontract amount; f) trade license number; g) Federal Employer Identification Number and h) SBE, MBE or WBE status.

01100  SPECIAL PROJECT PROCEDURES

A. This building houses critical infrastructure for campus operations and life safety communications. The contractor will provide the greatest level of care in protecting these vital areas and systems during construction. Contractor will need to be on call 24/7 to respond to any issues arising from these construction activities, to remedy issues immediately. CCSU will back-charge the contractor for any emergency measures undertaken to correct field deficiencies.

B. Weather must be considered both in short and long-term schedule approach. By undertaking this project, the contractor understands that they will need to install the roof systems as required by the documents and manufacturer's requirements. The contractor will need to consider the approaching fall/winter weather. No extra costs will be considered due to cold (or otherwise adverse) weather conditions. Contractor will incorporate all provisions necessary to complete the work prior to August 10, 2018. This includes overtime, temporary heat, temporary protective measures, and any other aspects required to execute work.

C. Contractor is responsible for maintaining a properly conditioned environment inside the Server Room always during the project. Coordination with the specified sub-contractor and mechanical/electrical sub-contractors is required.

D. Satellite communication services shall be uninterrupted throughout the project. Coordination with the specified sub-contractor is required.

01121  SALVAGEABLE MATERIALS/REUSE OF EXISTING MATERIAL

A. All items on the plans to be removed will become the property of the Contractor.

B. Except as specifically indicated or specified, materials and equipment removed from the existing Work Site will not be used in the completed work.

01210  PRECONSTRUCTION CONFERENCE

A. The Project Coordinator will organize a Pre-construction Conference and notify the parties concerned.
01220  PROJECT MEETINGS

A. Scheduled Project Meetings will be held once (1) each week during the construction of this Project, unless otherwise specified by the Architect/Engineer. The day and time of these meetings will be determined by mutual agreement of the parties in attendance. If a time and date cannot be agreed upon, the Project Coordinator will establish them. Meetings will commence seven (7) calendar days from the issue of the Purchase Order and terminate the week of the Substantial Completion of this Project. Attendance at these meetings by the Contractor’s Project Manager and Construction Supervisor is mandatory. Meetings will be held in the Temporary Office Trailer, or a location approved by the Architect/Engineer.

B. Special Project Meetings may be called by any regular attendee of Scheduled Meetings, upon issue of two (2) days written notice. The parameters specified above for Scheduled Meetings will apply hereto.

C. Minutes of the above meetings will be produced by the Architect/Engineer and distributed to all parties.

01340  SHOP DRAWINGS

A. The Contractor will forward, after detailed checking in its office to confirm that is complies with the contract requirements (with transmittal letter), .PDF copies of each shop drawing and/or product data sheet to the Architect/Engineer for review, copied to CCSU, within seven days of receipt of same.

B. The submittals specified herein will show all the work in detail. Product data submittals will be edited and all data irrelevant to this Project and its conditions will be eliminated. Details will be drawn to a scale of 3” = 1'-0" or larger.

C. The Contractor will review the Shop Drawings, stamp with its approval, and submit them in orderly sequence to cause no delay in its work or in the work of any Subcontractor. Shop Drawings will be properly identified regarding the Specification Section and article, material, and Project. At the time of submission, the Contractor will inform the Architect/Engineer, in writing, of any deviation in the Shop Drawings from the requirements of the Contract Documents.

D. The Architect/Engineer will review Shop Drawings for conformance with the design concept of the Project, and will return corrected and/or approved Shop Drawings to the Contractor within seven (7) days of the receipt of same.

E. The Contractor will make any corrections required by the Architect/Engineer. The Contractor will resubmit the specified number of corrected copies of the Shop Drawings until accepted by the Architect/Engineer.
F. The Architect/Engineer’s review of a Shop Drawing submittal will in no way relieve the Contractor of its responsibility in fulfilling the letter and the intent of the Contract Documents.

G. When the Shop Drawing review process has been satisfactorily completed, the Contractor will provide a total of four (4) prints of each Shop Drawing to the Architect/Engineer for distribution and filing. The Architect/Engineer will retain two (2) sets of each submittal for its files, and two (2) set to the Agency, with a transmittal letter.

H. Long Lead Time Items: It is the responsibility of the Contractor to ensure that all materials, products, etc. required for the Project are ordered in a timely manner so as not to delay its work or that of any Subcontractor. Long Lead Time Items will be reviewed in the same way as other items as described above.

01341 SAMPLES

A. Submit Samples of all items so specified.

B. Legibly mark all Samples as follows:
   1. Name or trade, type, quality or grade and any further designation required to identify the item.
   2. Manufacturer or fabricators name, address, and telephone number.
   3. Contractor and Subcontractor’s name, person to contact, address and telephone number.
   4. Project name and designation.

C. Submit Samples of sufficient size and in sufficient numbers to clearly show the quality, type, range of color, texture of the surface and other important features of the item.

D. All materials, fabrications and equipment provided for the Project will be as specified, identical to the Samples submitted.

01380 CONSTRUCTION PHOTOGRAPHS

A. The Architect/Engineer may take progress photographs at any time during the construction process. The Contractor will always allow unobstructed access to the Work for this purpose.

01400 QUALITY CONTROL

A. Comply with manufacturers' and association or trade instructions and specifications for storage and use of their products.

B. Comply with instructions in full detail, including each step in sequence. Should instructions conflict with the Contract Documents, request clarification from the Architect/Engineer before proceeding.
C. When specified, require manufacturer to provide qualified personnel to observe field conditions, installation, quality of workmanship and to test, adjust and balance equipment, as applicable.

D. Where required by the Specifications, submit certificates to the Architect/Engineer, executed by a responsible officer of the manufacturer, warranting that product meets or exceeds specified requirements.

01511 TEMPORARY ELECTRICITY AND LIGHTING

A. The Contractor may take electrical power and lighting from the nearest available outlets or panels on the Site. The Contractor will comply with all applicable codes that govern electrical usage or distribution on the Site.

B. The Agency will pay the cost of the electricity used. The Contractor will take measures to conserve electrical usage. If the Contractor's demand proves to be a hardship, the Agency reserves the right to terminate its provision of electrical power, or to measure the quantity of electrical energy provided and to charge the Contractor for its consumption at 1.2 times the cost to the Agency.

01513 TEMPORARY HEAT

Weather must be considered both in short and long-term schedule approach. By undertaking this project, the contractor understands that they will need to install the roof systems as required by the documents and manufacture's requirements. The contractor will need to consider the approaching fall/winter weather. No extra costs will be considered due to cold (or otherwise adverse) weather conditions. Contractor will incorporate all provisions necessary to complete the work prior to August 10, 2018. This includes overtime, temporary heat, temporary protective measures, and any other aspects required to execute work.

01514 TEMPORARY TELEPHONE

A. Not Applicable.

01515 TEMPORARY WATER

A. Not Applicable.

01516 TEMPORARY SANITARY FACILITIES

The Contractor must provide their own temporary sanitary facilities as part of the project. Refer to Section 01 50 00 Temporary Facilities and Site Maintenance for additional information.

01518 FIRE PROTECTION

A. The Contractor will assume all responsibility for loss or damage by fire to the Site, until the Final Completion of this Project. No flammable or explosive materials will be stored on the
Project Site at any time. The Contractor will assign a responsible employee to oversee fire protection measures.

01520 CONSTRUCTION EQUIPMENT

A. The Contractor will furnish and maintain, at its own expense and risk, all tools, apparatus, and appliances necessary to insure the timely, convenient, and safe execution of this Contract. All the above will comply with applicable OSHA requirements and all other applicable codes, rules, regulations, and statutes, including compliance with the requirements of the current edition of the "Manual of Accident Prevention in Construction" published by The Associated General Contractors of America, and the standards of the State Labor Department.

01535 PROTECTION

A. Safe Work Environment: The Contractor shall cooperate with the Owner in creating a safe work environment for workers, building occupants and members of the university community during all construction operations. The Contractor shall employ work practices and safety measures in accordance with standards established by U.S. Department of Labor, Occupational Safety, and Health Administration (OSHA), National Fire Protection Association (NFPA), State and Local Building Codes, and the Department of Health. The Contractor shall maintain safe and protected means of egress to the buildings at all times and shall protect adjacent walkways, as required, to provide for the safe flow of pedestrian traffic around each building.

B. The Contractor shall enroll in the onsite Safety and Health Consultation Program offered by the Connecticut Occupational Safety and Health Administration located with the Connecticut Department of Labor, 200 Folly Brook, Wethersfield, CT.

C. See Section 18 in the Contract Draft document.

01540 SECURITY

A. The Contractor will be solely responsible for the protection and safekeeping of products stored or installed under this Contract until the Date of Substantial Completion of the Project.

B. The Contractor will be solely responsible for damage, loss, or liability due to theft or vandalism. The Contractor will bear full responsibility for the protection and safekeeping of products stored on site under this contract.

01550 TRAFFIC WAYS

A. The Contractor may use on-site paved roads and parking areas, as approved by the Agency, but will not block, encumber, or otherwise obstruct the same. Public roadways will not be blocked by standing trucks, parked cars, material storage, construction

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operations or in any other manner. The Agency will designate an area(s) within or outside of the Contract Limit Lines in which construction vehicles, dumpsters, etc. may be located.

B. The Contractor will keep public roads and existing paved roads, drive and parking areas on the Agency's property, free of scrap or debris due to construction operations. The Contractor will repair, at the Contractor's expense, any damage to the surface of the roadways caused by the Contractor's construction operations.

C. If the Work of the Contract affects public use of any street, road or highway, the Contractor will confer with the police authority having jurisdiction to determine if and how many police are needed for public safety in addition to any barriers and signals that may be needed. The Contractor will be responsible for payment of any required police or traffic control services.

01560 TEMPORARY CONTROLS

A. This building houses critical infrastructure for campus operations and life safety communications. The contractor will provide the greatest level of care in protecting these vital areas and systems during construction. Contractor will need to be on call 24/7 to respond to any issues arising from these construction activities, to remedy issues immediately. CCSU will back-charge the contractor for any emergency measures undertaken to correct field deficiencies.

B. Weather must be considered both in short and long-term schedule approach. By undertaking this project, the contractor understands that they will need to install the roof systems as required by the documents and manufacturer's requirements. The contractor will need to consider the approaching fall/winter weather. No extra costs will be considered due to cold (or otherwise adverse) weather conditions. Contractor will incorporate all provisions necessary to complete the work prior to December 22, 2017. This includes overtime, temporary heat, temporary protective measures, and any other aspects required to execute work.

C. During the progress of the Work, the Contractor will conduct its operations and provide adequate pollution controls to minimize the creation and dispersion of noise, odors, dust, dirt and/or mud within and beyond the Site. The controls will be implemented to the satisfaction of the Project Coordinator, to the extent required to assure the Agency's continued use of its facilities.

D. Should the Agency's use of its facilities be denied or interrupted by the Contractors not providing adequate controls, as specified above, the Contractor will be required to cease operations until adequate controls are provided. All costs incurred in such a cessation of operations will be borne by the Contractor. No extension of time will be granted due to such a cessation in operations.
01569 CLEANING

A. The Contractor will keep the Site and Building Interior clean, free from excessive soiling, dust collection, staining, the excessive accumulation of debris and other substances and conditions that, in the opinion of the Architect/Engineer, or the Construction Coordinator, are detrimental to the safety of the building, public and the appearance of the Site. The Contractor will employ whatever cleaning measures are required to achieve the above. They will include, but are not limited to, the following:

1. Remove and legally dispose of off-site all items scheduled for demolition and removal. Stockpiling of demolition items within or outside the Contract Limit Lines is prohibited.
2. Maintain all areas under the Contractor's control free of waste, debris, and rubbish.
3. Remove waste, debris and rubbish from the Site daily and legally dispose of off-site. Maintain the Site in a clean and orderly condition.
4. Provide on-site containers for the collection of waste materials, debris and rubbish. USE OF AGENCY WASTE CONTAINERS, COMPACTORS, DUMPSTERS, AND TRASH RECEPTACLES IS PROHIBITED.
5. Remove debris and rubbish from closed or remote spaces prior to closing the space.
6. Periodically clean interior building areas until Substantial Completion.

01580 PROJECT SIGN

A. Not Required

01590 FIELD OFFICES AND SHEDS

A. CCSU will furnish, without charge, one (1) room for the General Contractor’s use as an office in an existing office space at the Energy Center. The Contractor shall provide and install a 5-lb ABC fire extinguisher and an approved first aid kit. Meeting space outside of the field office shall be coordinated with CCSU in either the Energy Center or East Hall Conference rooms during the hours of 8am to 4 pm. Meeting room use will be subject to availability and will require notice. The Contractor shall be responsible for providing furniture and shall keep this area clean and return it to its original condition after use. The Contractor shall provide the following furniture and Equipment, which will remain his property. The furniture may be used but shall be in good condition as judged by CCSU.

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
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<tbody>
<tr>
<td>1.1</td>
<td>The General Contractor shall provide a lockable chemical toilet(s) within the contract limit line. The General Contractor shall maintain the facility in a sanitary condition.</td>
</tr>
<tr>
<td>1.2</td>
<td>One (1) Lockable office desks each with an executive chair.</td>
</tr>
<tr>
<td>1.3</td>
<td>One (1) Plan tables.</td>
</tr>
<tr>
<td>1.4</td>
<td>One (1) Wall mounted, cork display boards (4’ x 6’).</td>
</tr>
<tr>
<td>1.5</td>
<td>Two (2) File cabinets (lockable four drawer letter size).</td>
</tr>
<tr>
<td>1.6</td>
<td>Two (2) Bookshelves each with 10 linear feet x 12”-wide shelving.</td>
</tr>
<tr>
<td>1.7</td>
<td>Two (2) Large capacity waste receptacles.</td>
</tr>
</tbody>
</table>
Should this scenario not be acceptable to the Contractor, see Option for Field Office / Equipment below.

As an Option, the Contractor shall provide a field office within the space of the lower lot of East Hall accessed off of Manafort Drive or other location as mutually agreeable between the contractor and CCSU. The field office shall be one (1) single wide trailer minimum 12’ x 32’. The trailer shall have to be in “new condition” as determined by the Construction Administrator. The trailer shall have a minimum of one (1) office and a main meeting area. The trailers shall have ample natural light, heating of sufficient capacity to maintain 70 degrees (F) in winter and air conditioning of sufficient capacity to maintain 75 degrees (F) in summer. The operational noise level of the supplied HVAC systems shall be low enough so as not to impede the conducting of meetings. The General Contractor shall provide a 5-lb. ABC fire extinguisher and an OSHA- approved first aid kit. The General Contractor shall provide the following furniture, and equipment which will remain his property. The furniture may be used but shall be in good condition as judged by CCSU.

| 1.8 | One (1) Plain paper, Fax Machine with dedicated telephone line approved by Owner. |

| 1.1  | The Contractor shall provide a lockable chemical toilet(s) within the contract limit line. The General Contractor shall maintain the facility in a sanitary condition. |
| 1.2  | One (1) Lockable office desks each with an executive chair. |
| 1.3  | One (1) Plan tables. |
| 1.4  | Six (6) Conference chairs and a conference table (approx. 5’ x 12’). |
| 1.5  | One (1) Wall mounted, cork display boards (4’ x 6’). |
| 1.6  | Two (2) File cabinets (lockable four drawer letter size). |
| 1.7  | Two (2) Bookshelves each with 10 linear feet x 12”-wide shelving. |
| 1.8  | Two (2) Large capacity waste receptacles. |
| 1.9  | One (1) Plain paper, Fax Machine with dedicated telephone line approved by Owner. |

01592 PARKING PERMITS

A. Parking is by permit only. The Contractor will meet with a representative of the Agency’s Police Department to arrange for parking permits for all construction personnel, including Subcontractors and employees of Subcontractors. Parking will be permitted in the designated areas as determined by the CCSU Police Department. Vehicles without permits will be ticketed, tagged, and towed at the vehicle owner’s expense. Parking will not be permitted in front of the building.

01594 RESTRICTIONS

A. Weapons or Intoxicants: No person employed on this Project will bring intoxicants or any type of weapons onto the Campus.
B. Fraternization or Harassment: The Contractor is advised to avoid personal contact and fraternization with facility occupants and the general campus population.

01600 MATERIAL AND EQUIPMENT

A. Material and equipment incorporated into the Work will conform to applicable specifications and standards and comply with size, make, type and quality specified.

B. For manufactured and fabricated products:
   1. Design, fabricate and assemble in accordance with the best engineering and shop practices.
   2. Manufacture like parts of duplicate units to be standard sizes and gages, to be interchangeable.
   3. Two or more items of the same kind will be identical, by the same manufacturer.
   4. Products will be suitable for service conditions.
   5. Equipment capacities, sizes and dimensions shown or specified will be adhered to, unless variations are specifically approved in writing.

C. Do not use material or equipment for any purpose other than for which it is designed or is specified. All material, equipment and product will be fit for their intended purpose.

D. Architect will consider requests for Substitutions only within 15 days after date established in Notice to Proceed. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents. A request constitutes a representation that the Contractor:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Will provide the same warranty for the Substitution as for the specified product.
   3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension which may subsequently become apparent.
   5. Will reimburse Owner for review or redesign services associated with re-approval by authorities.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure:
   1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
   2. Submit shop drawings, product data and certified test results attesting to the proposed product equivalence.
3. The Architect will notify Contractor, in writing, of decision to accept or reject request.

01604 MANUFACTURER’S INSTRUCTIONS

A. When the Contract Documents require that installation of any part of the Work will comply with manufacturer’s printed instructions, the Contractor shall obtain and distribute copies of such instructions to parties involved in the installation, including one copy to the Architect/Engineer.
   1. Maintain one (1) complete set of instructions at the job Site during installation and until the Date of Substantial Completion.

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 the Architect/Engineer for further instructions.
   2. Do not proceed with the Work without clear instructions.

C. Perform all Work in accordance with the manufacturer’s instructions. Do not omit any preparatory step or installation procedure unless it is specifically modified or deleted by the Contract Documents.

01610 TRANSPORTATION AND HANDLING

A. Materials and equipment will be delivered, stored, and handled to prevent intrusion of foreign matter and damage by weather or breakage. Packaged materials will be delivered and stored in original, unbroken packages.

B. The contractor shall promptly inspect shipments to assure that products comply with requirements, that quantities are correct and products are undamaged.

C. Packages, materials, and equipment showing evidence of damage will be rejected and replaced at no additional cost to the Agency.

01620 STORAGE AND PROTECTION

A. Store products in accordance with the manufacturer’s instructions with seals and labels intact and legible. Store sensitive products in watertight enclosures. Maintain within temperature and humidity range required by the manufacturer.

B. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.

C. Store loose granular material on solid surfaces in a well-drained area; prevent mixing with foreign matter.

D. Arrange storage to provide access for inspection. Periodically inspect to insure products
are undamaged and are maintained under required conditions. Keep log showing date, time, and problems, if any.

E. Stone, masonry units and similar materials will be stored on platforms on dry skids and will be adequately covered and protected against damage.

F. Provide substantial coverings, as necessary, to protect installed products from traffic and subsequent construction operations. Remove when no longer needed.

**01710 FINAL CLEANING AND SITE RESTORATION**

A. The Contractor, within one (1) week of the inspection required to establish the Substantial Completion of the Project, or any portion thereof, will perform a final cleaning of all Work and any impacted surfaces or equipment. The Contractor will leave the Project clean. If the Contractor fails to perform a final cleaning to the satisfaction of the Architect/Engineer and the Project Coordinator, the Agency may do so, and the cost thereof will be charged to the Contractor.

B. This final cleaning will be complete in every manner, including but not limited to, the following:
   1. The removal of all defacements both new and existing including, but not limited to, graffiti, putty, paint and adhesive residue, streaks, stains, finger prints, erection marks and construction notes.
   2. The cleaning of all metal surfaces.
   3. The cleaning of all outside areas including building surfaces (brick walls, window panes, frames, and sills), sidewalks, roads, and grass areas.
   4. The cleaning of exposed and accessible concealed surfaces of the Project, including but not limited to walls, ceilings, carpeted surfaces, concrete flooring, mechanical and electrical fixtures, built-in equipment, etc.

C. Site Restoration: The Contractor will restore all grass areas, sidewalks, and paved areas damaged or destroyed by construction operations in accordance with Agency Standards.

**01720 PROJECT RECORD DOCUMENTS**

A. “As-Built Drawings”: Refer to Section 01 70 00 Project Close-Out for As-built drawing requirements.

B. “Record Survey”: Not applicable

C. “Campus Master Survey Map”: Not applicable.

D. “Data Base Building Plan(s)”: Not Applicable

**01730 OPERATIONAL AND MAINTENANCE DATA**

A. Submit two (2) sets of Operational Manuals of each of the Project’s systems in 3-ring loose-
leaf binders, properly marked and indexed. Delete and remove from the manual all information not relevant to the purpose of the manual. Submit the above to the Architect/Engineer for approval, with all additional information that the Architect/Engineer may request and considers necessary for the proper servicing and maintenance of all equipment. The quality of all copies will be subject to approval by the Architect/Engineer.

B. Manuals will include, but will not be limited to the following:

1. Operating Procedures:
   a. Typewritten procedures indicating each mode of operation of each piece of equipment or system. Procedures will indicate the status of each component of a system in each operation mode.
   b. Procedures will indicate names, symbol numbers, valve tags, circuit numbers, schematic control and wiring diagrams, locations of thermostats, manual starters, control cabinets and other controls of each system.
   c. Emergency shut-down procedures for each piece of equipment in each system, both automatic and manual, as appropriate.

2. Maintenance Schedule:
   a. Provide a typewritten schedule describing the manufacturer's recommended schedules of maintenance and a specification of those maintenance procedures.

3. Catalog Cuts and Shop Drawings:
   a. The catalog cuts will clearly indicate the exact model and type of each piece of equipment installed in the Project, including all options provided.
   b. The catalog cuts will fully describe equipment, including physical, performance, electrical, mechanical, and other characteristics. They will also include installation or erection diagrams.
   c. The catalog cuts will indicate spare parts numbers and the name, address and phone number of the manufacturer, and the name, address and phone number of the manufacturer's local representative or service department.

4. Provide a typewritten list of all Subcontractors on the Project, including the name, address and phone number of all local representatives or service departments.

5. All manuals will be indexed, with dividers separating each system or piece of equipment.

C. The Contractor will orient and instruct maintenance personnel, designated by the Agency, in the operation of all equipment. The date and time of the meeting will be mutually agreed upon. The Contractor will provide qualified instructional personnel for as long as necessary, to fully orient and instruct those designated.

01740 WARRANTIES AND GUARANTEES

A. The Contractor will guarantee all materials and warrant all workmanship for a period of three (3) years from the Date of Substantial Completion of the Project. Provide extended guarantees and warranties as specified in the Contract Documents, as per attached form.
B. Form of Guarantee/Warranty: See Appendix C in APPENDICES.

C. All required bonds will be by their respective Surety Companies, made out to Central Connecticut State University.

D. All guarantees/warranties or bonds supplied by Subcontractors, Installers, Suppliers, or Manufacturers will be countersigned by the General Contractor.

01800 CONFINED SPACE ENTRY

A. Confined Space Entry: The Agency has established a permit-required, confined space entry program. Confined spaces that affect the Work of this Project, will be defined in accordance with the requirements of OSHA, 29 CFR 1910.146 Appendix A and the Agency's confined Space Entry Plan. In the event that the Contractor must perform work within a permitted "confined space" as defined by federal OSHA regulations or by the CCSU "Confined Space Entry Plan", the Contractor will comply with all safety and monitoring requirements imposed by OSHA and by the "CCSU Confined Space Entry Plan" relative to work within the permitted confined space.

B. All proposed entries must be reviewed and approved, in advance, by the Agency's Environmental Health and Safety Compliance Officer, Mr. Domenic Forcella, telephone number (860) 832-2499, prior to the Contractor's entry into a permitted confined space.

C. All such compliance measures will be at the Contractor's expense and performed with the Contractor's own equipment. The Agency reserves the right to suspend the Contractor's operations for any violation of the above-mentioned confined space regulations.

01805 OSHA TRAINING

A. (Effective October 1, 2006) Public Act 06-175 (a) Each contract entered into on or after July 1, 2007, for the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public building project by the state or any of its agents, or by any political subdivision of the state or any of its agents, where the total cost of all work to be performed by all contractors and subcontractors in connection with the contract is at least one hundred thousand dollars, shall contain a provision requiring that, not later than thirty days after the date such contract is awarded, each contractor furnish proof to the Labor Commissioner that all employees performing manual labor on or in such public building, pursuant to such contract, have completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, in the case of telecommunications employees, have completed at least ten hours of training in accordance with 29 CFR 1910. 268.

01810 OSHA COMPLIANCE/AIR-BORNE PARTICLES

A. Lead Paint and Asbestos: Not Applicable
BUILDING CONTRACTOR REPORTING FORM

In order to receive final payment for services, all general contractors and their subcontractors must supply the information requested on this form and submit these form(s) with their final invoice (P.A. 93-288). Please duplicate this form and submit one for each contractor/subcontractor.

1. CENTRAL CONNECTICUT STATE UNIVERSITY – 7802
   Project Title: Energy Center Roof Replacement and Associated Work

   Project Number: STATE PROJECT #BI-RC-401; CCSU PROJECT #43-46

   Purchase Order #: TBD

2. Federal Employer Identification Number:

   If FEIN Number is not available, provide Social Security Number.
   Social Security Number:

   If neither field is completed, please check the appropriate reason:

   1. Refused to supply FEIN _____ 3. Not a U.S. citizen _____
   2. FEIN has been applied for _____ 4. Other reason _____

3. Connecticut Tax Registration Number:

4. Type of Work: Goods or Services Contract Construction Contract

5. Name of Business:

6. Business Address:
   Street/PO Box
   City State Zip Code

   Telephone Number: (________)

7. Remittance Address (If different):
   Street/PO Box
   City State Zip Code

8. Business Listed Above is: General Contractor Subcontractor

9. Name of Person Completing Form:
CERTIFICATE OF COMPLIANCE

AGENCY: Central Connecticut State University

ADDRESS: 1615 Stanley Street, New Britain, CT 06050

COMMISSIONER or AUTHORIZED REPRESENTATIVE: Sal Cintorino
Assistant Chief Administrative Officer

PROJECT TITLE: CCSU Energy Center Roof Replacement and Associated Work

PROJECT NUMBER: STATE PROJECT # BI-RC-401; CCSU PROJECT #43-46

PART “A” – DESIGN (Before bidding and when applicable for Building Permit):

THIS IS TO CERTIFY THAT to the best of my knowledge, information and belief the above-described project has been designed in substantial compliance with requirements of the State of Connecticut Basic Building Code and all other applicable codes as required by Chapter 541, Connecticut General Statutes.

Commissioner or Authorized Representative:
(Signature) Date:

Architect/Engineer:
(Signature) Date:

Registration Number:

PART “B” – CONSTRUCTION COMPLETION (Prior to Agency Occupancy):

THIS IS TO CERTIFY THAT to the best of my knowledge, information and belief the above-described project was built in accordance with the plans and specifications and approved change orders, and is in substantial compliance with all applicable codes as required by Chapter 541, Connecticut General Statutes.

Architect/Engineer:
(Signature) Date:

Registration Number:

General Contractor:
(Signature) Date:

(Below signature required for projects only when NOT exceeding threshold limits)

Commissioner or Authorized Representative:
(Signature) Date:

cc: DPS/OSBI, A/E, General Contractor, Agency File

CCSU Energy Center Roof Replacement
And Associated Work
CCSU PROJECT NO: 43-46
February 27, 2018; 1 of 1
Guarantee/Warranty
Central Connecticut State University
1615 Stanley Street
New Britain, CT  06050

CCSU Energy Center Roof Replacement and Associated Work

State Project Number: BI-RC-401
CCSU Project Number: 43-46

I (We) hereby guarantee (or warranty) the ______________________________
_____________________________ work on the Project referenced above
for a period of ___________ year(s), from the Date of the Substantial Completion of
the Work, ________________, 20____ against failures of workmanship and
materials, in accordance with the requirements of Section ____________, Page
_________ Paragraph(s) ________, of the Contract Specifications.

Signed:
(By Authorized Agent)

(Typed or Printed Name)

Title:

Date:
CERTIFICATE OF SUBSTANTIAL COMPLETION

PROJECT NAME: CCSU Energy Center Roof Replacement and Associated Work

DATE OF SUBSTANTIAL COMPLETION: September 12, 2018

STATE PROJECT NUMBER: BI-RC-401

CCSU PROJECT NUMBER: 43-46

CONTRACTOR

Name: TBD
Address: TBD

ENTIRE PROJECT OR DESIGNATED PORTION THEREOF:

Entire Project

TO WHOM IT MAY CONCERN:

The Date of the Substantial Completion of the Project, or designated portion thereof, is hereby defined as the date certified by the project Architect/Engineer as the date when construction is sufficiently complete, in accordance with the Contract Documents, so that the Agency can occupy or utilize the Project, or designated portion thereof, for the use for which it is intended.

You are advised that the above referenced Project, or designated portion thereof, is substantially complete and ready for use. All guaranty and warranty periods shall commence on the Date of Substantial Completion specified above.

The Project, or designated portion thereof, is hereby returned to the possession of the Agency effective on the date of Substantial Completion, subject to the following conditions:

1) It is understood that the Agency’s use of the Project, or designated portion thereof, in no way constitutes acceptance of any defective item. The failure to include any item in a Report does not alter the responsibility of the contractor to complete all the Work in accordance with the Contract Documents.

2) The Agency hereby assumes full responsibility for the proper maintenance of and for any and all damage to the Project, or designated portion thereof.

CCSU Energy Center Roof Replacement
And Associated Work
CCSU PROJECT NO: 43-46
February 27, 2018; 1 of 2
3) The Agency shall grant free access to the Contractor, or his agent, for the purpose of completing any unperformed and/or corrective work that may become necessary.

The total cost of this Project has increased from $XXX,000.00 to $XXX,000.00.

The Agency's Business Office is requested to provide any necessary insurance coverage required to fully cover the facilities effective on the date of Substantial Completion specified above.

DEPARTMENT OF PUBLIC WORKS: Not Applicable
(Date)

FOR THE CONSULTANT: Not Applicable
(Date)

FOR THE CONTRACTOR:
(Date)

CCSU COORDINATOR:
(Date)

CCSU FACILITIES MANAGEMENT:
(Date)

Original: Office of the University Architect, (file)
Cc: Associate Chief Administrative Officer
Scope Construction Company, Inc., Contractor
Business Office, CCSU
Project File
## CCSU - CONTRACTOR CHANGE ORDER PROPOSAL WORKSHEET

### Section 1

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Unit</th>
<th>Description of Material and Equipment</th>
<th>Unit Cost</th>
<th>Lump Sum Cost</th>
<th>Insert &quot;X&quot; If Credit (Quantity x Unit Cost OR Lump Sum) Total</th>
</tr>
</thead>
</table>

### Section 2

<table>
<thead>
<tr>
<th>Labor Classification</th>
<th>No. of Workers</th>
<th>Total Hours</th>
<th>Base Rate Per Hour</th>
<th>Taxable Benefits Per Hour (Cash)</th>
<th>Non-Tax. Benefits Per Hour (Plan)</th>
<th>Prevaling Rate Job (D+E) x C</th>
<th>Insert &quot;X&quot; If Credit</th>
</tr>
</thead>
</table>

### Line #1 Subtotal Costs - Material and Equipment $ |

### Column A B C D E F G H I J

<table>
<thead>
<tr>
<th>No. of Workers</th>
<th>Total Hours</th>
<th>Base Rate Per Hour</th>
<th>Taxable Benefits Per Hour (Cash)</th>
<th>Non-Tax. Benefits Per Hour (Plan)</th>
<th>Prevaling Rate Job (D+E) x C</th>
<th>Insert &quot;X&quot; If Credit</th>
</tr>
</thead>
</table>

### Section 3 Taxes on Labor

<table>
<thead>
<tr>
<th>Social Security Tax</th>
<th>CT Unemployment Tax</th>
<th>Fed. Unemployment Tax</th>
<th>% Total</th>
</tr>
</thead>
</table>

### Line #2 Labor Hourly Costs: Taxable: $ Total: $ |

### Section 4 Overhead and Profit % Mark-up on Contractor's Own Work

<table>
<thead>
<tr>
<th>Cost</th>
</tr>
</thead>
</table>

### Line #3 Subtotal Taxes and Compensation Insurance $ |

### Line #4 Total Labor and Materials (Total Lines #1 + #2 + #3) $ |

<table>
<thead>
<tr>
<th>Cost</th>
</tr>
</thead>
</table>

### Section 5 Trade Name of Subcontractor (from attached proposed change order form(s)) $ |

### Line #5 Total Mark-up on Contractor's Own Work $ |

### Line #6 Total Contractor Cost (Lines #4 + #5) $ |

### Section 6 Bond Fee (Final Change Order) $ Amount % Allowed Total |

### Line #7 Subtotal Subcontractor Costs $ |

### Line #8 General Contractor's Mark-up on Subcontractor Work 6.00% $ |

### Line #9 Total Subcontractor Costs (Lines #7 + #8) $ |

### Section 6 Bond Fee (Final Change Order) $ Amount % Allowed Total |

### Line #10 Total of Project Change Orders $ |

### Line #11 Total Proposed Change Order Amount (Lines #6 + #9 OR Line #10) $ |

---

CCSU Energy Center Roof Replacement and Associated Work
CCSU PROJECT #43-46
February 27, 2018; Page 1 of 1
## CCSU - SUBCONTRACTOR CHANGE ORDER PROPOSAL WORKSHEET

**Sub-Contractor:**

**Company Name (Typed or Printed):**

**Signature:**

**COP Description:**

**DPW Project No.:**

**CCSU Project No.:**

### Section 1

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Unit</th>
<th>Description of Material and Equipment</th>
<th>Unit Cost</th>
<th>Lump Sum Cost</th>
<th>Insert &quot;X&quot; If Credit</th>
<th>Lump Sum Total</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

**Line #1**

**Subtotal Costs - Material and Equipment**

**$**

### Section 2

**Labor Classification**

<table>
<thead>
<tr>
<th>No. of Workers</th>
<th>Total Hours</th>
<th>Base Rate Per Hour</th>
<th>Taxable Benefits Per Hour (Cash)</th>
<th>Non-Tax. Benefits Per Hour (Plan)</th>
<th>Gross Pay for Prevailing Rate Job (D+E) x C</th>
<th>Total Cost Per Hour</th>
<th>Total Hourly Labor Cost</th>
<th>Insert &quot;X&quot; If Credit</th>
<th>Total Hourly Labor Cost</th>
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</tbody>
</table>

**Line #2**

**Labor Hourly Costs:**

**Taxable:**

**$**

**Total:**

**$**

### Section 3

**Taxes on Labor**

<table>
<thead>
<tr>
<th>Social Security Tax: %</th>
<th>CT Unemployment Tax: %</th>
<th>Fed. Unemployment Tax: %</th>
<th>% Total</th>
<th>% x Total Col G Sec 2: Cost</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

**Line #3**

**Subtotal Costs - Material and Equipment**

**$**

### Section 4

**Overhead and Profit %**

<table>
<thead>
<tr>
<th>Mark-up on Contractor's Own Work</th>
<th>% Allowed</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0.00 to $5,000</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>$5,001 to $15,000</td>
<td>17%</td>
<td></td>
</tr>
</tbody>
</table>

**Line #5**

**Total Mark-up on Subcontractor's Own Work**

**$**

**Line #6**

**Total Subcontractor Own Cost (Lines #4 + #5)**

**$**

### Section 5

**Trade Name of Subcontractor (from attached proposed change order form(s))**

**Cost**

**$**

**Line #7**

**Subtotal Subcontractor Costs (No Overhead and Profit may be added on this figure)**

**$**

**Line #8**

**Total of This Change Order (Lines #6 + #7)**

**$**
SUBCONTRACT AGREEMENT FORM

THIS AGREEMENT made this________ day of __________, 20______, by and between 
__________________, a corporation organized and existing under the laws of _____________ (a 
partnership consisting of ____________) (an individual doing business as ____________) hereinafter 
called the "Contractor" and ______________________, a corporation organized and existing under the 
laws of ____________________ (a partnership consisting of ________________) (an individual doing 
business as ____________) hereinafter called the "Subcontractor",

WITNESSETH that the Contractor and the Subcontractor for the considerations hereafter named, agree 
as follows:

1. The Subcontractor agrees to furnish all labor and materials required for the completion of all 
work specified in Section No___________ of the specifications for _________(Name of 
Subtrade)__________ and the plans referred to therein and addenda No.____________, and 
__________ for the (Complete title of project and the project number taken from the title 
page of the specifications)___________ all as prepared by __________________(Name of 
Architect or Engineer) ________________for the sum of ____($_________) and the 
Contractor agrees to pay the Subcontractor said sum for said work. This price includes the 
following alternates:

Supplemental No. (s) ___________, ____________, ____________, ___________, 
_________, _______________, ______________, ___________, ____________, __________.

(a) The Subcontractor agrees to be bound to the Contractor by the terms of the hereinbefore 
described plans, specifications (including all general conditions stated therein which 
apply to his trade) and addenda No. _____, ______, _____ and ______ and 
__________, and to assume to the Contractor all the obligations and responsibilities that 
the Contractor by those documents assumes to the ______(Awarding Authority)______, 
hereinafter called the "Awarding Authority", except to the extent that provisions 
contained therein are by their terms or by law applicable only to the Contractor.

(b) The Contractor agrees to be bound to the Subcontractor by the terms of the hereinbefore 
described documents and to assume to the Subcontractor all the obligations and 
responsibilities that the Awarding Authority by the terms of the hereinbefore described 
documents assumes to the Contractor, except to the extent that provisions contained 
therein are by their terms or by law applicable only to the Awarding Authority.

2. The Contractor agrees to begin, prosecute and complete the entire work specified by the 
Awarding Authority in an orderly manner so that the Subcontractor will be able to begin, 
prosecute and complete the work described in this subcontract; and, in consideration thereof, 
upon notice from the Contractor, either oral or in writing, the Subcontractor agrees to begin, 
prosecute and complete the work described in this Subcontract in an orderly manner in 
accordance with completion schedules prescribed by the general contractor for each
subcontract work item, based on consideration to the date or time specified by the Awarding Authority for the completion of the entire work.

3. The Subcontractor agrees to furnish to the Contractor, within a reasonable time after the execution of this subcontract, evidence of workers' compensation insurance as required by law and evidence of public liability and property damage insurance of the type and in limits required to be furnished to the Awarding Authority by the Contractor.

4. The Contractor agrees that no claim for services rendered or materials furnished by the Contractor to the Subcontractor shall be valid unless written notice thereof is given by the Contractor to the Subcontractor during the first forty (40) days following the calendar month in which the claim originated.

5. This agreement is contingent upon the execution of a general contract between the Contractor and the Awarding Authority for the complete work.

IN WITNESS WHEREOF, the parties hereto have executed this agreement the day and year first above-written.

(SEAL)

(Type in Name of Subcontractor here)

WITNESS: ____________________________ By: ______________________________
Its ____________________________ Date

Print Name: ___________________________

(SEAL)

(Type in Name of Contractor here)

WITNESS: ____________________________ By: ______________________________
Its ____________________________ Date

Print Name: ___________________________

++++END OF SECTION++++

CCSU Energy Center Roof Replacement
And Associated Work
CCSU PROJECT NO: 43-49
February 27, 2018; 2 of 2
June 13, 2017

Mr. Henry Altman, AIA, LEED AP  
Coordinator, Capital Projects & Fac. Planning  
CCSU Facilities Management  
East Hall Room 2120700  
1615 Stanley Street  
P.O. Box 4010  
New Britain, CT  06050-4010

Re: Energy Center – Copper Mansard and Gutter Evaluation  
Central Connecticut State University  
New Britain, CT  
DAS Project No. BI-RC-401  
Gale JN 976650

Dear Mr. Altman:

Per our agreement, Gale Consultants, Inc. (Gale) performed an evaluation of the standing-seam copper mansard roof, parapet, and integral EPDM lined gutter, which extends above roof level on the north and east elevations of the Energy Center.

Please find below our general observations and recommendations:

**Copper Mansard Roof Panels**

- Copper standing-seam roof panels were measured to be 15.25” wide with 1” tall seams. Panels are continuous from built-in gutter to ridge. It appears the panels were installed per the 1992 project design.
- The standing seams remain locked to each other and onto the cleat at the built-in gutter transition.
- Compromising damage to the roof panels was not observed.
- There is a 1” diameter, single-pipe, copper snow rail at each area, located 12” upslope from the eave edge. The rail is attached to the roof seams with clips and secured in place with set screws. The snow rails were not loose, where checked, and generally appeared to be in serviceable condition. No action is necessary now.
  - **Recommendation**: Sloped copper mansard panels appear in good condition and when possible should remain intact. Set screws at snow-rail locations should be checked and tightened as the north and east eave edges are accessed for other work.
Copper Fascia

- The copper fascia at the gutters (north and east edges) is one-piece, extending from the exterior edge of the gutter to the vented soffit above the louvers.
- Fascia sections are ±10'-0" long and are attached at the soffit side with approximately four (4) rivets each.
- Gale observed that many of the rivets between the fascia and the soffit have failed and are no longer engaged. This generally occurs at butt joints between fascia sections. Displaced corners are visible throughout the roof perimeter.
- The fascia-to-soffit configuration is replicated at the open sides (west and south edges). Similarly, failed rivets were also observed at these areas.

  **Recommendation:** Where, and if, reused, re-secure the fascia to the soffit panel. If new fascia, design new gutter cleat and fascia system to be ES-1 compliant. Secure the lower edge of the fascia with new cleat independent of the soffit panel.

Gutter Linings

- Gutters consist of steel channel framing, plywood sheathing, and adhered 0.060”-thick EPDM linings, with field-fabricated seams at ±10'-0” o.c.
- The gutter lining extends behind the copper roof panels and the copper fascia. To replace the lining in its entirety would require removal of these components.
- Gale observed bubbles/blisters in the rear leg of the gutter lining. Blisters were prevalent at the north edge and concentrated at the north end of the east edge.
- Gale observed pin holes between the lining and the strip flashing at the seams. The strip flashings are starting to separate from the field of the lining.

  **Recommendation:** Due to the good condition of the copper mansard and our desire to leave it intact where possible, we recommend repairs to the existing EPDM lining. Repairs may include patches, supplemental membrane securement to the rear vertical leg and an application of a restoration (reflective, heavy build, and elastomeric) coating. As the building was constructed in 2004, it appears the gutter lining is approximately 13-years old and should be maintained to extend its service life.

- The gutters were measured to slope at ±0.0275” (less than 1/32”) per foot, directing water to ±2.5” diameter drain outlets, which connect to vertical, copper downspout leaders measuring 3” square.
- The gutters measure ±8.25” wide at their base.
- Downspouts connect to below-grade leaders, which appeared in functional condition.
• Gale observed ponding water in the east gutter due to blockage at the two (2) drain strainers. Gale removed debris from around the drain strainer and, once cleared, the flow of water through the strainer, downspout, and into below-grade leaders did not appear restricted.

• At the north gutter, Gale observed some water collected between the four (4) drains. However, the lining was dry around the drains indicating drains being slightly higher in elevation than some of the gutter lining.

  o **Recommendation:** While it appears that bi-yearly maintenance of the gutter system should result in adequate drainage, consideration should be given to adding a downspout to the east gutter as there are only two (2) existing downspouts on this elevation. The addition of a downspout would aid in gutter drainage. However, a suitable outlet location would need to be determined. Drainage capacity of the two (2) leaders on this elevation is not a concern. Consider adding a secondary drain strainer outboard of the primary drain strainer.

**Stone Copings at Gables**

• Sloped stone components generally appear in good condition.

• All stone joints are sealant, as wide as 2”. Weeps are not included in any of the joints.

• Sealant is crazed on the surface, but generally adhered to stone and brick substrates. Crazing indicates the sealant may be approaching its intended service life.

• Gale observed a few locations where the sealant bond between substrates has failed.

• Water protection (AVB, roofing, flashing, etc.) beneath the coping stones could not be confirmed.

  o **Recommendation:** Remove and replace coping cap sealants including backing materials. Add weeps beneath stones to address trapped moisture (see below). A water-repellent sealer could be applied to the exposed stone surfaces.

• Copper reglet counter flashings exist on the roof side of the stone copings, which counter flash the standing-seam roof panels.

• The reglet extends ±6.5” into the joint between the cast stone and brick. Reglet flashings in brick are typically cut-in at 1/2 – 1-1/2” deep. A 6.5” flange is more likely to collect water that is able to pass through the stone or joints.

• Shallow (1/2” deep) reglet at the end walls were either open or sealed with clear silicone. At the open reglet joints, Gale observed wedges, which appear to hold the reglet counterflashing in place.
Mr. Henry Altman  
CCSU Facilities Management  
June 13, 2017  
Page 4

- Brick masonry at the low ends of the gables was stained dark, showed light efflorescence, and was growing algae and moss. This indicates trapped moisture in the brick below the coping stones. It would appear that moisture is not able to adequately drain from the wall.

  o **Recommendation**: In order to address trapped moisture, weep holes beneath the stone copings should be provided in replaced sealant joints located at the base of the sloped gables. Reglet flashings should be re-secured and sealed, which may require new mortar cuts. The existing masonry should be cleaned to remove stains and vegetative growth.

We trust this information meets your needs. Should you have any questions, please do not hesitate to contact this office.

Best Regards,

GALE CONSULTANTS, INC.

Marc A. Loranger, P.E., LEED® AP  
Associate  
Building Enclosure Design and Consulting Group

MAL/dlm

Elliott Hambrook – Gale

Attachments

i:\976650\02 design\letters\bi-rc-401 ccsu energy center evaluation letter 2017 0613.docx
PHOTOGRAPHIC DOCUMENTATION
Energy Center Roof Replacement
Copper Mansard & Gutter Evaluation
June 13, 2017
BI-RC-401 / 976650

Photo 1 – Overall view of the existing standing-seam copper mansard roof panels, rail snow guards, EPDM-lined gutter, and copper fascia. The copper panels and flashings appeared to be in servicable condition and should remain intact.

Photo 2 – View of the transition from the copper mansard roof to the EPDM-lined gutter and copper fascia. Note that the snow guard rails are attached to the standing seams with brackets held in place with set screws. Set screws could be checked and tightened as the eave edge is accessed for other work.
PHOTOGRAPHIC DOCUMENTATION
Energy Center Roof Replacement
Copper Mansard & Gutter Evaluation
June 13, 2017
BI-RC-401 / 976650

Photo 3 – Overall view of the existing copper fascia at the copper mansard roof edges.

Photo 4 – View of sloped fascia leg extending into the gutter at the mansard roof areas.
PHOTOGRAPHIC DOCUMENTATION
Energy Center Roof Replacement
Copper Mansard & Gutter Evaluation
June 13, 2017
BI-RC-401 / 976650

Photo 5 – View of sloped fascia leg secured with rivets.

Photo 6 – View of existing copper fascia at the low-slope roof edges.
PHOTOGRAPHIC DOCUMENTATION
Energy Center Roof Replacement
Copper Mansard & Gutter Evaluation
June 13, 2017
BI-RC-401 / 976650

Photo 7 – View of the fascia at the low-slope roof areas. This section was loose at one end as a result of a failed rivet.

Photo 8 – View of typical copper fascia connection to the copper soffit using rivets. The fascia section in this photo was not attached as a result of a filed rivet. Fascia-to-soffit connections are identical at copper mansard and low-slope roof edges.
PHOTOGRAPHIC DOCUMENTATION
Energy Center Roof Replacement
Copper Mansard & Gutter Evaluation
June 13, 2017
BI-RC-401 / 976650

Photo 9 – Typical view of the EPDM gutter lining at the east edge. Note the standing water and debonding at the rear leg.

Photo 10 – Gale observed unadhered membrane at the EPDM gutter rear leg. This was prevalent on the north roof edge of the building, and at the north end of the east roof edge.
PHOTOGRAPHIC DOCUMENTATION
Energy Center Roof Replacement
Copper Mansard & Gutter Evaluation
June 13, 2017
BI-RC-401 / 976650

Photo 11 – View of a gutter outlet drain, which was clogged with debris. The drains should be cleared bi-annually to reduce standing water on the lining.

Photo 12 – Typical view of a 2.5” diameter outlet drain after debris was cleared and the gutter was allowed to drain.
PHOTOGRAPHIC DOCUMENTATION
Energy Center Roof Replacement
Copper Mansard & Gutter Evaluation
June 13, 2017
BI-RC-401 / 976650

Photo 13 – View of the north edge gutter. Note standing water located between outlet drains. The slope of the built-in gutters was positive overall, but standing water between drains indicates localized low spots.

Photo 14 – Gale observed holes at field-fabricated seam stripping in the gutter lining, typical. Seams should be stiped in prior to coating.
Photo 15 – Gale observed open seams at the rear leg of the gutter lining, east edge of the building. This condition was typical.

Photo 16 – View of partially unadhered EPDM lining at the north edge.
PHOTOGRAPHIC DOCUMENTATION
Energy Center Roof Replacement
Copper Mansard & Gutter Evaluation
June 13, 2017
BI-RC-401 / 976650

Photo 17 – Overall view of the sloped coping stones at the back side of the north gable.

Photo 18 – Overall view of the sloped coping stones at the east gable.
PHOTOGRAPHIC DOCUMENTATION
Energy Center Roof Replacement
Copper Mansard & Gutter Evaluation
June 13, 2017
BI-RC-401 / 976650

Photo 19 – View of existing sealant joints and lightning protection terminal at the ridge of the coping stones.

Photo 20 – Typical view of crazed sealant at sloped coping stones.
PHOTOGRAPHIC DOCUMENTATION
Energy Center Roof Replacement
Copper Mansard & Gutter Evaluation
June 13, 2017
BI-RC-401 / 976650

Photo 21 – Typical view of crazed sealant at sloped coping stones.

Photo 22 – View of efflorescence staining at the low end of the east gable. Weeps should be added when replacing sealant joints between the stone and the brick, in order to promote drainage.
PHOTOGRAPHIC DOCUMENTATION
Energy Center Roof Replacement
Copper Mansard & Gutter Evaluation
June 13, 2017
BI-RC-401 / 976650

Photo 23 – View of the north end wall at the east gable. Masonry should be cleaned. To increase drainage, add weeps when replacing sealant between the brick and sloped coping stones.
PART 1- GENERAL

1.01 IN GENERAL

A. The General Conditions, and all parts of the Bid and Contract Documents are made part of this Section as if fully repeated herein.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

B. Construction Phasing is indicated throughout the Contract Documents and summarized herein. Contractor to submit a detailed schedule and phasing plan demonstrating how the project will be completed within the project timeframe. Subsequent schedule updates will be reviewed weekly at each project meeting to confirm that the project is on schedule.

C. The entire Project shall be constructed as one Project Phase. Work of this Project shall be defined by individual Construction Phases, each relying on substantial completion, or significant progress, of previous Construction Phases(s). Each Construction Phase must be substantially complete, or shall sufficiently overlap associated phases as mutually agreed upon, or receive written approval from the Architect and CCSU prior to initiating to the next Construction Phase. Refer to Supplemental Bids Section 01 23 13 for additional information. Phasing assumes all Supplemental Bids are selected.

1. Construction Phase No. 1 shall include the following portions of work, including all labor and material, shown on the drawings and/or as specified hereinafter. The intent of this Construction Phase is to submit shop drawings, obtain approval and fabricate the elevated steel communication platform and includes but is not limited to the following:
   1. Submit shop drawings and obtain approval from Architect;
   2. Initiate fabrication of elevated communication platform;
   3. Install elevated communication platform prior to moving the existing satellite and communication equipment;
   4. Install new galvanized conduit, support system and extension of communication cabling;
   5. Relocation of satellite and communication equipment will not proceed until the platform and wiring is complete.

2. Construction Phase No. 2 shall include the following portions of work, including all labor and material, shown on the drawings and/or as specified hereinafter. The intent of this Construction Phase is to initiate and complete the interior protection and roof/waterproofing restoration at the Server Building and the Switch Gear Room and includes but is not limited to the following:
1. Installation of butyl seals to the Switch Gear Room;
2. Installation of roof restoration products at the Server Building;
3. Installation of temporary protection at the Boiler Exhaust grates, Server Building and the Switch Gear Room prior to main roof area renovations;
4. Deck infill at boiler exhaust vent locations once temporary protection in installed and shut-down is coordinated with CCSU.

3. Construction Phase No. 3 shall include the following portions of work, including all labor and material, shown on the drawings and/or as specified hereinafter. The intent of this Construction Phase is to initiate and complete the seamless transfer of cooling provisions into the Server Building and includes but is not limited to the following:
   1. Construction of temporary door closure at the rear of the Server Building;
   2. Provide and install required duct work, drain lines and other connections to the three (3) temporary cooling devices;
   3. Provide electric service to the three (3) temporary cooling devices;
   4. Decommission the existing four (4) roof top condensing units once and only after cooling loads have been transferred to the temporary units.

4. Construction Phase No. 4 shall include the following portions of work, including all labor and material, shown on the drawings and/or as specified hereinafter. The intent of this Construction Phase is to initiate and complete main roof restoration program and includes but is not limited to the following:
   1. Non-phased roof removal and replacement above sensitive and critical interior areas.

5. Construction Phase No. 5 shall include the following portions of work, including all labor and material, shown on the drawings and/or as specified hereinafter. The intent of this Construction Phase is to initiate and complete main roof restoration program and includes but is not limited to the following:
   1. Phased roof removal and replacement (using vapor retarder as temporary roof) for remainder of main roof area.

6. Construction Phase No. 6 shall include the following portions of work, including all labor and material, shown on the drawings and/or as specified hereinafter. The intent of this Construction Phase is to initiate and complete the Supplemental Bid No. 2 scope of work and includes but is not limited to the following:
   1. Work designated on the Contract Documents as Supplemental Bid No. 2.

END OF SECTION
PART 1- GENERAL

1.01 IN GENERAL

A. The General Conditions, and all parts of the Bid and Contract Documents are made part of this Section as if fully repeated herein.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.03 CONTRACTOR'S COSTS

A. The Contractor's costs for unloading and handling, labor, installation costs, storage, insurance, overhead and profit and other expense related to the Allowance item shall be included in the Lump Sum Bid Amount and not in the Allowance unless stated otherwise is the Allowance Schedule of this section.

1.04 ARCHITECT/ENGINEER RESPONSIBILITIES

A. Consult with Contractor for consideration of Products, suppliers and installers.

B. Select Products in consultation with the Owner and Representatives and transmit decision to Contractor.

C. Prepare Change Order.

1.05 CONSTRUCTION ADMINISTRATOR RESPONSIBILITIES

A. Consult with Architect/Engineer, Contractor, Owner and Representatives for consideration of Products, suppliers and installers.

B. Select Products in consultation with Architect/Engineer, Owner and Representatives and transmit decision to Contractor.

1.06 GENERAL CONTRACTOR RESPONSIBILITIES

A. Assist Architect/Engineer and Owner in selection of Products and Suppliers.

B. Obtain proposals from Suppliers and offer recommendations.

C. On notification of selection by Owner and/or Architect/Engineer execute purchase agreement with designated supplier.

D. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
E. If the actual cost of an Allowance item is more or less than the given amount, the Contract Sum will be adjusted by Change Order.

1.07 ALLOWANCE SCHEDULE

A. **Allowance No. One:** Include the Stipulated sum of $3,760.00 (plus applicable taxes) for Schneider Electric IT Corporation for decommissioning and recommissioning (labor only) of four (4) existing rooftop condensing units (RTCU) per proposal dated August 7, 2017 (attached) (Quote No. 1-3RZQGVC/1).

B. **Allowance No. Two:** Include the Stipulated sum of $2,500.00 (including applicable taxes) for parts, equipment, temporary measures, or any other costs associated with completing the decommissioning and recommissioning of four (4) existing rooftop condensing units to achieve a finished installation.

C. **Allowance No. Three:** Include the Stipulated sum of $5,406.00 (plus applicable taxes) for Apogee Advanced Resnet Services (Apogee) to provide labor, parts, equipment or any other costs associated with completing the relocation of the existing rooftop communication equipment. The sum includes coordination meetings, submittal review, 1.5x premium time per proposal dated August 28, 2017 and August 31, 2017 (attached) (authored by Al Piehl).

D. **Allowance No. Four:** Include the Stipulated sum of $4,860.00 (plus applicable taxes) for The Stuart L. White Company and McPhee Electric, Ltd. to provide labor, parts, equipment, or any other costs associated with the fire suppression system and electrical work per proposal dated September 26, 2017 (attached) (authored by Ed Kozak).
ALLOWANCE NO. 1

Schneider Electric IT Corporation

132 Fairgrounds Road
West Kingston RI 02892 United States
Purchaseorders@apcc.com

401-792-2313

Detailed Quote Report

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Please include the Quote # OR this Quote Report with your Purchase Order when submitting to Schneider Electric IT. This will facilitate and expedite Schneider Electric IT entering your order - Thank you.

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Total Extended Price: $ 3,760.00

NOTE:
• LABOR QSKU ONLY, PARTS OR ANY OTHER LABOR SUBTYPE NOT INCLUDED
• ANY PARTS LISTED ON THIS DESCRIPTION IS FOR REFERENCE PURPOSES ONLY, NO SALES OF GOODS INCLUDED.

5X8 FSR LABOR (Regular business hours)
TYPE: CUSTOM SERVICE
SUBTYPE: STANDBY (16 HRS, 8 hours per day)
**ALLOWANCE NO. 1**

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**IMPORTANT NOTES**

- Quote will expire on 02-NOV-2017
- Prices are in USD
- Pricing does not include Freight Cost or Applicable Taxes

The discount, as given in the Products section of this Quotation, is granted exclusively for the Products and Quantity that shall be taken over by the designated end user for its own use, not for resale. Schneider Electric IT reserves the right to validate the requested quantity of goods goes to the end user. Schneider Electric IT may execute this right either before releasing the goods for sale to direct partner or even after it. Schneider Electric IT is entitled to request back, and therefore invoice to direct partner, the amount of discount provided for any outstanding SKU/Qty claimed by Direct account (Distributor) but not received by end user.

**ANY ORDER PLACED PURSUANT TO THIS QUOTATION SHALL BE GOVERNED SOLELY BY THE TERMS AND CONDITIONS SET FORTH AT**

ALLOWANCE NO. 3

August 28, 2017

Central Connecticut State University
1615 Stanley Street
New Britain CT 06050

Apogee will relocate the existing dishes as discussed. CCSU would provide all structure and mounting pipes and any other equipment needed as part of this project.

Apogee can provide this service for a one-time cost of $2,781.

Prices are valid for one hundred and twenty (120) days. Prices do not include any applicable taxes. Pricing does not include prevailing wage.

Apogee will not be responsible for the physical and/or operational condition of cable and/or equipment installed by others. Apogee can repair technical problems encountered during the course of this installation on a time and materials basis.

Apogee recommends fusion splicing method with SC/APC pigtails for all CATV applications.

If you have any questions regarding this proposal, please contact me at 512-717-0937.

Sincerely,
Al

Al Piehl
Client Services Manager - Northeast
August 31, 2017

Central Connecticut State University
1615 Stanley Street
New Britain CT 06050

Central Connecticut State University (CCSU) is requesting Apogee attendance at various future meetings, site checks, document review etc., with regards to the roof replacement project.

Attendance by Apogee technician at the following meetings: there is a 3-hour minimum (2 hours travel and 1 hour minimum billed for attending). We are billing at $87.50/hour.

- 9/13/17 pre-bid meeting with CCSU – 6 hours @ $87.50/hour – total $525.00
- TBD- documentation review meeting with GC - 6 hours @ $87.50/hour – total $525.00
- TBD- general project meeting with GC - 6 hours @ $87.50/hour – total $525.00
- TBD- general project meeting with GC - 6 hours @ $87.50/hour – total $525.00
- TBD- final site check meeting with GC & CCSU prior to installation - 6 hours @ $87.50/hour – total $525.00

TBD- actual installation per the number in the Apogee proposal dated 8/28/17 - $2,781.00

Grand total not to exceed: $5,406.00
Cost per hour beyond the stipulated amount: $87.50/hour

Prices are valid for one hundred and twenty (120) days. Prices do not include any applicable taxes. Pricing does not include prevailing wage.

If you have any questions regarding this proposal, please contact me at 512-717-0937.

Sincerely,
Al

Al Piehl
Client Services Manager - Northeast
ALLOWANCE NO. 4

September 26, 2017

CCSU
Energy Center HVAC/Roofing Project
Data Center Novac Fire System Impact

Fire Lieutenant Terrence Ferrarotti

Stuart L. White Co. Proposed Technical Scope of Work:

**Day One (8hr day—install):**

Stuart White will come out and shut down the system and cover their smoke heads
Tie in the Shunt Trip Breaker to the NOVEC System
Clean the heads and re-arm the system at the end of the day

**Day Two (4hr day) (Removal of duct work and patching of holes)**

Stuart White will come out and shut down the system and cover their smoke heads
Remove the Shunt Trip Breaker Tie In to the NOVEC System
Clean the heads and re-arm the system at the end of the day

**Day Three (4hr Day) (Finish the compound and paint)**

Stuart White will come out and shut down the system and cover their smoke heads
Clean the heads and re-arm the system at the end of the day

**Prevailing Wage Project**

We propose to supply labor and materials to provide the above listed scope of work for a total of --- $3,200.00.

Price does not include tax, 120 vac wiring, base building fire alarm, interlock shutdown wiring.

Ed Kozak
VP - Sales
ALLOWANCE NO. 4

QUOTE

McPHEE ELECTRIC LTD.
505 Main St
Farmington, Connecticut 06032-2912
Tel: (860) 677-9797
Fax: (860) 674-4862
E-mail: info@mopheeseusa.com

Job # E9162 CCSU Energy Center IT Cube
File # 12660
Job date: Sep. 26, 2017
Ticket #: E9162 CCSU Energy Center IT Cube
Customer PO #: E9162 CCSU Energy Center IT Cube
Quote #: E9162 CCSU Energy Center IT Cube
Contract #: E9162 CCSU Energy Center IT Cube
Page number: 1

Billing address:
CCSU
Attn: Joe Starczyk
1615 STANLEY STREET
NEW BRITAIN, Connecticut 06050
Tel: (860) 982-8090

Site address:
CCSU ENERGY CENTER
Attn: Jeff Sacharko
CENTRAL CONNECTICUT STATE UNIVERSITY
NEW BRITAIN, Connecticut
Tel: 860-982-8090

Work Description
E9162 CCSU Energy Center IT Cube Temp Cooling Allowance
Includes:
- Connect the shunt trip function that is provided within the specified cooling units to
  the Stuart White Novec Fire Suppression equipment
- Coordinate with the Stuart White Technicians and CCSU Fire Marshall for connection of the shunt trip function.
- Coordinate with CCSU Facilities disconnect the temporary cooling units from the Stuart White Novec Fire Suppression equipment
  at the end of the project
- Straight time labor only

Summary

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END OF SECTION
PART 1- GENERAL

1.01 RELATED DOCUMENTS

A. The General Conditions, and all parts of the Bid and Contract Documents are made part of this Section as if fully repeated herein

1.02 DEFINITIONS

A. Unit Price is an amount the General Contractor acknowledges in the Bid Proposal Form as a price per unit of measurement for materials or services as described in the Bidding Documents or in the Contract Documents.

B. The estimated quantities of Work shown here with each of the Unit Prices are to be extended out and the total value of each applicable Unit Price is to be included in any Subcontractor’s and/or Contractor’s bid in addition to all work described and shown elsewhere in the Contract Documents. Refer to the technical specification sections for quantities of Unit Prices carried in the Base Bid.

C. All Unit Prices will be shown in the Contract and any unused values from Unit Price Work will be deducted from the Contract by appropriate modification.

1.03 PROCEDURES

A. Unit Prices included in the Contract Documents are to be used for determining compensation to the Contractor or Owner for changes to the scope of the work indicated in the Contract Documents, and included in the Lump Sum Contract Price. Unit Prices are for items complete, in place, and shall be inclusive of furnishing and installing of all material, labor, trucking, overhead, profit, equipment, hoisting, engineering, scaffolding, power hookups, protection, shop drawings, taxes, permits, appliances, delivery, insurance, supervision, cost of bond, etc. and shall remain in effect until completion of the Contract.

B. Unit Price: Is identified by the Owner as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if the estimated quantities of Work required and carried by the Contract Documents are increased or decreased. Refer to the technical specification sections for quantities of Unit Prices carried in the Base Bid.

C. Increases or Decreases: Should the amount of the Work required be increased or decreased because of changes in the work ordered in writing by the Owner, the Contractor agrees that the following UNIT PRICES will be decreased 10% for a reduction of work. Each Unit Price shall include all equipment, tools, labor, permits, fees, etc., incidental to the completion of the work involved. All items shall include disposal of surplus or unsuitable materials in accordance with the Plans and Specifications.
D. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices and estimated quantities carried in the Base Bid. Methods of measurement and payment for unit prices and estimated quantities are as follows:

1. For work covered by scheduled quantities, notify the Owner and Engineer a minimum of 24 hours in advance of the performance of such work.
2. Document such work in writing, identifying type of work, quantity, and location of work. Submit documentation on General Contractor’s letterhead.
3. All documentation of work covered by scheduled quantities will be subject to verification and approval by the Owner and Engineer.
4. In order to be considered for payment, documentation for work covered by scheduled quantities shall be submitted within one month of performance of such work. Requests for payment of such work submitted more than one month after the work has been performed will not be accepted.
5. Only documentation signed and verified by the General Contractor, Trade, and the Owner’s Representative will be considered valid. Documentation not signed by all these parties will be considered invalid.

E. The General Contractor shall contact the Owner and Engineer if a Unit Price quantity is anticipated to be reached prior to exceeding that quantity. No additional costs will be awarded to the General Contractor for additional Unit Price Work without written approval from the Owner and/or Engineer.

F. The General Contractor must provide safe, adequate, and ample access to the Owner and Engineer for verification of the Unit Price Work throughout the course of construction.

G. The General Contractor is required to track and record actual placed and completed Unit Price Work throughout the course of construction, and submit a breakdown to the Owner and Engineer on a weekly basis or as requested. The breakdown shall include the following for each Unit Price item:

1. Completed quantity to date.
2. Remaining quantity to date.
3. Percentage of total quantity remaining.

1.04 CONTRACTOR’S MEASUREMENT OF WORK-IN-PLACE

A. The Owner reserves the right to reject the Contractor’s measurement of work-in-place that involves use of established unit prices, and to have this work measured, at the Owner's expense, by an independent surveyor acceptable to the Contractor.

1.05 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to the specified requirements. If, in the opinion of the Architect/Engineer it is not practical to remove and replace the work the Architect/Engineer will direct an appropriate remedy or adjust the payment.
1.06 UNIT PRICE SCHEDULE

A. A "Unit Price Schedule" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials described under each unit price.

PART 2- UNIT PRICE SCHEDULE

2.01 UNIT PRICE SCHEDULE

<table>
<thead>
<tr>
<th></th>
<th>Unit Price Items</th>
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<th>Estimated Quantity</th>
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<th>$ Deduct</th>
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<tr>
<td>1.1.1</td>
<td>Notch and seal crack repair</td>
<td>LF</td>
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<td>Concrete spall repair</td>
<td>SF</td>
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<td>Wood blocking replacement</td>
<td>BF</td>
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<td>Plywood sheathing</td>
<td>SF</td>
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<td></td>
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<td>Lightning Protection Terminals and Mounting Accessories</td>
<td>Each</td>
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<td></td>
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<tr>
<td>1.1.6</td>
<td>Replacement or Extension of Lightning Protection Cable and Splices (5 LF each)</td>
<td>Each</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1.1.7</td>
<td>Lightning protection through-roof connectors</td>
<td>Each</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Unit prices shall be negotiated if there is a change in scope of work.

END OF SECTION
PART 1- GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements governing Supplemental Bids.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division B - General Conditions of the Contract
   2. Section 01000 - Supplemental General Conditions
   3. Section 045000 - Masonry Restoration
   4. Section 075000 - Elastomeric Membrane Roofing
   5. Section 075100 - Elastomeric Membrane Restoration
   6. Section 075200 - Flashing and Sheet Metal Roofing

1.03 DEFINITIONS

A. Definition: “The monetary value stated in the Bid to be added to the amount of the Base Bid if the corresponding Work, as described in the Bidding Documents, is accepted.” A Supplemental Bid is an amount proposed by bidders and stated on the Bid Proposal Form for certain work defined in the Bidding Documents that may be added to the Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
   1. The cost for each supplemental bid is the net addition to the Contract Sum to incorporate the Supplemental Bid into the Work. Supplemental Bids are only accepted in the numerical order that they are listed on the Bid Proposal Form and never accepted out of numerical sequence. No other adjustments are made to the Contract Sum.

1.04 PROCEDURES

A. Coordination: Modify or adjust affected adjacent Work as necessary to completely and fully integrate that Work into the Project.
   1. Include as part of each Supplemental Bid, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not mentioned as part of the Supplemental Bid.
   2. Consider all work that must be accomplished for complete incorporation of the Supplemental Bids including modifications to Base Bid items.
   3. Include in lump sum prices for Supplemental Bids all costs of labor, materials, equipment, permits, fees, insurance, bonds, overhead, and profit.
4. Immediately after award of Contract, advise all necessary subcontractors, vendors, and suppliers as to which Supplemental Bids have been selected by Owner. Use all means necessary to alert those subcontractors, vendors, and suppliers involved as to all changes in the work caused by Owner's selection or rejection of Supplemental Bids.

5. Coordinate related work and modify surrounding work to integrate work of each Supplemental Bid.

B. Execute accepted Supplemental Bids under the same conditions as other Work of this Contract.

Schedule: A "Schedule of Supplemental Bids" is included at the end of this Section. It contains all of Specification Sections, and applicable portions of Drawings and Details that govern the scope, quality, and execution of referenced in the Schedule contain all of the requirements necessary to achieve the Work described under each Supplemental Bid.

PART 2- PRODUCTS (Not Applicable)

PART 3- EXECUTION

3.01 SCHEDULE OF SUPPLEMENTAL BIDS

A. Supplemental Bid No. 1: Includes, but may not be limited to the following:

1. Access and review the existing stainless-steel drip pans over the switch gear units for re-application of butyl sealant at penetrations through the pan.
2. Apply new butyl tape flashing at each penetration in the existing stainless-steel drip pans.
3. Existing EPDM roof covering to remain at the server room. Install EPDM Strip flashings over the existing seams.
4. At the server room roof, extend new EPDM flashing up onto the column penetration a minimum of 8”.
5. Prepare the existing EPDM roof covering and new seam stripping and apply an elastomeric coating over the entire roof surface.
6. Existing conduit supports to remain at the server room roof. Temporary shifting of supports is permitted for roofing work.

B. Supplemental Bid No. 2: Includes, but may not be limited to, the provision and installation of the following:

1. Gutter lining repairs including membrane seam stripping and fluid applied coatings;
2. Gable end coping cap repairs including joint sealants, general cleaning and application of water repellant;
3. Gable end masonry repairs including the modification of reglet flashing, masonry re-pointing and general cleaning;
4. Closure flashing at exposed pre-cast concrete bands (2 locations);
5. Roofing, blocking and flashing work associated with the northeast low slope EPDM roof area; and
6. Tightening of snow retention system rails.

C. **Supplemental Bid No. 3:** Includes, but may not be limited to, the provision and installation of the following:
   1. Remove three (3) existing, abandoned mechanical units including curbs and blocking.
   2. Prepare the existing steel and apply direct-to-metal primer/paint.
   3. Provide new framing and roof infill with steel decking and insulation boards. Include cell closures for the steel deck edges.

D. **Supplemental Bid No. 4:** Includes, but may not be limited to, the provision and installation of the following:
   1. Fabricate and install a new, elevated, galvanized-steel communication platform structure using HSS and W sections with skewed base plates to account for existing deck slope.
   2. Provide galvanized-steel grating for platform deck, secured to the platform structure.
   3. Provide six (6) galvanized-steel posts mounted to the grating with sandwiched steel plates.

**END OF SECTION**
PART 1 - GENERAL

1.01 DESCRIPTION

This Section contains instructions and requirements for the provision and utilization of temporary facilities to protect the Owner's property, the site and construction materials; and daily maintenance and cleanup of the site during the project.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, are hereby made a part of this Section.

1.03 CONTRACTORS USE OF EXISTING FACILITIES

A. Limit use of the premises to the work indicated, so as to allow for the Owner's uninterrupted occupancy and use. Confine operations to the areas indicated under the Contract. Conformance to the regulations set forth by the Owner, regarding use of existing facilities, is mandatory.

B. Contractor shall provide temporary sanitary facilities. Use of the sanitary facilities within the building is not permitted.

C. Temporary construction, protection, and support facilities required include, but are not limited to:
1. Temporary field offices or use of Owner provided locations;
2. Waste disposal services;
3. Temporary storage on and off-site;
4. Emergency portable generators of size required, if permanent power is temporarily unavailable;
5. Parking;
6. Temporary protection of the Server Room roof that includes tarping during main roof demolition and construction;
7. Temporary protection of the Switchgear Equipment that includes tarping during main roof demolition and construction;
8. Temporary covers at Boiler exhaust grates during main roof demolition and construction, and during deck in-fill operations; and
9. Protection to interior finishes where team members access the roof via internal ladder.

D. The temporary services described in this specification section may not be adequate to provide for all of the needs of the Contractor or all Subcontractors. The Contractor or any Subcontractor requiring additional temporary services for the proper execution of his work or because of climatic conditions shall arrange for and obtain such services at his own expense without further compensation by the Owner.
E. Owner will assist in controlling occupancy. Contractor shall provide and place portable barricades, as coordinated with the Owner, under work areas inside and outside the building.

F. Take precautions necessary and provide equipment, materials, and labor to adequately protect previous construction, the building, its contents, and occupants, and surrounding landscaped areas from damage due to construction as well as from inclement weather during construction.

G. The Contractor shall be responsible for restoring all landscaped areas affected by the work of this project to their original “like-new” state that existed prior to work commencing. This restoration work shall include, but not be limited to, sidewalks, planting beds with mulch, trees, shrubs, and lawn areas. Great care should be taken during the work to not damage nor destroy any landscaping impacted by this work. Any landscaping disturbed, damaged, or destroyed shall be restored, repaired, or replaced in-kind at no cost to the Owner.

H. Clean interior and exterior areas affected by the construction on a daily basis. Do not allow construction debris, waste materials, tools, excess packaging materials or other construction related materials to accumulate on the roof, in the facility, or on the exterior grounds and pavements.

I. Contractor to prevent accumulation of dust and debris at interior building equipment. All items should be kept clean at all times. Damage to interior equipment is the responsibility of the Contractor and must be left in the condition it was found, or better, prior to construction.

J. See Section 01 65 00, PRODUCT DELIVERY, STORAGE, AND HANDLING for product storage facilities and requirements.

1.04 UTILITIES

A. Electrical service will be provided to the Contractor free of charge by the Owner through exterior electrical outlets where operable electrical outlets are present on the exterior of the facility. Use shall be limited to construction hours. The Owner reserves the right to charge the Contractor for excessive electrical service usage (i.e., wasteful usage). Should charges be considered, the Owner will notify the Contractor in writing of his intent, 48 hours in advance. If the Contractor’s power use results in power failures or reoccurring blown breakers, use will be discontinued, and the Contractor will be fully responsible for the supply and distribution of all the electrical needs for the project.

B. Owner will provide water for construction purposes free of charge through exterior water spigots if operable. The Owner reserves the right to charge the Contractor for excessive or wasteful use. Should charges be considered, the Owner will notify the Contractor in writing of his intent, 48 hours in advance. The Contractor shall provide drinking water.
C. Contractor shall provide all other utilities required by the work.

D. Plumbing, heating, and electrical work, including reinstallation of equipment and other work to be performed by the Contractor, shall be carried out without interference to the building's normal operation. Where work requires interruption of service, the Contractor shall make advance arrangements with the Owner for dealing with such interruption.

E. Ensure proper and safe operation and maintenance of utility systems within the construction limits, whether these are supplied by the Owner's distribution system or otherwise, until the Owner accepts the work. Maintain and operate appurtenances within the construction area that serve the distribution system, subject to periodic inspection by the Owner's operating personnel. Inspection by any representative or personnel of the Owner shall not relieve the Contractor of his responsibilities in connection with operation and maintenance of these facilities and equipment.

1.05 ACCESS

A. Provide ladders, scaffolding, and staging as required to access the project area(s) in accordance with OSHA guidelines. Should damage to the building occur, restore damaged areas to their original condition, clean up debris, and provide other access to the roof for the duration of the project.

B. Do not interfere with normal building operations. Coordinate activities with the Owner and building occupants.

C. Worker access to exterior areas shall be provided by the Contractor. All materials to be delivered shall be stored in approved locations.

D. Worker access to the interior of the building shall limited to project managers and engineers for inspection purposes. Daily worker access to the roof will be via exterior stair tower. Interior access to erect and maintain temporary protections or perform interior work will be coordinated between the Contractor and the Owner.

1.06 BARRIERS

A. Install temporary fencing, warning lines, barriers, and guards, as required, to segregate the construction areas from adjacent operational facilities, occupants, and the public. In the event that access cannot be interrupted in the construction area, provide protection above doorways, and walks in the construction area conforming to U.S. Army Corps of Engineers EM 385-1-1, “Safety and Health Requirements Manual”. Provide guard lights on barriers and lighting as necessary to prevent vandalism of work and storage areas. The Owner is not responsible for Contractor's losses due to damage or theft by vandals.

B. Install protective coverings at paving and building walls adjacent to hoist, crane, or chutes prior to starting work. Lap protective coverings at least 1’, secure against wind, and vent to prevent condensation of moisture on covered surfaces. Maintain
the protective coverings in place for the duration of the project. Cover windows adjacent to Contractor operation areas with plywood or other approved protection.

C. Security and protection facilities required include, but are not limited to:
   1. Temporary weather protection, enclosures, and covers.
   2. Barricades, warning signs, and lights.

1.07 TEMPORARY PROTECTION

A. Provide suitable Owner approved temporary protection to prevent the entrance of debris, obstructions, and water infiltration into the building. Provide warning signs to reroute personnel around areas of dangerous work. Schedule operations to allow for completion of restoration over a predetermined area within a day's work. Use special care to avoid damaging existing structure when working on or adjacent to the building.

B. Protect materials scheduled for reuse from damage by placing them in labeled containers or wrappings stored in a weather tight trailer or other acceptable means.

C. Provide temporary protection such as, but not limited to, plywood, rigid foam insulation, and tarps for all phases of the project.

D. Provide plywood protection at roof openings during the course of work. Temporary enclosures should be gasketed and include polyethylene sheeting as required to provide a tight seal against the existing frame substrates effectively shielding the interior from dust, debris, or precipitation.

1.08 WORKER IDENTIFICATION

A. The Contractor shall be responsible for actions of construction personnel in regard to the security requirements of the Owner.

B. The Contractor shall comply with the requirements of the Owner concerning identification of personnel, issuance and return of badges, and signing in and out. Procedures shall be determined by the Owner.

1.09 DEBRIS REMOVAL

A. The Owner shall designate crane and refuse container locations. This area shall be sectioned off with proper warning lines.

B. Removed materials shall not be thrown freely from the structure but shall be lowered to the ground by crane in suitable containers or in an enclosed chute, to reduce the spread of dust and other debris.

C. Supply adequate covered receptacles for waste, debris, and rubbish. One receptacle will be allowed on site at a time unless otherwise indicated by the Owner, and must be immediately removed from the site when full. Clean the
project area daily and prior to moving the receptacle to another location on the site. Locations shall be as permitted by the Owner. Disposal shall be off site in a legal dump authorized to accept construction demolition solid wastes.

1.10 WEATHER PROTECTION

Weather protection includes temporary protection of components adversely affected by moisture, wind, heat, and cold by covering, patching, sealing, enclosing, ventilating, cooling, and/or heating. Provide protection for locations within the project area as necessary to protect the building and its contents, adjacent areas to be trafficked, and new construction materials and accessories. The cost of heat, fuel, and power necessary for proper weather protection shall be the responsibility of the Contractor. Installed weather protection shall comply with safety regulations, and provisions for adequate ventilation and fire protection.

1.11 VOLATILE MATERIALS

A. The Contractor is reminded that the adhesives, solvents, bitumens, etc., are highly volatile and flammable materials. Do not store these materials, contaminated tools, applicators, or rags, on or within the building. No overnight storage on or in the building will be allowed. Do not transport materials through the building. Take precautions and closely follow the Specification requirements for fire protection on site during construction.

B. Locate and use flame-heated equipment so as not to endanger the structure, other materials on site, or adjacent property. Do not place flame-heated equipment on or in the building. Locate and use flame-heated equipment in specific areas approved by the Owner. Do not relocate flame-heated equipment without prior approval from the Owner.

C. The use of flame-heated equipment or torches is prohibited unless specifically approved in writing by the Owner. Hot works permit will be required on a daily basis when hot equipment is in use.

1.12 FIRE PROTECTION

A. Provide necessary temporary fire protection for the building, its contents, and materials during construction. Do not store combustibles inside or on the building. Store adhesives, cauls, and cleaning solvents away from the building using a method approved by local fire officials. Should torching, cutting, burning, or welding be necessary, provide a fire watch during operations and for four (4) hours’ minimum after completion of the operations.

B. Comply with local fire codes and obtain permits necessary from the local fire department. Provide a copy to the Owner. Provide recently tested, fully charged fire extinguishers around the storage area, rubbish receptacle, and two (2) fire extinguishers within 50’ of the Work.
1.13 **WALKWAY COVERING**

Install walkway coverings above entrances where indicated on the drawings or at entrance locations that must remain accessible. The framework supporting the walkway covering shall be free-standing and well braced. The roof covering and support framing shall be designed to support a live load of at least 150 psf. The roof coverings shall be of width sufficient to cover the entire walkway or sidewalk. A minimum height clearance of 8’-6” shall be maintained below coverings. Should coverings obscure the building’s address, a temporary address shall be installed as to be visible from the street. Lettering shall be approved by the Owner. Protection shall be in accordance with all applicable OSHA standards.

1.14 **TEMPORARY FENCING**

The Contractor shall erect temporary fences to surround his materials storage area. The fences shall be a minimum of 8’-high, chain-link type, with posts set in movable concrete base supports. Fencing shall be mobile to allow for proper coordination with the Contractor’s work location.

1.15 **ADDITIONAL PROTECTION**

A. Contractor shall protect new Work, the existing building, and the entire premises from soiling or damage by the activities under this Contract such as movements of materials and personnel and the use of temporary constructions and construction aides.

B. When temporary constructions, construction aides, field offices, trailers, sheds, and project signs are used in the course of the Work they shall be promptly removed when no longer needed.

C. If any soiling or damage has been caused by operations under this Contract, the affected area shall be restored to its original condition to the satisfaction of the Owner.

1.16 **CLEAN-UP**

A. Clean and restore interior building spaces adjacent to the work areas to original condition prior to the construction.

B. Debris, dust, and dirt shall be swept completely clean at the joists, beams, overhead accessories, and similar items. Those items soiled or stained from the work shall be cleaned and refinished.

C. Electrical fixtures damaged by the construction shall be replaced with an equal in shape, color, manufacturer, and capacity at no added expense to the Owner.
D. Interior ceiling finishes, which are damaged by the construction shall be repaired or replaced with a system equal in color, texture, and finish at no added expense to the Owner.

E. Floors shall be swept and vacuumed completely clean of dust, dirt, and debris. The Owner will wash and re-wax floors, but only as part of a normal or routine maintenance procedure. Heavily soiled, stained, or damaged floor areas will be cleaned, repaired, and/or replaced by the Contractor at no additional cost to the Owner.

F. Open ducts, grills, thermostats, electric boxes, or similar fixtures and items, which can be soiled or affected by the work or, which might conduct dust to other areas shall be masked, protected, and cleaned by the Contractor.

G. Remove completely temporary protection materials and facilities from the site upon completion of the work and demobilization of the project.

H. Restore streets, drives, curbs, sidewalks, landscaping, and existing improvements disturbed by the construction operations to their condition at the start of the work.

1.17 NOTIFICATION

Notify the Owner at least 72 hours in advance of the desire to extend, connect, disconnect, or turn on or off HVAC, steam, electric, water, or other service from the Owner's supply systems. Authorized representatives of the Owner shall witness the actual operation. Plumbing, heating, and electrical work, including installation of equipment and any other work to be performed by the Contractor, shall be carried out without interference with the Owner's normal operation. Where work requires interruption of a service, make advance arrangements with the Owner for dealing with such interruption.

1.18 VEHICLES

Acceptable areas for the locations of the Contractor's vehicles shall be as indicated in the drawings or as otherwise designated by the Owner. No other areas may be utilized without the Owner's permission.

1.19 SUBMITTALS

A. Schedule: Submit a schedule indicating implementation and termination of each temporary utility within seven (7) days of date established for the Work item.
1.20 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:
   2. Federal, State and City Health and safety regulations;
   3. Utility company regulations;
   4. Police, Fire Department, and Rescue Squad rules;
   5. Environmental protection regulations; and
   6. regulations of authorities having jurisdiction.

1.21 PROJECT CONDITIONS

A. Conditions of Use: Maintain temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload temporary facilities, or permit them to interfere with progress. Do not allow hazardous, dangerous, unsanitary conditions, or public nuisances to develop or persist on the site.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General: Provide new materials suitable for the use intended, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

2.02 TEMPORARY WATER

A. Definitions:
   1. Water Access Point: A point, within the Project area, at which water is available during construction.

B. Charges: The Contractor shall pay for all facilities to provide water during construction, while the Owner will supply and pay for water during the construction.
   1. The furnishing of water by the Owner shall be conditional upon all contractors being conservative and prudent in its use. In the event of any contractor is repeatedly wasteful in the use of water thus provided, the Owner reserves the right to charge the Contractor for wasteful usage at an equitable rate for the additional portion of water used.

C. Temporary Water: The Contractor shall be responsible for all facilities for to provide water during construction as defined above and further specified as follows:
1. Except under unusual circumstances, when otherwise specified or approved by the Architect, all water shall be of potable quality.

2. The Contractor shall provide all necessary piping, valving, hose bibs, hosing, etc. to provide temporary water during construction from a water access point determined by the Owner’s Representative. Any facilities running within the building are required not to leak. Any damage incurred due to leaks shall be repaired at the expense of the General Contractor.

3. The Contractor shall pay for and be responsible for the protection of Temporary Water, which he installs, from freezing and other damage.

2.03 TEMPORARY HEAT

A. Definitions:
   1. Temporary Heating & Ventilating: The Contractor shall provide temporary heat and ventilation, as needed, to work areas outside the building to maintain minimum temperatures described below. The Contractor shall also provide temporary heat and ventilation, as needed, to work areas inside the building.

B. Charges: The Contractor shall pay for all temporary heat and ventilation as defined above. The Contractor shall pay for all fuel required for Temporary Heat and Ventilation. The Owner shall pay for all electrical energy use charges.
   1. The furnishing of electrical energy by the Owner shall be conditional upon being conservative and prudent in its use. In the event that any contractor is repeatedly wasteful in the use of electrical energy thus provided, the Owner reserves the right to charge the General Contractor at an equitable rate for the additional portion of electrical energy used.

C. Temporary Heating: Portable heating units shall be of sufficient capacity and number and shall be located so that damage to any part of the project from low temperature will be prevented and that concrete, masonry, and other components requiring curing shall be properly cured.
   1. Heaters for temporary heat shall be temporary steam generators, forced air heaters, or other type heaters located outside the building or vented to the outside of the building. Type(s) shall be such as to not damage or stain construction or any part of the existing building. Heaters must be UL approved.
   2. At no time will oil-burning “salamander” type heaters be used, nor will non-vented, open flame heaters be used inside the building.
   3. Propane-type heaters shall not be used at any time within the area of the building or near stockpiles of combustible materials.

2.04 TEMPORARY COOLING

A. Definitions:
   1. Temporary cooling: The Contractor shall provide temporary cooling to the Server Room, as needed to maintain temperatures currently provided. The
Contractor shall also provide temporary exhaust and condensate drainage from the temporary cooling units.

B. Charges: The Contractor shall pay for all temporary cooling as defined above. The Contractor shall pay for all equipment and accessories for temporary cooling. The Owner shall pay for all electrical energy use charges.

1. The furnishing of electrical energy by the Owner shall be conditional upon being conservative and prudent in its use. In the event that any contractor is repeatedly wasteful in the use of electrical energy thus provided, the Owner reserves the right to charge the Contractor at an equitable rate for the additional portion of electrical energy used.

C. Temporary Cooling: Portable units shall be of sufficient capacity and number and shall be located so that existing server equipment is protected during the downtime of the existing rooftop condensing units.

1. Temporary conditioners shall be forced air located per contract documents and vented to the power plant building. Type(s) shall be such as to not damage or stain construction or any part of the existing building. Temporary coolers must be UL approved.

2.05 TELEPHONE SERVICE

A. Temporary Telephone Service: The General Contractor shall furnish, maintain, and pay for at least one (1) cellular phone for his personnel on site. General Contractor shall make this telephone available at all times while work is being performed on site and for Emergencies on a 24/7 basis.

2.06 TEMPORARY FIELD OFFICES

A. Refer to the Supplemental General Conditions for bidder requirements for temporary office space and/or option to provide an office trailer.

B. An office space within the Energy Center may be used for the Contractor to use as a temporary field office. The Owner, with 48-hour advanced notice from the Contractor, will also make available a small conference room or space to allow project meetings to be held within the building.

C. The Owner will provide basic cleaning services like those regularly performed in the rest of the building’s rooms. The furnishing of cleaning services by the Owner shall be conditional upon the Contractor minimizing the additional cleaning of the space. In the event that this office space is excessively dirty, the Owner reserves the right to charge the Contractor at an equitable rate for the additional portion of cleaning services provided.

2.07 TEMPORARY SANITARY FACILITIES

A. At no time shall any Contractor Personnel use toilet facilities in the building.
2.08 TEMPORARY WEATHER PROTECTION

A. Definitions:
   1. Weather Protection: The furnishing, installing, maintenance, and removal of temporary closures, covers, shields, and any other weather protection devices as required to protect work in place and permit construction to proceed during cold or inclement weather.

B. Weather Protection Standard: Incorporated into this specification, Contractors are required to provide weather protection to allow building construction to be carried on during the months September to December. These standards do not require enclosures for heat for operations that are not economically feasible to protect in the judgment of the Awarding Authority; including for example, site work, excavation, pile driving, steel erection, erection of certain exterior panels, roofing, and the like. However, cold weather roofing work shall follow general industry standards, manufacturer’s recommendations, and FM Global requirements.
   1. The Contractor shall provide and install weather protection.
   2. Weather protection shall be provided during the months of September through December.
   3. Temperature at the working surface shall be at least forty degrees Fahrenheit (40° F). This provision does not supersede any specific greater requirements for the methods of construction or curing of materials.
   4. Weather protection materials, equipment, and the installation thereof, shall comply with all safety rules and regulations including the provisions for adequate ventilation and fire protection devices.
   5. At completion of work, the Contractor shall remove temporary weather protection and restore all surfaces to first class condition.
   6. Reporting Requirements:
      a. Within 15 calendar days after Contract Award the Contractor shall submit, in writing to the Awarding Authority for approval, its proposed plan for weather protection. Refer to Section 01300 – Submittals for additional information regarding the appropriate procedure in preparing this submittal.
      b. The Contractor shall furnish and install accurate Fahrenheit thermometers at places designated by the Awarding Authority to determine whether the required temperature is being maintained.

C. Temporary Covers and Enclosures:
   1. Except as otherwise specified herein below, all costs of closing openings in new construction and the exterior of the existing buildings where opened to the weather, including temporary covers and enclosures, shall be borne by the Contractor. Enclosures must be built around various portions of the new construction and new exterior openings in the existing building as the work progresses if, and as necessary to totally insure against the intrusion of rain, snow, and other moisture which might
damage the new or existing materials or finishes and as necessary to maintain the minimum temperatures specified.

a. Where roofs, exterior walls, windows, or other elements of new or existing buildings or structures providing weather protection are to be temporarily opened to the weather, they shall be fully enclosed or covered with securely attached and well-draining enclosures whenever inclement weather is occurring or is threatening, to assure absolute weather protection. Any and all damage to the new or existing buildings or structures, including all materials and finishes thereon, caused by inadequate protection shall be made good by the Contractor without further cost to the Owner.

2. All such weather tight enclosures shall provide a reasonable open area to permit drying of new wet materials while at the same time making it possible to maintain the required interior temperatures. The Contractor shall provide sufficient continuous ventilation until the time that the "wet" work of the project has dried sufficiently to receive finished woodwork and other materials subject to moisture damage, at which time the ventilation shall be maintained at approximately the anticipated conditions of final use of the project.

2.09 TEMPORARY FENCING, BARRIERS, AND PARTITIONS

A. Protection: The Contractor shall be fully responsible for security of the work areas of the site and for patrolling and protecting the work under construction and his and the Owner's materials stored or otherwise located on the site.

B. Temporary Barricading: In addition, the Contractor shall provide other temporary fencing, barricading, and overhead protection of substantial nature to protect workmen, other personnel, and the public against various hazards and attendant nuisances that come about as the work progresses such as, but not necessarily limited to, falling materials, dangerous excavations, dangerous projections, or obstructions, stored or stock piled materials, etc. Comply fully with recommendations of the Association of General Contractors and provisions of the governing laws and codes.

Note: As part of requirement for overhead protection, include substantial, well-constructed walkway covers, sufficient to assure pedestrian safety, in accordance with recommendations of the Association of General Contractors and provisions of the governing laws and codes.

C. In addition, the General Contractor shall provide all necessary protective barriers within the existing building as required to assure the safety of persons and property wherever work of this Contract is being carried out. Include substantial, well-constructed, protective barriers at all construction work-limit-lines separating Contract work areas from areas occupied by the Owner. Also include flameproof dust-curtaining and block or filter mechanical return air systems in a safe manner, in cooperation with Mechanical trade, between areas where dust effusive work is being carried out and other interior areas of the new addition and
existing building to prevent passage of dirt and dust. Barriers, curtaining, etc.,
must be self-supporting, and must not depend on building construction for
primary structure or anchorage. Locations and quantities of barriers and dust
curtaining shall at all times be subject to Owner's and Architect's approval, but
such approval, or lack of inspection or approval, by the Owner or the Architect,
shall not be construed as relieving the Contractor of any of his responsibilities
under the Contract.

2.10 TEMPORARY STORAGE FACILITIES

A. Space for storage of materials shall be confined to the construction areas outside
the building and as designated and/or approved by the Owner.

B. Locations where construction equipment may be stored during non-working
hours shall be as acceptable to the Owner. Construction equipment shall not
present a hazard when stored.

2.11 NOISE, DUST, AND POLLUTION CONTROL

A. All work performed under the Contract shall conform to the requirements of local,
State, and Federal noise, dust, and pollution control laws, ordinances, and
regulative agencies applicable to the work.

B. The Contractor shall provide temporary partitions to prevent noise, dust,
pollution, or order from entering occupied spaces. Submit location plan and type
of construction for temporary partitions for approval.

C. Control of air borne dust or pollution from the site with spray or as otherwise may
be necessary to prevent the migration of any dust or pollutants.

D. Dust Control: Use water mist, temporary enclosures, and other suitable methods
to limit spread of dust and dirt. Comply with governing environmental protection
regulations.
1. Do not use water when it may damage existing construction or create
hazardous or objectionable conditions, such as ice, flooding, or pollution.
2. Vacuum equipment shall be equipped with HEPA filters.
3. Vacuum carpeted areas.
4. Wet mop floors to eliminate trackable dirt.
5. Sweeping shall be allowed only with the use of a non-oil based sweeping
compound followed by vacuuming any remaining residue.

E. Disposal: Remove and transport debris, in a manner that will prevent spillage on
adjacent surfaces and areas, to the construction dumpster(s).

F. Cleaning: Clean areas adjacent to the work area of dust, dirt, and debris caused
by selective demolition operations. Return adjacent areas to condition existing
before selective demolition operations began.
2.12 CONSTRUCTION CLEANING AND CONSTRUCTION DUMPSTERS

A. The Contractor shall provide and pay for temporary dumpster type trash containers outside the building for use by all Subcontractors, and shall have the containers replaced, hauled away, and the contents legally disposed of at sufficient intervals to maintain them at all times in sufficiently empty condition that they are ready to receive trash and debris.

B. All construction dumpsters shall be located in the south parking lot within the construction staging area and where permitted by the Owner.

C. The Contractor on the project shall be responsible for removing their own trash and debris from the building to the construction dumpster(s).

D. Waste materials and rubbish, which might otherwise raise dust, shall be sprinkled during handling and loading to minimize this effect. Debris shall be carried out of the structure in containers or dropped in fully enclosed chutes and shall not be passed through, or thrown from, windows or other wall openings, and in no case shall the debris or trash be permitted to drop freely from the openings.

E. The Work Areas shall be inspected daily and all debris, waste, rubbish, etc. shall be removed and placed in a dumpster.

F. All waste materials and rubbish shall be disposed of legally, off the site.

PART 3 - EXECUTION
NOT USED

END OF SECTION
PART 1 - GENERAL

1.1 DESCRIPTION
A. This Section contains instructions and requirements for the provision and maintenance of adequate delivery, storage, and handling on site of products and materials to be utilized in the Work.

1.2 MATERIAL DELIVERY, STORAGE, AND HANDLING
A. Deliver materials in sufficient quantity to allow continuity of work. Deliver materials to the site in original sealed containers bearing manufacturer's name and brand designation. Where materials are designated by a referenced specification, containers or packages shall bear specification number, type, and class as applicable. Do not deliver materials that are not approved for use. Remove such materials from the site immediately.

B. Store roofing materials on site in areas designated by the Owner. Materials are to be stored in box trailers or in elevated piles completely wrapped in waterproof tarps. Tilt stock piles for effective drainage and utilize tie-downs to protect tarps against wind blow-offs. Mark materials that are exposed to the elements for removal from site. Do not incorporate defective or rejected materials in the Work.

C. Remove the plastic packaging for the insulation and cover boards immediately upon receipt of delivery. Failure to remove the plastic packaging may result in entrapment of condensation or moisture. If the boards are stored outside they must be stored level, off the ground, and protected by a breathable waterproof cover. A means for air circulation around and under stored bundles should be provided. The cover boards should not be installed during rain, heavy fog, and any other conditions that may deposit moisture on the surface. The presence of free moisture can have a detrimental effect on the performance of the insulation and the installation of the roof membrane allowing adhesive not to dry properly ultimately leading to a roof failure. Do not install any cover boards exposed to moisture during this project.

D. Ensure roof insulation boards are set on pallets or dunnage and are protected from the weather and sunlight prior to installation. Do not allow plastic to cover the insulation as it can allow condensation. A breathable material such as canvas is recommended. Do not install any insulation exposed to moisture during this project.

E. Store flammable materials such as adhesives in storage containers suitable for flammable substances.

F. Handle materials with equipment selected and operated so as not to damage the materials or the roofing. Handle roll materials in a manner to prevent damage to the edges or ends. Seal containers when their contents are not being used to prevent premature curing or damage to materials. Damaged or improperly stored materials shall be marked and removed from the site immediately.
G. No more materials shall be stored on the roof than can be installed in one day. Distribute materials brought to the roof so that the uniform load shall be less than 40 PSF. Evenly distribute materials for daily operations to prevent concentrated loads. The weight of workmen, equipment and materials shall not exceed the capacity of the structure.

H. Misshapen, oval, creased, and/or damaged roll goods shall not be used in the new roof system. The Contractor shall handle and store roll materials to prevent such conditions. The Contractor shall also ensure that roll goods accepted from the manufacturer are in good condition. The Owner will not be responsible for, nor accept, roll goods that are defective.

1.3 TOOLS AND EQUIPMENT

A. Contractor is responsible for delivery, storage, maintenance, and security of tools and equipment.

1.4 INSPECTION AND NOTIFICATION

A. Materials stored on site and subject to damage from wind, precipitation, hail, or other potential climatic conditions will be subject to inspection daily by the Owner or Owner’s Representative. Absorptive materials such as lumber, insulation and felts will be tested periodically for moisture content.

B. Upon notification by the Owner or Owner’s Representative of insufficient protection of or damage to materials on site, the Contractor shall, within 24 hours, properly restore protection and replace or repair damaged materials and systems. Should the Contractor not accomplish immediate repair or replacement when notified, the Owner shall have the proper protection installed at the Contractor’s expense.

1.5 MANUFACTURER’S INFORMATION

A. Submit the roofing system materials manufacturer’s and Factory Mutual Global written instructions concerning storage and handling of materials, including adhesives, cements, sealants, and accessories. Provide the following information:
   1. Manufacturer’s "shelf-life" of materials including the date of manufacture of perishables such as volatiles, caulking, and mastics.
   2. Acceptable latent moisture content for absorptive materials such as lumber, insulation and felts.
   3. Manufacturer's requirements for storage facilities concerning temperature, humidity, and ventilation.

B. Provide and maintain on site manufacturer’s information concerning storage and handling of flammable or volatile materials, such as Safety Data Sheets, for the duration of the project.

C. Comply with the manufacturer’s recommendations and these Specifications for on-site storage of materials.
PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section contains requirements for items to be completed by the Contractor prior to Owner's final acceptance.

1.2 SUBSTANTIAL COMPLETION

A. Substantial completion for this project is defined as the date when the Owner and Owner's Representative mutually agree and certify that all project related work has been properly installed and completed in a manner conforming to the Contract Documents. Work specified within the Contract Documents, which has not been performed or has been performed in a manner which does not conform with the Contract Documents shall be deemed as not having achieved substantial completion.

1. Substantial Completion shall be reached on or before September 12, 2018.
2. Final Completion shall be reached on or before September 26, 2018.

1.3 CLOSE-OUT INSPECTION

A. Notify Owner or Owner's Representative in writing that the Work of the project has been completed and is ready for inspection. After work is deemed substantially complete, and only minor repair items remain, the Owner or Owner's Representative shall tour the project site and compile a list of these items. Minor repair items are those items which have been properly installed and are functional, but which require cosmetic repair or cleaning which does not affect the system's integrity. A copy of the list shall be sent to the Contractor who shall then correct each item. The Contractor shall certify completion of the itemized repair list to the Owner or Owner's Representative and request a reinspection in writing. Should the Contractor delay correction of the list of items for more than 30 days, the Owner may have the deficiencies repaired by others at the Contractor's expense.

1.4 CORE SAMPLES

A. The Owner reserves the right to have core sampling and patching performed by the Contractor where moisture contamination is suspected within the new roof system until the expiration of the Contractor's warranty. Core sample locations shall be chosen by the Owner and be performed at no cost to the Owner.

1.5 MANUFACTURER'S INSPECTION

A. After the Close-Out inspection by the Owner's Representative, the Materials Manufacturer shall be required to tour the site. Announce the Manufacturer's site inspection to the Owner and Owner's Representative 72 hours prior to its occurrence. Provide the written reports of Manufacturer's Representative to the Owner indicating the determination of whether the materials have been installed as intended by the Manufacturer. Items determined not so installed shall be removed and reinstalled so as to comply with the Manufacturer's intended use, within the...
parameters of this Specification at no additional cost to the Owner. Issuance of Warranty prior to Manufacturer's inspection is prohibited.

1.6 PROJECT CLOSE-OUT SUBMITTALS

A. When both the Owner or Owner's Representative and the Manufacturer's Representative agree that the Contractor has performed according to the Specifications and has installed the materials to the satisfaction of the Manufacturer, submit the following:

1. Specified Contractor's and Manufacturer's Warranties and Guaranties.
2. Lien Releases from Contractor, subcontractor, and suppliers (AIA Forms G706, G706A).
3. Consent of Surety to Final Payment (AIA Form G707).
4. Project As-built Documents.
5. Operations and Maintenance Data for each applicable system or material

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION
PART 1- GENERAL

1.01 IN GENERAL

A. The General Conditions, and all parts of the Bid and Contract Documents are made part of this Section as if fully repeated herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01 03 01 – Available Information - Gale Evaluation Report
B. Section 01 12 16 – Work Sequence
C. Section 01 21 00 – Allowances
D. Section 01 22 00 – Unit Prices
E. Section 01 23 13 – Supplemental Bids
F. Section 01 50 00 – Temporary Facilities and Site Maintenance
G. Section 01 65 00 – Product Delivery, Storage, and Handling
H. Section 01 70 00 – Project Closeout
I. Section 03 30 00 – Concrete Restoration
J. Section 04 50 00 – Masonry Restoration
K. Section 06 10 00 – Rough Carpentry
L. Section 07 50 00 – Elastomeric Membrane Roofing
M. Section 07 51 00 – Elastomeric Membrane Restoration
N. Section 07 62 00 – Flashing and Sheet Metal Roofing
O. Section 22 22 22 – Roof Drains
P. Section 23 00 00 – HVAC
Q. Section 26 00 00 – Electrical
R. Section 26 41 00 – Lightning Protection

1.03 SUMMARY OF WORK

This Section specifies requirements for the following Scope of Work:

A. Remove and dispose of existing roofing, including stone ballast, separation layer, roof membrane, sheet metal flashings, and deteriorated wood blocking down to the existing structural roof deck. Remove all existing metal and other existing flashings at roof perimeters, vent pipes, unit curbs, etc. as required to properly complete the work. (Refer to Existing Roof System Cross Sections in the Contract Drawings for additional information.)

B. Remove and store existing walkway pavers for reinstallation and/or relocation on new roof system.

C. Remove, relocate, and reinstall lightning protection system daily only as needed to perform the work. The lightning protection system is to remain active for the duration of the project.

D. Temporary removal, storage, and protection of existing rooftop equipment scheduled to be reinstalled. Remove abandoned equipment and roof curbs.
E. Remove, protect, and/or store all equipment and assemblies to be reinstalled.

F. Remove and dispose of rooftop mechanical equipment and associated components scheduled for replacement including but not limited to equipment curbs, sleepers, piping, insulation, utilities, electrical wiring, ductwork, etc.

G. Temporary protection of existing rooftop utilities.

H. Remove and reinstall utility pipe supports and sleepers.

I. Remove and reinstall the existing roof hatch and curb to accommodate additional roof insulation and increased flashing heights.

J. Remove and reinstall existing copper standing seam wall and roof panels as required to perform the work.

K. Remove and dispose of existing safety railings.

L. Existing drain bowls to remain. Remove and dispose of the existing roof drain strainer, flashing, and hardware assemblies.

M. Maintain all roof drains in working condition at the end of each workday. Provide temporary sleeves.

N. All roof penetrations are to be 100% weather-tight at the end of each workday.

O. Remove rubbish and debris from the project site daily; do not allow accumulations inside or outside the buildings.

P. Supply all necessary chutes, disposal facilities, transportation, and labor necessary to dispose of all demolished materials, dirt, and debris off-site in a legal dumping area. The Contractor shall obtain all permits necessary to transport and dispose of all materials, rubbish, and debris.

Q. Clear, clean, and prepare the existing EPDM gutter lining to receive new EPDM seam stripping and elastomeric coating – Supplemental Bid.

R. Cut and remove sealants at precast concrete as part of masonry restoration – Supplemental Bid.

S. Cut and remove mortar and sealant at brick as part of reglet flashing replacement – Supplemental Bid.

1.04 JOB CONDITIONS

A. This building houses critical infrastructure for campus operations and life safety communications. The contractor will provide the greatest level of care in protecting these vital areas and systems during construction. Contractor will need to be on call 24/7 to respond to any issues arising from these construction activities,
remedy issues immediately. CCSU will back-charge the Contractor for any emergency measures undertaken to correct field deficiencies.

B. Weather must be considered both in short and long-term schedule approach. By undertaking this project, the Contractor understands that they will need to install the roof systems as required by the documents and manufacturer's requirements. The Contractor will need to consider the approaching fall/winter weather. No extra costs will be considered due to cold (or otherwise adverse) weather conditions. Contractor will incorporate all provisions necessary to complete the work prior to September 26, 2018. This includes overtime, temporary heat, temporary protective measures, and any other aspects required to execute work.

C. Phased roofing work is not allowed at critical areas identified on the Contract Drawings. Excluding critical areas, the Contractor shall remove only as much roofing, flashing, and associated components and other exterior waterproofing components as can be made water tight in a given day's work, including all flashings and associated components.

D. At critical areas, roofing removed shall be replaced daily including vapor retarder, insulation, coverboard and EPDM membrane.

E. Provide temporary water stops to edges of newly replaced roofing or areas of temporary work.

F. Provide temporary roof protection or coverings for delays in the work. Maintain watertight conditions at all time.

G. The buildings will remain in use during construction. Provide temporary protection, barriers, warning lines, and overhead protection to protect the building occupants, the public, the building, and the Owner's property during construction operations.

H. Care shall be taken during the roof removal process so as not to damage the substrates. Decking damaged due to negligence during removal of existing roofing shall be replaced or repaired by the Contractor at no expense to the Owner.

I. Coordinate work locations with the Owner as specified.

1.05 HOT WORK PROCEDURES

A. A HOT WORK Permit is required for any operation that involves open flames or producing heat and/or sparks. This includes, but is not limited to: brazing, cutting, grinding, soldering, and welding.

B. Fully charged, inspected, and approved fire extinguishers shall be on site at all times. No cutting, grinding, or welding of any kind shall proceed without an approved fully charged fire extinguisher.

C. Make sure construction in the area is non-combustible including insulation.

D. Remove combustible contents or cover with FM approved blankets or pads.
E. Follow procedures outlined under FM Global Resources ‘Don’t Get Burned by Hot Work’ and ‘Hot Work Permit Form – F2360.

1.06 SUBMITTALS

A. Submit a detailed Removal Plan to the Owner and Engineer to include the following:
   1. Proposed means and methods to be utilized in the legal removal, handling, transportation, and disposal of the existing roof systems and related debris, including ballast, insulation, membranes, metals, roof top equipment, abandoned curbs, etc.
   2. Proposed locations of chutes, dumpsters, cranes, hoists, and other temporary equipment or facilities required for demolition work.
   3. Temporary Protection Plan in accordance with Section 01 50 00 TEMPORARY FACILITIES AND SITE MAINTENANCE.
   4. Electrical and mechanical removal work in accordance with Divisions 23 and 26 and associated drawing scope.

1.07 DIMENSIONS AND QUANTITIES

All dimensions and quantities shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the time of construction. The Contractor is advised to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.08 REMOVAL AND DISPOSAL EQUIPMENT

A. Conveyances: Buggies or wheelbarrows used on roofs to transport removed debris to chutes or crane apparatus location shall be limited to 3/8 cubic yard capacity.

B. Chutes: Provide enclosed chutes for debris transfer from roof areas to dumpsters. Debris shall not spill from the bottom of the chute directly onto the ground. Direct chutes into an approved construction debris container (dumpster). Control and contain dust and noise from falling debris by use of breaks in vertical alignment of chute or tarps covering dumpster. Provide a hose with a nozzle connected to an adequate water supply, near chute outlet, to wet debris as necessary for dust control.

C. Hoists/Cranes: Provide hoists or cranes to remove debris and transport materials to and from the roof. Materials shall be properly secured to prevent loose materials/debris from breaking loose from hoisting apparatus. Debris to be transported from the roof shall be placed directly in approved construction debris containers. Proper protection of wall areas for their entire height shall be provided in the form of heavy duty tarps secured or affixed to exterior walls directly adjacent to or under the area of hoisting.

D. The use of “bobcat” type removal equipment on the roof is prohibited.
E. Mechanical cutting equipment: Roof cutting equipment, if used, shall be equipped with operable blade depth setting mechanisms in order to control the cutting depth of the blade and alleviate the potential of damaging the structural deck during cutting operations.

F. The use of spark producing equipment or tools on the roof or in the vicinity of the gas or refrigeration lines is prohibited.

PART 2 – MATERIALS

NOT USED

PART 3 – EXECUTION

3.01 GENERAL

A. During the removal of existing roofing and related materials, the Contractor shall report to the Owner areas of damaged, deteriorated, or otherwise unsuitable structural deck or substrates uncovered during the work. Do not cover or remove unacceptable deck or substrates areas until reviewed by the Engineer or Owner. Provide temporary protection to the areas in question. Use care in the removal of roof systems so as not to damage the substrates.

3.02 REMOVALS

A. Ballast removal must be coordinated and performed prior to removal and replacement of the roof system.

B. Do not allow exposure of un-ballasted roof system to weather and wind events.

C. Provide temporary ballast during the time frame when existing ballast is removed and roofing system is replaced.

D. Both vacuuming and other mechanical removal means will be necessary due to the over-sized nature of the existing stone ballast.

E. Remove and dispose of existing roof cover, insulation, and flashing systems as indicated down to the surface of the existing substrates.

F. Remove and dispose of existing penetration flashings, counter flashings, sheet-metal flashings, and related sheet-metal items as indicated in preparation for new sheet-metal flashings and accessories.

G. Remove and dispose of existing deteriorated perimeter wood blocking as indicated in preparation for new wood blocking. The intent of the project is to reuse as much of the original wood blocking as practical. Refasten existing blocking.
H. Remove and dispose of existing sealant and backing. Grind existing sealant to suitable substrate without damage to substrate. Remove all existing sealant residue.

I. Remove, disconnect, store, and reinstall existing rooftop electrical and mechanical equipment in preparation for replacement roof systems. Removals, lengthening/shortening, and reinstallations of electrical and mechanical equipment, including mechanical/electrical connections are to be performed by licensed tradesmen. Costs for mechanical/electrical work shall be included in the Contractor’s bid price. Refer to specification section Divisions 23 and 26 for additional information.

J. Carefully remove existing roof drains to avoid damage to existing leader piping and substrates to remain. Remove and replace roof drains and leader piping prior to or concurrently with roof replacement. The Contractor is responsible for interior damage as a result of roof drain replacement. Refer to Section 22 22 00 Roof Drains for additional information.

3.03 CLEAN-UP AND DISPOSAL

A. Upon completion of the work of this Section and following removal of debris from roof levels, leave site in clean condition satisfactory to Owner on a daily basis in accordance with Division 1 requirements. Clean-up shall include disposal of all items and materials not required to remain the property of the Owner, as well as debris and rubbish resulting from demolition operations. Dispose of debris in accordance with applicable regulations at an approved landfill.

END OF SECTION
PART 1 - GENERAL

1.01 IN GENERAL

The General Conditions and all parts of the Bid and Contract Documents are made part of this Section as if fully repeated herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

A. Section 01 03 01 – Available Information - Gale Evaluation Report
B. Section 01 12 16 – Work Sequence
C. Section 01 21 00 – Allowances
D. Section 01 22 00 – Unit Prices
E. Section 01 23 13 – Supplemental Bids
F. Section 01 50 00 – Temporary Facilities and Site Maintenance
G. Section 01 65 00 – Product Delivery, Storage, and Handling
H. Section 01 70 00 – Project Closeout
I. Section 02 41 00 – Selective Demolition
J. Section 04 50 00 – Masonry Restoration
K. Section 06 10 00 – Rough Carpentry
L. Section 07 50 00 – Elastomeric Membrane Roofing
M. Section 07 51 00 – Elastomeric Membrane Restoration
N. Section 07 62 00 – Flashing and Sheet Metal Roofing
O. Section 22 22 22 – Roof Drains
P. Section 23 00 00 – HVAC
Q. Section 26 00 00 – Electrical
R. Section 26 41 00 – Lightning Protection

1.03 SUMMARY OF WORK:

This Section specifies requirements for the following Scope of Work:

A. The Contractor shall supply all labor, equipment, staging, temporary protection, tools, and appliances necessary for the proper completion of the work in this Section, as required in the Specification and in accordance with good construction practice.

B. Prepare concrete substrates for application of new roofing.

C. Repair deteriorated concrete deck substrate on a Unit Price basis as indicated in Section 01 22 00 – Unit Prices.

D. V-notch sealant crack repairs of existing composite concrete deck (Unit Price Item).

E. Perform patching and repairing of concrete deck substrates using patching materials (Unit Price Item).

F. Seal surface imperfections of composite concrete deck substrates using repair materials (Unit Price Item).
G. Clean and restore all areas affected by the work.

1.04 JOB CONDITIONS

A. This building houses critical infrastructure for campus operations and life safety communications. The contractor will provide the greatest level of care in protecting these vital areas and systems during construction. Contractor will need to be on call 24/7 to respond to any issues arising from these construction activities, to remedy issues immediately. CCSU will back-charge the contractor for any emergency measures undertaken to correct field deficiencies.

B. Weather must be considered both in short and long-term schedule approach. By undertaking this project, the contractor understands that they will need to install the roof systems as required by the documents and manufacturer's requirements. The contractor will need to consider the approaching fall/winter weather. No extra costs will be considered due to cold (or otherwise adverse) weather conditions. Contractor will incorporate all provisions necessary to complete the work prior to September 26, 2018. This includes overtime, temporary heat, temporary protective measures, and any other aspects required to execute work.

C. The contractor is responsible for the containment of all dust, dirt, debris, overspray, and run-off resulting from the work. The Contractor shall collect and contain all materials and repair any resulting damage to adjacent surfaces, site fixtures, personal property, or adjacent repairs.

D. Store flammable liquid and materials away from open sparks, flames, and extreme heat.

E. Comply with all OSHA requirements for construction. It is the contractor's responsibility to comply with all state, federal, and local codes, guidelines, and safety requirements.

F. Phased work is not allowed at critical areas identified on the Contract Drawings. Concrete patching will be performed same day roofing is installed.

G. Should unforeseen conditions (not inclusive of Unit Price items) be encountered, the Contractor will be responsible for temporary protection and weather tightness until a solution is determined by the Engineer and implemented by the Contractor.

H. Equipment required to hoist materials to the roof and remove debris from the roof shall be supplied, maintained, and operated by the Contractor.

I. The Contractor shall provide protection of entrance ways, building interior spaces, sitework, plantings, landscaping, building surfaces, and similar items to protect from damage. Items damaged because of the work in this section shall be repaired or replaced by the Contractor to the satisfaction of and at no additional cost to the Owner.
1.05 REFERENCES

A. Comply with provisions of following codes, specifications, and standards except where more stringent requirements are shown on the design Drawings or specified herein:
   1. “Hot Weather Concreting,” reported by ACI Committee 305 (ACI 305R).
   2. “Cold Weather Concreting” reported by ACI Committee 306 (ACI 306R).
   3. ICRI: International Concrete Repair Institute.
   4. CRSI: Concrete Reinforcing Steel Institute.
   5. SSPC: Steel Structures Painting Council (The Society for Protective Coatings).

1.06 SUBMITTALS

A. Manufacturer’s product and installation literature for approval. Include shop drawings for project specific details.

B. Material Safety Data Sheet (MSDS) for each product used.

C. Submit associated equipment and materials list including, but not limited to, surface preparation equipment and methods used, bonding agents, etc.

D. Submit means and methods for curing and protecting all placements and repairs, and for masking surrounding surfaces.

1.07 UNIT PRICE WORK

A. The Unit Prices are above and beyond those shown on the Contract Drawings, and shall be carried by the Contractor within the Base Bid Scope of Work. Unit prices for certain work of this Section are listed in Section 01 22 00 – Unit Prices that precedes the technical specifications. The Contractor and Engineer shall verify the actual quantities used.

B. For notch and seal repairs, the Base Bid shall include all labor, access, materials, and accessories required for the proper installation. The current quantity of cracked concrete roof deck is unknown. The base bid shall include 150 linear feet of notch and seal repairs. (For additional Unit Price information, refer to Unit Price item 1.1.1)

C. For concrete spall repairs, the Base Bid shall include all labor, access, materials, and accessories required for the proper installation. The current quantity of spalled concrete roof deck is unknown. The base bid shall include 10 square feet of spall repairs. (For additional Unit Price information, refer to Unit Price item 1.1.2)

1.08 DIMENSIONS AND QUANTITIES

A. All dimensions and quantities shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the time of construction. The Contractor is advised to take all
precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.09 QUALITY ASSURANCE

A. Contractor must coordinate site visits with appropriate manufacturer’s field representative to view surface preparations, material mixing, application procedures, and curing operations for each different material.

1.10 TEST AREAS

A. Before full-scale work is commenced, execute the following work for trial work areas to be reviewed by the Manufacturer’s Field Representative as to surface preparation and material mixing and application acceptability.
   1. Concrete crack repair (approximately 4 linear feet).
   2. Concrete spall repair (approximately 1 square feet).

1.11 GUARANTEES

A. Upon completion of the work, and prior to final payment, the Contractor shall submit a Guarantee of his work to be free from defect in materials and workmanship. This Guarantee shall be for a period of three (3) years from the date of substantial completion, and shall be signed by a Principal of the Contractor's firm, and sealed if a corporation.

PART 2 - MATERIALS

2.01 NOTCH AND SEAL REPAIRS (UNIT PRICE)

A. Sealant for notch and seal repairs shall be high-performance, low-modulus, high-movement, non-sag, fast-curing, ready-to-use hybrid sealant complying with ASTM C-920, Type S, Grade NS, Class 50, use NT, M, A, O. Acceptable products:
   1. Masterseal NP100 by BASF Corporation Construction Systems
   2. Dymonic FC by Tremco Commercial Sealants and Waterproofing
   3. DynaTrol 1-XL by Pecora Corporation
   4. SikaHyflex-150 LM by Sika Corporation

2.02 CONCRETE ROOF DECK SPALL REPAIR MORTAR – (UNIT PRICE)

A. Hand-applied patching mortar for horizontal concrete spalls shall be a polymer-modified cementitious repair mortar, such as:
   1. MasterEmaco T302; BASF
   2. Sika Monotop 611; Sika Corporation.
   3. Emaco R310 CI; Master Builders, DeGussa.
2.03 CONCRETE ROOF DECK MORTAR BONDING AGENT/REINFORCING PROTECTION

A. Bonding agent for application onto prepared spall repair substrates as well as anti-corrosion coating for cleaned steel reinforcement shall be:
   1. Sika Armatec 110 EpoCem; Sika Corporation
   2. Rebar Primer and Bonding Agent; ThoRoc/DeGussa
   3. MasterEmaco P124; BASF

2.04 CONCRETE ROOF DECK PINNING AND SPALL REPAIRS

A. Metal pins to attach steel mesh reinforcing at vertical and overhead spalls with a depth greater than 1-1/2" shall be:
   1. Helical Patch Reinforcement, stainless steel helical pins, (8.0 mm dia. X 3” long), or approved equivalents.
   2. Refer to Accessory Materials, Part 2.07 for options.

B. Metal pins to act as studs to improve mechanical bond of shallow patches (equal to or less than 1-1/2” in depth) shall be:
   1. Helical Patch Reinforcement; stainless steel helical pins, (8.0 mm dia. X 3” long), or approved equivalents.

2.05 CONCRETE ROOF DECK ACCESSORY MATERIALS

A. Fasteners for concrete spalls that exceed 1-1/2” in depth shall be minimum 1-1/2” long by 1/4” diameter drive pins in stainless-steel sheaths as manufactured by Star, Powers Fasteners, or Hilti. Embedment into substrate shall be 1-1/4” minimum. It is recommended that stainless-steel pins have through-holes at exposed ends to accept tie wire.

B. Type 304 stainless-steel wire mesh to be wrapped around drive pins for concrete spalls that are in excess of 1-1/2” deep shall be a 2” x 2” grid mesh, 14 gage wire (minimum).

C. Burlap for curing patches shall be heavyweight burlap cloth.

D. Polyethylene for curing patches shall be 6-mil polyethylene plastic sheet, or equal.

2.06 CONCRETE ROOF DECK SUPPLEMENTAL REINFORCING STEEL

A. All supplemental reinforcing steel bars shall match the same size diameter of the original bars’ diameter prior to its section reduction.

B. All supplemental reinforcing steel shall be new deformed billet steel conforming to ASTM 615, Grade 60, epoxy coated.

C. All supplemental reinforcing steel bars shall be shop epoxy coated after final fabrication, in strict conformance with the current CRSI specifications.

D. All bars shall be cold bent prior to epoxy coating in accordance to the proper radii established by the current ACI and CRSI specifications. Under no conditions shall heat be applied to the bars to obtain bends.
E. New welded-wire-mesh shall be supplied to match the same wire-gauge size and grid opening size as existing mesh scheduled for replacement (prior to corrosion section loss).

F. All new welded-wire-mesh shall conform to ASTM A185 and shall be shop epoxy coated in strict conformance with the current CRSI specification.

PART 3 - EXECUTION

3.01 GENERAL WORKMANSHIP

A. Do not deliver to site or install any material or system that has not been approved. Materials installed without approval may be required to be removed at no additional cost to the Owner.

B. Comply with the manufacturer's written instructions and these Specifications for all renovations and associated work.

C. Partial or unmarked cans or rolls of materials cannot be used.

D. Verify that all surfaces have been demolished to the specified depth and surface profile, and thoroughly cleaned for the areas to receive repairs.

E. Provide all devices and protection (including heaters, dehumidification, ventilation, etc.) necessary to maintain areas and surfaces at the proper temperature, humidity, and surface moisture content for the curing of repair mortar, epoxy, and other materials.

F. No concrete repair work shall be executed when the temperature in the work areas has dropped below 45 degrees Fahrenheit, unless heated. Consult the manufacturers of the materials for proper application and storage procedures.

3.02 NOTCH AND SEAL CRACK REPAIRS

A. Rout or “vee” crack by saw cutting to a minimum depth of 1/2”. Do not cut reinforcement.

B. Clean the routed crack and adjacent area of all loose material with oil-free high-pressure air to blow the crack clean.

C. Prime joint substrates where recommended in writing by sealant manufacturer. Confine primer to areas that will be covered with sealant in same day. Unless recommended otherwise by sealant manufacturer, re-prime areas exposed for more than 24 hours.
D. Install sealant to produce uniform, cross-sectional shape, and depth; to directly contact and fully wet joint sides and/or complete fill recesses in joint configuration.

E. Immediately after sealant application and before skinning or curing begins, tool joint with slightly concave surface, compressing sealant into joint to form smooth, uniform sealant bead; to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Do not use tooling agent.

3.03 CONCRETE ROOF DECK SPALL REPAIRS

A. The prepared concrete surfaces must be dry, clean, and smooth. Provide dryers, if necessary, to dry concrete surfaces prior to installing new work. Open flame devices shall not be used.

B. Comply with the manufacturer’s written instructions and these Specifications for all renovations and associated work.

C. Partial or unmarked cans or rolls of materials cannot be used.

D. Verify that all surfaces have been demolished to the specified depth and surface profile, and thoroughly cleaned for the areas to receive repairs.

E. Provide all devices and protection (including heaters, dehumidification, ventilation, etc.) necessary to maintain areas and surfaces at the proper temperature, humidity, and surface moisture content for the curing of repair mortar, epoxy, and other materials.

F. No concrete repair work shall be executed when the temperature in the work areas has dropped below 50 degrees Fahrenheit, unless heated. Consult the manufacturers of the materials for proper application and storage procedures.

G. In all cases, the prepared surfaces ready to receive concrete repair and coating work, shall be maintained with adequate temporary protection to keep atmosphere and construction related contaminants (dust, debris, water, dirt, laitance, grease, oil, coating overspray, etc.) or any bond inhibiting contaminants from depositing on prepared surfaces.

H. Remove areas of spalled, cracked, loose, or otherwise unsuitable concrete from the existing concrete surfaces. Define all repair areas with 1/4” deep saw cut perpendicular to the repair surface. Cuts shall not overlap at corners.

1. Using hand and electric power tools (15 lb. maximum chipping hammers) remove all areas of deteriorated, delaminating, de-bonded, spalled or otherwise damaged concrete from existing surfaces, as required to install the new work. Sound concrete areas adjacent to cracks to determine additional spall areas. Removal of deteriorated concrete and surface preparation shall be completed as recommended by the patching mortar manufacturer and as outlined within these specifications.

2. Prepare the surface of the existing concrete to receive the bonding agent and repair mortar. Provide a 1/2” minimum aggressive surface profile with
fractured aggregate (ICRI-CSP 8 or CSP 9). Tool marks should be visible. Examine substrate for cracks and treat with specified crack repair procedure.

3. Thoroughly clean all reinforcing or embedded steel and provide supplemental steel in accordance with this Section.

4. Completely remove all dust, grease, and other impurities via high-pressure water wash or equal, combined with wire brushes, chipping, grinding, or other methods as required to achieve acceptable bonding surfaces. Dampen the existing surface area with clean potable water, to obtain saturated-surface-dry (SSD) conditions.

5. Apply coating/bonding agent to all substrate surfaces and reinforcing steel as recommended by the repair mortar manufacturer. Provide one coat on concrete substrates and two coats on all steel items. Slurry scrub repair mortar into prepared damp substrates.

6. Install repair mortar to properly prepared areas within a time period to achieve a “wet-on-wet” mortar application. Mix repair mortar in accordance with the material manufacturer’s instructions. At vertical and overhead spall repairs with a depth greater than 1-1/2”, provide pinning and mesh reinforcement. At vertical and overhead spall repairs with a depth of 1-1/2” or less, provide pinning without mesh at 3” on-center each way. Utilize the manufacturer’s recommended mix rates.

7. Vertical spall locations that exceed 1-1/2” depth shall have specified drive pins installed into the substrate. Drive pins shall be spaced 6” maximum on center with a minimum of 2 pins per spall, and have stainless-steel wire mesh or hot-dip galvanized wire mesh wrapped throughout the repair to act as a reinforcement line upon installation of the patching materials.

8. The concrete substrates require wetting with water to obtain SSD conditions prior to installing the bonding agent. Consult with the manufacturer’s instructions prior to initiating repairs.

9. Finish the repairs flush with the existing surfaces. Ensure that the surface, texture, and profile is roughed and textured match surrounding concrete and to achieve proper mechanical bond with the later applied coating primer. Do not feather edge repairs, but install in 1/2” minimum applications, or as otherwise limited by each materials manufacturer’s limitations.

10. Clean uncured materials off of undesired areas with a moist sponge or cloth immediately after application.

11. Provide for proper cure of patch as recommended by the repair material manufacturer. At a minimum, curing shall consist of wet burlap placed over the repair area, continuously wetted to provide a constantly moist burlap, and enclosed with polyethylene, duct taped to the adjacent surfaces. Curing materials shall remain in place for the minimum manufacturer’s specified time based upon surface and ambient temperatures and humidity.

12. Associated access required due to building height and geometry for properly curing patches shall be included within the contract bid price. All spall repairs are required to be cured as herein indicated and as required by current ACI concreting practices, with no exceptions.

13. After curing repair, remove all traces of adhesive and dirt left on surfaces from duct tape and masking. Use solvent wipes and touch grinding as required.
3.04 REINFORCING AND MISCELLANEOUS EMBEDDED STEEL AT SPALL REPAIR

A. Perform surface preparation as described previously, and as recommended by the repair mortar manufacturer. Should reinforcing bars be encountered, perform the following work:

B. All reinforcing steel bars exposed which have rust (greater than mild surface rusting) that extends to the back of the bar, or where concrete has cracked due to expansive forces from corroding steel, shall have the concrete removed from the full circumference of the bars to provide a minimum clearance of 3/4” all around. If more than one half of any bar diameter is exposed during demolition, remove concrete from the full circumference of bar with minimum 3/4” clearance all around.

C. Reinforcing steel must be mechanically or sandblast cleaned and free of rust, scale, grease, oil, and other bond-inhibiting matter in accordance with SSPC – SP11, at a minimum, and as required by the rebar coating/bonding agent manufacturer. This can be accomplished using power tools, sandblasting, or similar approved methods.

D. Miscellaneous embedded steel items requiring cleaning shall be sand-blasted or mechanically ground to shiny steel.

E. After cleaning of reinforcement and embedded steel to bare metal, thoroughly examine and determine section loss. Bars with 25% or greater section loss shall receive supplemental steel. New steel bars shall be placed and tied alongside of existing corroded bar at 1-1/2” depth from surface (where possible). Bar lap shall be developed 20 bar diameters, each end, beyond point of corroded bar. Remove additional concrete as required to fit bar and develop lap lengths. New bar diameter shall match existing nominal bar diameter prior to corrosion. In all cases, new reinforcement shall have a minimum concrete or mortar cover of 1-1/2”. Notify Designer in writing if 1-1/2” of concrete cover is not present, nor achievable.

F. At discontinuous ends of reinforcement, or where 20 bar diameter lap is not possible, supplemental reinforcement may be drilled and epoxied into the substrate adjacent to existing corroded bars. Drill hole 1/4” diameter larger than bar diameter at a depth 10 times the bar diameter. Maintain a minimum 2” cover and edge distance at all drilled hole locations. Clean hole and fill with a high modulus, high-strength, structural epoxy paste adhesive conforming to ASTM C-881 and AASHTO M-235 specifications. Fully insert bar into center of epoxy filled hole.

G. Apply epoxy coating/bonding agent to all exposed steel and concrete bonding surfaces using brushes in strict accordance with the bonding agent manufacturer’s written requirements. Use two coats on steel, and one coat on concrete substrates.

H. Apply repair mortar as specified and recommended by the manufacturer.

I. Clean areas adjacent to the repair area prior to curing with a moist sponge or cloth immediately after application.

J. Apply all curing materials and techniques as specified in this Section.
3.05 **CLEAN-UP**

Prior to acceptance of the masonry work covered in this section, the Contractor shall perform a thorough clean-up of the work site, building surfaces, landscaping, etc. Any plantings or other items damaged shall be repaired or replaced to the satisfaction of and at no additional cost to the Owner.

**END OF SECTION**
PART 1 - GENERAL

1.01 IN GENERAL

The General Conditions and all parts of the Bid and Contract Documents are made part of this Section as if fully repeated herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

A. Section 01 03 01 – Available Information - Gale Evaluation Report
B. Section 01 12 16 – Work Sequence
C. Section 01 21 00 – Allowances
D. Section 01 22 00 – Unit Prices
E. Section 01 23 13 – Supplemental Bids
F. Section 01 50 00 – Temporary Facilities and Site Maintenance
G. Section 01 65 00 – Product Delivery, Storage, and Handling
H. Section 01 70 00 – Project Closeout
I. Section 02 41 00 – Selective Demolition
J. Section 03 30 00 – Concrete Restoration
K. Section 06 10 00 – Rough Carpentry
L. Section 07 50 00 – Elastomeric Membrane Roofing
M. Section 07 51 00 – Elastomeric Membrane Restoration
N. Section 07 62 00 – Flashing and Sheet Metal Roofing
O. Section 22 22 22 – Roof Drains
P. Section 23 00 00 – HVAC
Q. Section 26 00 00 – Electrical
R. Section 26 41 00 – Lightning Protection

1.03 SUMMARY OF WORK:

In general, the Contractor shall supply all labor, materials, equipment, temporary protection, tools, and appliances necessary for the proper completion of the work in this Section, as required in the Specifications, in accordance with good construction practice, as amended. The work under this Section generally includes the following:

A. Provide and maintain vacuum equipment as required to reduce dust accumulation at the site.

B. Perform a general cleaning of the area and all masonry surfaces within the work area, and those outside the work area that are affected, from construction related activities and materials. Protect adjacent areas such as roofing, walls, and site components during cleaning.

C. Removal and replacement of existing sealant and backing at precast concrete cap stones.

D. Apply penetrating water repellent to all surfaces of precast concrete cap stones.
E. Remove efflorescence, algae, and stains on cap stones and brick masonry wing walls utilizing the specified cleaning materials and methods. This project does not include a comprehensive masonry cleaning and restoration of the building and only includes the exposed masonry at the wing walls of two (2) gables.

F. Mortar removal and reinstallation is necessary to remove and replace existing copper reglet flashings at the exposed masonry at bottoms of two (2) gables. Refer to Section 07 62 00 Flashing and Sheet Metal Roofing for flashing scope.

1.04 SUBMITTALS

A. Submittals shall be made in accordance with the General Conditions and Divisions 0/1.

B. The Contractor shall submit the following procedural items with their submittal package:
   1. Written plan of masonry restoration operations;
   2. Temporary protection procedures;
   3. Staging/set-up procedures;
   4. Program for containment of cleaning materials;
   5. Program for containment of dust; and

C. Submit miscellaneous masonry materials, including product data, certifications, and samples of each type product included in the masonry assemblies, including anchors, and reinforcing.

D. Protect persons and property. Submit proposed method of protection for adjacent building, landscaping, pavement, walkways, site plantings, and related site work from damage.

1.05 REFERENCE STANDARDS

A. ASTM C62-13a Specification for Building Brick (Solid Masonry Units made from Clay or Shale)

B. ASTM E96/96M-15 Test Methods for Water Vapor Transmission of Materials

C. BIA (Brick Industry Association) Technical Notes

1.06 JOB CONDITIONS

A. This building houses critical infrastructure for campus operations and life safety communications. The contractor will provide the greatest level of care in protecting these vital areas and systems during construction. Contractor will need to be on call 24/7 to respond to any issues arising from these construction activities, to remedy issues immediately. CCSU will back-charge the contractor for any emergency measures undertaken to correct field deficiencies.
B. Weather must be considered both in short and long-term schedule approach. By undertaking this project, the contractor understands that they will need to install the roof systems as required by the documents and manufacturer's requirements. The contractor will need to consider the approaching fall/winter weather. No extra costs will be considered due to cold (or otherwise adverse) weather conditions. Contractor will incorporate all provisions necessary to complete the work prior to September 26, 2018. This includes overtime, temporary heat, temporary protective measures, and any other aspects required to execute work.

C. The Contractor shall utilize skilled and experienced specialty workers having the specified minimum experience in masonry restoration to perform the work, in accordance with requirements listed herein. Experienced trade workers shall be utilized for all aspects of the masonry work.

D. Do not leave partially completed sections exposed to the elements overnight. Provide all devices necessary to maintain areas at the correct temperature and humidity for proper curing of mortar.

E. To prevent staining of adjacent construction during the work, immediately remove mortar or coating, which comes in contact with exterior surfaces. Protect all building components from damage or staining during construction.

F. Prepare, install, and cure all materials in accordance with these Specifications, all referenced standards, the Brick Industry Association (B.I.A.) Technical Notes, and the Manufacturer's Printed Instructions. In the case of a discrepancy, the Specifications will prevail.

G. Owner or Owner's Representative shall confirm areas of the work. Areas not outlined and agreed to by the Owner prior to commencing the work will not be considered for compensation.

H. The Contractor shall supply, install, and maintain all shoring, supports, barriers, protection, warning lines, lighting, and personnel required to support the structure, fixtures and facilities affected by his work and segregate the work area(s) from pedestrian or vehicular traffic, as well as to prevent damage to the building, occupants, and the surrounding landscaped and paved areas.

I. Coordinate the work in this section with the work by other trades to ensure the orderly progress of the work. No masonry work shall be performed until submittals have been reviewed and approved by the Architect/Engineer and Owner for acceptability.

J. Under no circumstances shall the Contractor remove existing materials and systems to the ground in an uncontrolled manner. Machinery or devices used shall be manufactured for this purpose. Adjacent building and property areas shall be protected from airborne debris.
K. All areas of existing masonry or flashings removed shall be made secure and weathertight during the same day. No building interiors shall be left exposed to the weather at the end of each workday.

L. During restoration operations, the Contractor is responsible for the containment of all dust, dirt, debris, overspray, and run-off resulting from the work. The Contractor shall collect and contain all materials and repair any resulting damage to adjacent surfaces, site fixtures, or personal property. Specific attention is drawn to the use of chemicals and cleaners.

1.07 ROOF AND BUILDING PROTECTION

A. Protect the building and grounds from undue damage.

B. Install tarpaulins secured with duct tape over wall penetrations and over roof systems during masonry repair work and cleaning, where masonry work is being performed after finished roofing systems in place.

C. Phased work is not allowed at critical areas identified on the Contract Drawings.

D. The Contractor is responsible for the prompt repair of any damage to the building systems resulting from the work at the project at no additional cost to the Owner.

E. Temporary window protection in the form of plywood and polyethylene sheeting shall be provided at all times during masonry washing, demolition, or other activities adjacent to the existing building assemblies, but especially at windows.

1.08 DIMENSIONS AND QUANTITIES

A. All dimensions and quantities shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the time of construction. The Contractor is advised to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.09 QUALITY ASSURANCE

A. The Contractor shall utilize skilled and experience specialty workers. Masonry foreman shall have a minimum of ten years’ experience in masonry restoration. Qualified masons shall have a minimum of five years’ experience in masonry restoration to perform the work, in accordance with requirements listed herein. Experienced trade workers shall be utilized for all aspects of the masonry work, except as follows:

1. Mason’s apprentices shall have a minimum of two years’ experience in masonry restoration to perform the work of assisting masons. Apprentices shall not be allowed to perform work involving disassembly or rebuilding of masonry without direct supervision of a qualified mason.

2. Laborers shall have a minimum of one year’s experience in masonry restoration to perform the work of assistance to the mason team.
shall be prohibited from performing skilled work on the building or preparing masonry materials.

B. Contractor to submit in-depth outline of each worker’s training and experience, along with a list of projects performed in the previous five years.
   1. Contactor shall demonstrate a proven track record of success, experience, and skill with production, preparation, and curing of mortars.

C. Owner reserves the right to reject any contractor personnel, which they consider to be inexperienced.

1.10 CLEAN-UP

A. Site clean-up shall be complete and performed daily to the satisfaction of the Owner.

B. All roof, building (interior and exterior), landscape, and parking areas shall be cleaned of all trash associated with masonry repairs, debris, and dirt caused by, or associated with, the work.

C. All trash and debris shall be completely removed from the site daily during the work and at the completion of the work. All debris shall be legally disposed of off-site.

1.11 GUARANTEES

A. Upon completion of the work, and prior to final payment, the Contractor shall submit a Guarantee of his work to be free from defect in materials and workmanship. This Guarantee shall be for a period of three (3) years from the date of Substantial Completion, and shall be signed by a Principal of the Contractor’s firm, and sealed if a corporation.

PART 2 - MATERIALS

2.01 MASONRY CLEANERS

A. Subject to approval through trial testing of masonry surface cleaning, provide the following cleaners or equivalents by other manufacturers:
   1. Cleaner for removal of biological growth, such as moss, algae, lichens, etc., shall be EK Restoration Cleaner by Prosoco, Inc., Bi-Cleaner by Cathedral Stone Products, or Envirestore 100 by Diedrich Technologies.

2.02 SEALANT

A. Sealant shall be high-performance, low-modulus, high-movement, non-sag, fast-curing, ready-to-use hybrid sealant complying with ASTM C-920, Type S, Grade NS, Class 50, use NT, M, A, O. Acceptable products:
   1. Masterseal NP100 by BASF Corporation Construction Systems
   2. Dymonic FC by Tremco Commercial Sealants and Waterproofing
3. DynaTrol 1-XL by Pecora Corporation  
4. SikaHyflex-150 LM by Sika Corporation

B. Backer rod shall be continuous length, closed-cell polyethylene foam, as recommended by the sealant manufacturer. Backer rod shall be compressible, resilient, non-waxing, non-extruding, and non-staining. Backer rod shall be of sufficient size to be compressed 30% of maximum joint width and shall be totally compatible with the sealant, primer, and substrates. Backers shall conform to the requirements of ASTM C 962 - Type A, ASTM D 1622, ASTM D 1623, and ASTM D 5249 such as Green Rod by Nomaco, Sonofoam by Sonneborn, ITP soft-type backer rod or approved equal.

C. Primers, surface cleaners, masking tape, and other materials are as recommended by sealant manufacturer. Products must be non-staining and compatible with substrates; based on mockups, preconstruction testing, and sealant manufacturer’s previous testing and experience.

2.03 WATER REPELLENT SEALER

A. Water repellent sealer for cap stones: A low-VOC, deep-penetrating, clear sealer formulated with silane and/or siloxane for use on concrete and masonry surfaces. Film forming repellents will not be allowed. Acceptable manufacturers are Pecora Corporation, Euclid Chemical Company, and Prosoco.

2.04 WEEP VENTS

A. Baffles to be installed in cap stone bed joints shall be 3/8" x 2-1/2" x 3-3/8" baffle comprised of a bonded cellular material by Masonry Reinforcing Corporation of America, Hohmann & Barnard, Inc., Dur-O-Wall, Inc., or approved equal.

PART 3 – EXECUTION

3.01 CLEANING

A. Clean efflorescence, heavy soil, stains, vegetative, and algae growth from masonry walls within the work areas designated.

B. Test the specified cleaners on a small area of masonry assembly or unit to determine compatibility with the masonry, window units, sealants, etc. Evidence of discoloration, metallic salts or other deleterious effects shall be grounds for requiring the use of a substitute cleaner.

C. Apply the cleaner at the manufacturer’s recommended dilution rate and dwell duration. Pre-wet the wall if the manufacturer so recommends. Spot cleaning only is permitted.

D. Allow the cleaner to stand for the manufacturer’s recommended dwell period while monitoring to ensure that the surface does not dry.
E. Brush as required with soft or stiff bristle, natural brushes. Steel-bristle wire brushes are not to be used. Select type of brush depending on level of staining and desired results.

F. Rinse all cleaner from the wall with water applied at the manufacturer's recommended flow and pressure. High-pressure washing equipment may be required. Any acid-neutralizing agent required by the manufacturer shall be applied as part of this rinse. Ensure that effluent does not accumulate at ground level, and fully rinse all effluent from sidewalks, streets, and landscaping each day.

G. The Contractor must provide sufficient site protection to prevent the cleaning effluent from draining into the adjacent storm drains. The Contractor will provide a narrative as to how the site protection will be performed.

H. Repeat applications may be required to achieve desired results and appearances.

3.02 SEALANT REMOVAL / SURFACE PREPARATION

A. Provide temporary dust control and containment measures prior to starting removal work.

B. Cut and remove existing sealant from joints.

C. Clean substrates by brushing, grinding, blast-clearing, mechanical-abrading, or a combination of methods to produce clean, sound substrate capable of developing optimum bond with sealant. Remove laitance and form-release agents from concrete. Remove loose particles remaining after cleaning operations by vacuuming or blowing out joints with oil-free, compressed air.

D. Clean joint substrates immediately before installing sealant, to comply with sealant manufacturer's written instructions based on mockups.

E. Provide dry substrate; prevent wetting of substrate prior to sealant installation.

3.03 JOINT SEALANTS

A. Comply with sealant manufacturer's written installation instructions for products and applications indicated.

B. Joint Priming: Prime joint substrates where recommended in writing by sealant manufacturer, based on mockups. Apply primer to comply with sealant manufacturer's written instructions.
   1. Confine primer to areas that will be covered with sealant in same day. Unless recommended otherwise by sealant manufacturer, reprime areas exposed for more than 24 hours.

C. Install sealant backer and position to produce cross-sectional shape and proper depth of installed sealant.
1. Use properly-sized backer. Do not use multiple-backer units or braided-backer units to accommodate wide joints.
2. Install backer with device that will provide consistent depth between substrate surface and outer surface of backer.
3. Do not leave gaps between ends of sealant backers.
4. Do not stretch, twist, puncture, or tear sealant backers.
5. Remove wet backers and replace with dry materials.

D. Install bond-beaker tape at back of designed joints.

E. Bond breaker tape shall be installed at locations where backer rod cannot be utilized to achieve the designated joint depth and where shown on the Contract Drawings. Sealant shall adhere only to the sides of the joint and not to the back so as to prevent three (3)-sided adhesion.

F. Install sealant immediately after installing backer material; to produce uniform, cross-sectional shape, and depth; to directly contact and fully wet joint sides and backer material; and or completely fill recesses in joint configuration.
   1. Install sealant flush with surface.
   2. Immediately after sealant application and before skinning or curing begins, tool joint with slightly concave surface, compressing sealant into joint to form smooth, uniform sealant bead; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint. Do not use tooling agent.

G. At concrete cap stones, provide weep vents in the bed joints of the concrete cap stones. Space weep vents at 24" o.c.

3.04 APPLICATION OF WATER REPELLENT SEALER

A. Protect all wall and roof areas adjacent to concrete caps from product, splash, residue, fumes, and wind drift.

B. Prepare concrete substrates by cleaning to remove stains, efflorescence, environmental particles, etc. Allow do dry completely prior to sealer application.

C. Store and apply product in accordance with the manufacturer's acceptable temperature range(s). Do not apply sealer in freezing conditions or on surfaces hotter than 95° F.

D. Test a small area of the concrete cap to confirm suitability and to establish the require coverage rates prior to executing the balance of the work. Test areas should utilize the same equipment and techniques as the general application.

E. Mix and/or dilute according to with manufacturer's requirements.

F. Apply sealer to dry concrete surfaces. For vertical surfaces, saturate the substrate and allow to penetrate for 5-10 minutes. Re-saturate while the substrate is still moist from first application. For horizontal surfaces, one
application is acceptable. Use enough material to wet the surface for 2-3 minutes.

G. Allow sealed concrete to dry until dry to the touch. Protect surfaces from rainfall for 6 hours following sealer application.

H. Clean tools, equipment, and overspray with soap and water.

3.05 MORTAR REMOVALS AT REGLETS

A. During removals, controlled dampening to reduce dust generation and airborne particulate matter is required.

B. Cut out existing mortar and/or sealant at existing reglet joints to a minimum depth of two inches.

C. Use grinding wheels or saws at horizontal joints. Chisel fillets of mortar left from the blade’s curve.
   1. Do not damage masonry units. The use of guides or jigs is permitted.

D. After mortar removals are complete, thoroughly clean out all loose particles, sand, dust, and the like using fiber brushes and compressed air. Remove residual sealants using a grinder in preparation for new stepped reglet flashings and in accordance with Section 07 62 00 Flashing and Sheet Metal Roofing.

E. Seal reglet joints and tool sealant at the brick face to shed water.

3.06 CLEAN-UP

Prior to acceptance of the masonry work covered in this section, the Contractor shall perform a thorough clean-up of the work site, building surfaces, landscaping, etc. Any plantings or other items damaged shall be repaired or replaced to the satisfaction of and at no additional cost to the Owner.

END OF SECTION
PART 1 - GENERAL

1.01 IN GENERAL

The General Conditions and all parts of the Bid and Contract Documents are made part of this Section as if fully repeated herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

A. Section 01 03 01 – Available Information - Gale Evaluation Report
B. Section 01 12 16 – Work Sequence
C. Section 01 21 00 – Allowances
D. Section 01 22 00 – Unit Prices
E. Section 01 23 13 – Supplemental Bids
F. Section 01 50 00 – Temporary Facilities and Site Maintenance
G. Section 01 65 00 – Product Delivery, Storage, and Handling
H. Section 01 70 00 – Project Closeout
I. Section 02 41 00 – Selective Demolition
J. Section 03 30 00 – Concrete Restoration
K. Section 04 50 00 – Masonry Restoration
L. Section 07 50 00 – Elastomeric Membrane Roofing
M. Section 07 51 00 – Elastomeric Membrane Restoration
N. Section 07 62 00 – Flashing and Sheet Metal Roofing
O. Section 22 22 22 – Roof Drains
P. Section 23 00 00 – HVAC
Q. Section 26 00 00 – Electrical
R. Section 26 41 00 – Lightning Protection

1.03 SUMMARY OF WORK:

A. Re-secure existing wood blocking at roof penetrations, parapets, perimeters, expansion joints, and roof-to-wall locations where wood can remain.

B. Conform to FM Global Loss Prevention Data Sheet 1-49 for blocking attachment requirements.

C. Remove and replace deteriorated wood blocking on a Unit Price basis as indicated in Section 01 22 00 – Unit Prices.

D. Provide new wood blocking at roof penetrations, perimeters, transitions, and roof-to-wall locations, and as required to properly terminate the new roofing and flashing systems and to accommodate increased insulation heights while providing 8”-minimum flashing height above finished roof.

E. Provide new wood blocking and sheathing at “future curbs” to remain.

F. Provide plywood sheathing at existing rising wall locations, curb, perimeter, parapets, and other locations as indicated on the Contract Drawings.
G. New blocking shall be dimensional lumber of minimum 6”-wide construction-grade pressure-treated Southern Yellow Pine, formed to the dimensions shown on the Detail Drawings and as required for proper installation of the new work.

H. Provide stainless-steel fasteners for connections of pressure-treated wood blocking to structurally sound substrates.

1.04 JOB CONDITIONS

A. This building houses critical infrastructure for campus operations and life safety communications. The Contractor will provide the greatest level of care in protecting these vital areas and systems during construction. Contractor will need to be on call 24/7 to respond to any issues arising from these construction activities, to remedy issues immediately. CCSU will back-charge the Contractor for any emergency measures undertaken to correct field deficiencies.

B. Weather must be considered both in short and long-term schedule approach. By undertaking this project, the Contractor understands that they will need to install the roof systems as required by the documents and manufacture’s requirements. The Contractor will need to consider the approaching fall/winter weather. No extra costs will be considered due to cold (or otherwise adverse) weather conditions. Contractor will incorporate all provisions necessary to complete the work prior to September 26, 2018. This includes overtime, temporary heat, temporary protective measures, and any other aspects required to execute work.

C. All surfaces to receive the new wood blocking shall be thoroughly dry. Should surface moisture such as dew exist, the General Contractor shall provide the necessary equipment to dry the surface prior to application. Do not dry with open flames.

D. Do not leave any newly installed wood blocking exposed. Cover and protect all newly installed wood daily with the new flashing system or temporary covers until the roof/flashing systems are installed.

E. Protect all existing and new wood stored on site to prevent moisture absorption. Use tarps over the wood pile (top, sides, and bottom) elevated on pallets (one side lower to shed water).

F. If delays in the project exceeding one (1) week are anticipated due to inclement weather (or due to any other project condition), all wood shall be stored in weatherproof box trailers or storage sheds, provided by the Contractor, in locations to be designated by the Owner.

1.05 SUBMITTALS

A. Submittals shall be made in accordance with the Division 1.

B. The Contractor shall submit the following items with their submittal package.
1. Specified product data including wood blocking, plywood sheathing, bolts, anchors, screws, and fasteners.

C. Submit all proposed wood species, grades, grading agency, certificates, and source information to the engineer for written approval prior to ordering any materials.

D. All dimensional lumber shall be field tested for moisture content prior to installation. Contractor shall submit test results of each board to Engineer for approval prior to installation.

1.06 UNIT PRICE WORK

A. The Unit Prices are above and beyond those shown on the Contract Drawings, and shall be carried by the Contractor within the Base Bid Scope of Work. Unit prices for certain work of this Section are listed in Section 01 22 00 – Unit Prices that precedes the technical specifications. The Contractor and Engineer shall verify the actual quantities used.

B. For deteriorated wood blocking replacement, the Base Bid shall include all labor, access, materials, and accessories required for the proper installation. The current quantity of deteriorated wood blocking replacement is unknown. The base bid shall include 100 board feet of wood blocking replacement. (For additional Unit Price information, refer to Unit Price item 1.1.3)

C. For miscellaneous plywood sheathing, Base Bid shall include all labor, access, materials, and accessories required for the proper installation. The base bid shall include 160 square feet of plywood sheathing. (For additional Unit Price information, refer to Unit Price item 1.1.4)

1.07 QUALITY CONTROL

A. All dimensional lumber shall be maintained and installed at a moisture content less than 19%. All lumber shall be field tested for moisture content by the Contractor. Contractor shall submit test results of each board to Engineer for approval prior to roofing or flashing installation.

1.08 DIMENSIONS AND QUANTITIES

A. All dimensions and quantities shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the time of construction. The Contractor is advised to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.
1.09 GUARANTEES

A. Upon completion of the work, and prior to final payment, the Contractor shall submit a Guarantee of his work to be free from defect in materials and workmanship. This Guarantee shall be for a period of three (3) years from the date of Substantial Completion, and shall be signed by a Principal of the Contractor’s firm, and sealed if a corporation.

PART 2 - MATERIALS

2.01 DIMENSIONAL LUMBER

A. All dimensional lumber for roofs shall be construction-grade, pressure-treated, Southern Yellow Pine No. 2 or better, formed as required for proper installation of the new work.

B. All new exterior perimeter woodwork, nailers, and wood blocking used on the building shall be minimum 6"-wide, except where otherwise detailed.

C. All roof woodwork shall be kiln-dried after treatment (KDAT) with a maximum moisture content of 19% by weight on a dry weight basis.

2.02 PLYWOOD

A. Plywood for use at the sloped perimeter roof shall be APA Rated Sheathing, Grade CD, Exterior, minimum 5/8" thick. Pressure-treated plywood will not be permitted.

B. Plywood for other areas shall be APA Rated Sheathing, Grade CD, Exterior, pressure-treated, minimum 1/2" thick or as required to match existing thicknesses, unless designated otherwise on the detail drawings.

2.03 FASTENERS AND ANCHORS:

A. In general, all fasteners, anchors, nails, straps, and other accessories shall be of stainless-steel Series 300 or galvanized steel as amended below. Galvanizing shall be hot dip in accordance with ASTM A153 Specifications G-185. Electro-galvanized items shall not be used.

B. Stainless-steel fasteners shall be Type 304/316.

C. Fasteners for securing plywood and wood blocking to wood blocking shall be stainless-steel annular threaded-ring shank nails. Fasteners shall be of sufficient length to penetrate the receiving member 1-1/4" minimum, except full depth into plywood.

D. All nails shall be stainless-steel, annular ring nails. Nails shall be sized as required for system attachment including 8d (minimum 0.131" diameter by 1-1/2" long), 10d
(minimum 0.148 diameter by 3” long), and 16d (minimum 0.162” diameter by 3-1/2” long).

E. Fasteners for securing wood blocking to masonry substrates shall be one piece and minimum 1/4” diameter self-tapping threaded fasteners as manufactured by the Star Fasteners, Tapcon, Olympic Manufacturing Group, Powers Fasteners Company.

F. Fasteners for securing wood blocking to structural steel shall be FM Global Approved Heavy Gauge Self-Drilling Self-Tapping Screws with Drill Point #5.

2.04 HIGH TEMPERATURE BATT INSULATION

A. Unfaced Mineral Wool BATT Insulation: ASTM C 665, ASTM E 136, Type I, Non-combustible, Flame Spread = 0, Smoke Developed = 0.

PART 3 - EXECUTION

3.01 GENERAL

A. Prepared surfaces must be clean and dry. Fill, chip, or grind as required to provide a smooth, uniform surface.

B. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.

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

D. Refer to FM Data Sheet 1-49 concerning fastener spacing requirements for perimeter blocking anchorage. All anchors and fasteners that attach wood blocking to the structure shall have their spacing halved in corner zones. The corner zones are defined by a 13’x13’ area at exterior corners of the perimeter. Maximum fastener spacing shall be 2’ on-center and 1’ on-center within the corner zone.

E. All butt joints in woodwork shall be flush to provide a smooth, uniform line with no irregularities. Built-up blocking shall have butt joints staggered 4’ minimum layer to layer. The minimum length of any individual piece of woodwork shall be 2’. All lengths of woodwork shall have a minimum of four (4) fasteners. Layers of wood blocking at corners shall be interlocked to provide additional stability.

F. During removal and replacement of woodwork, the Contractor shall report to the Engineer any existing wood blocking designated to remain, or structural supports which are deteriorated or unsuitable. Do not cover unacceptable areas until reviewed by the Engineer, but provide temporary protection to the area in question.
G. The perimeter wood blocking shall be installed at a consistent, even height throughout that roof area(s) to provide a flush transition from insulation to blocking and provide an even and continuous line for metal fascia installation.

3.02 REMOVAL OF WOOD BLOCKING

A. Remove and dispose of all deteriorated wood blocking and all blocking scheduled to be removed and replaced in accordance with the Contract Drawings and this Specification.

B. During removal and replacement of woodwork, the Contractor shall report to the Owner and Engineer any existing wood blocking designated to remain which is deteriorated or unsuitable. Do not cover unacceptable areas until reviewed by the Engineer, and provide temporary protection to the area in question.

3.03 ROOF PERIMETER BLOCKING

A. At roof perimeters, the wood blocking and plywood shall be installed as detailed. Provide 6" nominal wide blocking at roof perimeters unless otherwise detailed. Provide full-width blocking at tops of parapets.

B. Existing wood blocking and curbs may be required to be cut back or trimmed to provide an even flush assembly as shown on the Detail Drawings. This shall be accomplished with power or hand tools. Should cutting of existing components reduce or eliminate securement of their components, the Contractor shall re-secure with the appropriate fasteners.

3.04 FASTENING OF WOODWORK

A. Wood blocking to wood blocking connections shall be made using the specified nails spaced 12" on-center maximum and staggered off the centerline of the woodwork being secured. Nails shall be of sufficient length to penetrate the receiving member 1-1/4" minimum.

B. Predrilling of fastener holes at concrete deck areas will be required prior to installing fasteners. Existing blocking scheduled to remain shall be re-secured with the appropriate fasteners spaced 24” on-center and 1’ on-center within the corner zone for each roof area.

C. Plywood shall be fastened to vertical concrete or masonry, surfaces with the specified fasteners spaced 8” on-center vertically and horizontally.

3.05 UNIT CURBS

A. Wood blocking shall be installed to provide curbs to support units as required to raise units 8” minimum above the roof surface, and to provide a smooth flashing transition between the insulation systems and curb unit.
B. Mechanical and electrical work requiring extension to raise and support units shall be completed by licensed tradesmen.

3.06 CLEAN UP

A. Site clean-up shall be complete and performed daily to the satisfaction of the Owner. Roof, building (interior and exterior), hardscape, and adjacent areas shall be cleaned of all trash, debris, and dirt caused by, or associated with, the work.

B. All trash and debris shall be completely removed from the site daily during the work and at the completion of the work. All debris shall be legally disposed of off-site.

END OF SECTION
PART 1 - GENERAL

1.01 IN GENERAL

The General Conditions and all parts of the Bid and Contract Documents are made part of this Section as if fully repeated herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

A. Section 01 03 01 – Available Information - Gale Evaluation Report
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E. Section 01 23 13 – Supplemental Bids
F. Section 01 50 00 – Temporary Facilities and Site Maintenance
G. Section 01 65 00 – Product Delivery, Storage, and Handling
H. Section 01 70 00 – Project Closeout
I. Section 02 41 00 – Selective Demolition
J. Section 03 30 00 – Concrete Restoration
K. Section 04 50 00 – Masonry Restoration
L. Section 06 10 00 – Rough Carpentry
M. Section 07 51 00 – Elastomeric Membrane Restoration
N. Section 07 62 00 – Flashing and Sheet Metal Roofing
O. Section 22 22 22 – Roof Drains
P. Section 23 00 00 – HVAC
Q. Section 26 00 00 – Electrical
R. Section 26 41 00 – Lightning Protection

1.03 SUMMARY OF WORK:

This Section specifies requirements for the following Scope of Work:

A. Roof system to be installed shall be in compliance with Factory Mutual FM 1-105 in the field, FM 1-165 at perimeters, and FM 1-225 at corners, as defined in FM Data Sheet 1-28R.

B. Roof perimeter zones shall be defined by a minimum 13'-wide strip at the roof edge. The corner zones are defined by a minimum 13' by 13' area at exterior corners of the perimeter.

C. Proposed roofing system shall have a UL Class A fire rating.

D. Proposed roofing system shall have a FM Global Class SH hail rating.

E. Submit a phasing plan and schedule for removal and installation. Refer to Section 01 12 16 Work Sequence for additional information.
F. Coordinate roofing removals and installation with areas of deteriorated concrete roof decking. Provide temporary roofing and protection as required to affect deck repairs prior to installation of new roofing system.

G. Perform a survey of the existing top of deck to coordinate existing slope with proposed tapered insulation plan.

H. Supply all necessary chutes, disposal facilities, transportation, and labor necessary to dispose of all demolished materials, dirt, and debris off-site in a legal dumping area. The Contractor shall obtain all permits necessary to transport and dispose of all materials, rubbish and debris.

I. Remove, protect, and/or store all equipment and assemblies to be reinstalled. Coordinate with mechanical specifications.

J. Clear roof surfaces of debris by sweeping and vacuuming methods as required to remove debris from the roof deck surface.

K. Perform removals in accordance Section 02 41 00 Selective Demolition to prepare substrates for new roofing and flashings.

L. Coordinate installation of wood blocking at roof penetrations and roof perimeters, as required to properly terminate the new roofing and flashing systems and match insulation heights.

M. Install a 2-ply vapor retarder/temporary roof. Temporary roofing will not be allowed above critical areas. Install complete roof system above critical areas on a daily basis.

N. Provide a fully adhered multi-layer flat stock insulation system with adhered coverboard, including tapered insulation.

O. Provide fully adhered elastomeric roof membrane and flashing system over properly prepared surfaces.

P. Strip in all field membrane seams with 6"-wide uncured flashing membrane or as required to achieve the 30-year warranty.

Q. Install membrane flashings at expansion joints, vent pipes, unit curbs, and roof perimeters.

R. Install protection membrane and oil containment system at crank case vent penetrations. Extend protection membrane onto penetrations, curbs, base flashings, drain sumps, crickets, etc.

S. Coordinate the installation of new primary and overflow drain assemblies.

T. At existing, “future” curbs to remain, install new roof system over the existing cover.
U. Reinstall existing walkway pavers on new membrane manufacturer’s walkway pads.

V. Coordinate and schedule FMG representative inspections.

W. Arrange and pay for third-party, FM1-52 negative-pressure uplift testing as part of the project’s final acceptance.

X. Clean and restore all areas affected by the work.

1.04 JOB CONDITIONS:

A. This building houses critical infrastructure for campus operations and life safety communications. The Contractor will provide the greatest level of care in protecting these vital areas and systems during construction. Contractor will need to be on call 24/7 to respond to any issues arising from these construction activities, to remedy issues immediately. CCSU will back-charge the Contractor for any emergency measures undertaken to correct field deficiencies.

B. Weather must be considered both in short and long-term schedule approach. By undertaking this project, the Contractor understands that they will need to install the roof systems as required by the documents and manufacturer’s requirements. The Contractor will need to consider the approaching fall/winter weather. No extra costs will be considered due to cold (or otherwise adverse) weather conditions. Contractor will incorporate all provisions necessary to complete the work prior to September 26, 2018. This includes overtime, temporary heat, temporary protective measures, and any other aspects required to execute work.

C. Take all necessary precautions regarding worker health and safety when using solvents, adhesives, and hot asphalt and occupant health and safety when using adhesives and solvents near fresh-air intakes.

D. Store flammable liquid and materials away from open sparks, flames, and extreme heat.

E. Comply with all OSHA requirements for construction. It is the roofing contractor’s responsibility to comply with all state, federal, and local codes, guidelines, and safety requirements.

F. FM Global Form 2688, Application for Acceptance of Roofing System shall be used to determine FM approval of the entire roof system. Contractor to complete and submit form to FM Global for review and acceptance prior to procurement of roof materials. Copy Engineer on submission to FMG.

G. All surfaces to receive new insulation, membrane, or flashings shall be thoroughly dry. Should surface moisture such as dew exist, the Contractor shall provide the necessary equipment to dry the surface prior to application. No open flames shall be permitted on the roof at any time.
H. Phased work is not allowed at critical areas identified on the Contract Drawings. Excluding critical areas, the Contractor shall remove only as much roofing, flashing, and associated components and other exterior waterproofing components as can be made water tight in a given day’s work, including all flashings and associated components.

I. Should unforeseen conditions be encountered, the Contractor will be responsible for temporary protection and weather tightness until a solution is determined by the Engineer and implemented by the Contractor.

J. Cover sidewall areas with canvas tarps where existing roof system is discarded into refuse containers via trash chutes. Plastic or "poly" tarps shall not be used. Do not cover or block air intake or discharge louvers.

K. Remove the plastic packaging for the insulation and cover boards immediately upon receipt of delivery. Failure to remove the plastic packaging may result in entrapment of condensation or moisture. If the boards are stored outside they must be stored level, off the ground, and protected by a breathable waterproof cover. A means for air circulation around and under stored bundles should be provided. The cover boards should not be installed during rain, heavy fog, and any other conditions that may deposit moisture on the surface. The presence of free moisture can have a detrimental effect on the performance of the insulation and the installation of the roof membrane allowing adhesive not to dry properly ultimately leading to a roof failure. Do not install any cover boards exposed to moisture during this project.

L. Ensure roof insulation boards are set on pallets or dunnage and are protected from the weather and sunlight prior to installation. Do not allow plastic to cover the insulation as it can allow condensation. A breathable material such as canvas is recommended. Do not install any insulation exposed to moisture during this project.

M. Equipment required to hoist materials to the roof and remove debris from the roof shall be supplied, maintained, and operated by the Contractor.

N. Remove rubbish and debris from the project site daily; do not allow accumulations inside or outside the buildings.

O. Fire suppression equipment will be readily available on the rooftop whenever combustible roofing material is being handled. Protect against fire and flame spread at all times.

P. Roofing contractor will establish a safety plan and rooftop evacuation procedures and brief his personnel on appropriate emergency actions.

Q. The Contractor shall provide protection of entrance ways, sitework, plantings, landscaping, building surfaces, and similar items to protect from damage. Items
damaged as a result of the work in this section shall be repaired or replaced by the Contractor to the satisfaction of and at no additional cost to the Owner.

1.05 HOT WORK PROCEDURES

A. A HOT WORK Permit is required for any operation that involves open flames or producing heat and/or sparks. This includes, but is not limited to: brazing, cutting, grinding, soldering, torch applied roofing, and welding.

B. Fully charged, inspected, and approved fire extinguishers shall be on site at all times. No cutting, grinding, or welding of any kind shall proceed without an approved fully charged fire extinguisher.

C. Make sure construction in the area is non-combustible including insulation.

D. Remove combustible contents or cover with FM approved blankets or pads.

E. Follow procedures outlined under FM Global Resources ‘Don’t Get Burned by Hot Work’ and ‘Hot Work Permit Form – F2360’

F. Torch applicators must be authorized by Certified Roofing Torch Applicator program (CERTA) in the safe use of roofing torches, the proper use of personal protective equipment, and first aid procedures specific to torching activities. Applicators are to carry their CERTA identification cards on their person when using torches.

1.06 SUBMITTALS

A. A sample roofing system warranty and letter of confirmation from the roof membrane manufacturer stating that the Contract Documents have been reviewed and that there are no exceptions to the Specifications and Contract Drawings shall be submitted.

B. Provide a letter of approval from the insulation manufacturer and membrane manufacturer that the proposed insulation system will achieve the specified warranty.

C. FM Global Form 2688 and Roof Nav No. for selected roof systems.

D. Provide the manufacturer’s product and installation literature for approval, including manufacturer’s standard details. Include shop drawings for project specific details.

E. Provide documentation indicating that the Contractor is a Certified Installer of the materials to be used.

F. Contractor’s proposed phasing of roof removals and installations, coordinated with a project schedule.

G. Tapered insulation plan and cross section shop drawings.
H. Shop drawings and Test Areas in accordance with Section 07 62 00 Flashing and Sheet Metal Roofing.

I. Submit CERTA qualifications for torch applicators.

1.07 WARRANTY

A. Roofing Systems Manufacturer’s Warranty: The roofing manufacturer shall guarantee roof areas to be in a watertight condition and free from blistering, seam separation, and the delamination of the roofing system components, for a period of **30 years, from the date of Substantial Completion** of the roofing system. The warranty shall be a **30-year no dollar limit, non-prorated total system labor and material warranty**, for wind speeds up to **90 miles per hour**. The total system warranty shall include all roofing materials, related components, and accessories including, but not limited to the vapor retarder, insulation board, cover board, roofing membrane, membrane flashings, fasteners, adhesives, and termination metals, and roof drain assemblies. The manufacturer shall repair leaks and defects, in materials, and workmanship as promptly after observation as weather and site conditions permit.

B. Upon completion of the work, and prior to final payment, the Contractor shall submit a Guarantee of his work to be free from defect in materials and workmanship. This Guarantee shall be for a period of **three (3) years from the date of Substantial Completion**, and shall be signed by a Principal of the Contractor’s firm, and sealed if a corporation.

C. Maintenance: Along with the issuance of the warranty, a set of instructions shall be included detailing preventative maintenance requirements on the part of the building owner and noting a list of harmful substances, which may damage the roofing membrane.

D. Identification Plate: at the completion of the job, mount an identification plate in a visible location at the point of the roof access. Fabricate plate of durable material such as 1/8” routed melamine plastic or 18-gauge stamped metal with the following information:
   1. Contractor’s name and address.
   2. Contractor’s telephone number to be called for emergency or maintenance.
   3. Dates of Contractor’s maintenance agreement for all roofs.
   4. Name and dates of manufacturer’s guarantee for all roofs.

1.08 DIMENSIONS AND QUANTITIES

All dimensions and quantities shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the time of construction. The Contractor is advised to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.
1.09 QUALITY ASSURANCE

A. Factory Mutual Inspections: Contractor shall coordinate and schedule inspections by a Factory Mutual Global representative at the start of roofing installation, interim in-progress, and at substantial completion, a minimum of three (3) visits.

B. Acceptable Products: Provide primary roofing products, including each type of sheet, all manufactured in the United States, supplied by a single manufacturer, which has been successfully producing the specified types of primary products for not less than 10 years. Provide secondary or accessory products, which are acceptable to the manufacturer of the primary roofing products.

C. Project Acceptance:
   1. Submit a completed manufacturer’s application for roof guarantee form along with shop drawings of the roofs showing all dimensions, penetrations, and details. The form shall contain all the technical information applicable to the project including deck types, roof slopes, base sheet, and/or insulation assemblies (with method of attachment, and fastener type), and manufacturer’s membrane assembly proposed for installation. The form shall also contain accurate and complete information requested including proper names, addresses, zip codes and telephone numbers. The project must receive approval, through this process, prior to shipment of materials to the project site.
   2. FM Global Form x2688 completed by the Contractor and approved by FM Global should be included as part of the project acceptance.

D. Scope of Work: The work to be performed under this specification shall include but is not limited to the following: Attend necessary job meetings and furnish competent and full-time supervision, experienced roof mechanics, all materials, tools, and equipment necessary to complete, in an acceptable manner, the roof installation in accordance with this specification. Comply with the latest written application instructions of the manufacturer of the primary roofing products. In addition, application practice shall comply with requirements and recommendations contained in the latest edition of the Handbook of Accepted Roofing Knowledge (HARK) as published by the National Roofing Contractors Association, amended to include the acceptance of a phased roof system installation.

E. It will be the responsibility of the roofing contractor to initiate and maintain a QC program to govern all aspects of the installation of the Membrane Roofing System. The project foreman and or supervisor will be responsible for the daily execution of the QC program.

F. If inconsistencies in the quality of the installation are found, all work shall cease until corrective actions are taken to ensure the continuity the installation.

G. The roofing contractor shall maintain an adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts, and who are completely familiar with the specified requirements and methods necessary for the proper performance of the work. No allowance will be made for lack of skill on the
part of the workers. Roofing contractor’s key personnel shall have received training by the membrane manufacturer.

H. Roofing system shall be installed in accordance with the most current guide specifications and details as amended and/or authorized by the membrane manufacturer for specific project requirements.

I. Any deviations from contract, drawings and/or specifications must be submitted in writing for approval prior to implementation to the design professional representing the Owner and the MRSM for acceptance / approval by both parties. Unauthorized deviations may subject the roof system to warranty ineligibility.

J. Any and all work found to be substandard or in violation of the Contract Documents or Manufacturer’s Specifications shall be subject to rejection including complete removal and replacement with new materials at the expense of the Contractor.

K. Upon completion and certification by the Contractor that a quality installation has been completed in accordance with the approved contract specifications and all field welds have been probed and inspected, the Contractor shall arrange for a quality assurance / warranty inspection by Technical Service Department of the approved MRSM for acceptance and approval. All field seams must be available for inspection. Notice of the inspection date and time will be given to the Owner / Owner’s representative at least 72 hours prior to the inspection taking place.

L. The Contractor should coordinate and pay for wind uplift testing of the roof assembly per FM 1-52. Acceptance of the new roofing assembly by FM Global is achieved by satisfactory completion of an uplift test. Owner and Engineer should be present during testing. Contractor must be present at time of testing to make watertight any destructive test areas. Testing agency must be selected from DAS list of qualified firms and must have experience with FM 1-52 uplift testing.

M. FM Global Form x2688 “Contractors Application and Acceptance of Roofing System” is to be completed by the Contractor should be included as part of the project acceptance prior to procurement of materials.

1.10 COORDINATION

A. Prior to installation of materials, a pre-roofing conference should be held with the roofing, communications, mechanical/electrical, lightning protection contractors, and Owner/Owner Representative to discuss the specified roofing system, coordinate its proper application and the expectations of all parties involved. The authorized roofing contractor and the Owner/Owner Representative shall notify all parties a minimum of fourteen days prior to the meeting.

B. Plan and coordinate the installation of the roofing system with other trades in such a manner to avoid membrane damage, keeping the complete installation weather tight and in accordance with all approved details and warranty requirements.
PART 2 - MATERIALS

The products specified herein are basis of design and are subject to change based on the selected manufacturer's assembly letter and requirements the meet the specified warranty.

2.01 ROOFING AND FLASHING MEMBRANES

A. EPDM Roofing Membrane: ASTM D 4637, Type I non-reinforced such as:
   1. Manufacturers: Subject to compliance with requirements, provide products by the following manufacturers:
      a. Carlisle SynTec Incorporated – Sure Seal
      b. Firestone Building Products Company – RubberGard Platinum LSFR
      c. Versico Roofing Systems Inc. – Versagard
   2. Thickness: 90 mils, nominal.
   3. Exposed Face Color: Black

B. The elastomeric sheet membrane shall have the following minimum properties and conform to ASTM D 4637 – Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane, Type I:

<table>
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<th>SPECIFICATIONS</th>
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<td>Tolerance on Nominal Thickness, %</td>
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<td>+/- 10</td>
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<tr>
<td>Tensile Strength, min, psi (Mpa)</td>
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<td>Elongation, Ultimate, min, %</td>
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<td>Tear Resistance, min, lbs/in (kN/m)</td>
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<tr>
<td>Factory Seam Strength, min</td>
<td>Modified ASTM D 816</td>
<td>Membrane Rupture</td>
</tr>
<tr>
<td>Resistance to Heat Aging Properties after 4 weeks @ 240°F (116°C)</td>
<td>ASTM D 412</td>
<td>1415</td>
</tr>
<tr>
<td>Tensile Strength, min, psi (MPa)</td>
<td>ASTM D 412</td>
<td>250</td>
</tr>
<tr>
<td>Elongation, Ultimate, min, %</td>
<td>ASTM D 624</td>
<td>180</td>
</tr>
<tr>
<td>Tear Resistance, min, lb/in (kN/m)</td>
<td>ASTM D 1204</td>
<td>&lt;1.0%</td>
</tr>
<tr>
<td>Linear Dimensional Change, max, %</td>
<td>ASTM D 1149</td>
<td>No Cracks</td>
</tr>
<tr>
<td>Ozone Resistance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition after exposure to 100 ppm</td>
<td>ASTM D 471</td>
<td></td>
</tr>
<tr>
<td>Ozone in air for 168 hours @ 104°F (40°C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specimen is at 50% strain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brittleness Temp., max deg. F (deg. C)</td>
<td>ASTM D 746</td>
<td>-49</td>
</tr>
<tr>
<td>Resistance to Water Absorption</td>
<td>ASTM D 471</td>
<td>1.5%</td>
</tr>
</tbody>
</table>
C. Factory fabricated membrane seams shall be step tapered to achieve a smooth transition across the seam. Seams shall be vulcanized.

D. Flashing membrane to be used at corners of walls or penetrations shall be of the same manufacturer as the roof membrane and shall be 0.060” thick uncured elastomer completely compatible with all other components used in the new roofing system. Cured membrane specified in 2.01B shall be used at straight flashing runs. **Seams shall be stripped-in with uncured membrane. Color to match the field roof membrane**

E. All materials and accessories used to install the roofing and flashing membrane systems shall be of the same manufacturer as the sheet membrane. These materials include, but are not limited to, the following:
1. Surface cleaners and primers
2. Bonding adhesive
3. Splicing cement
4. Lap Sealant
5. Water Cut Off Mastics
6. Caulking and sealants
7. Pipe seals
8. Walkway Pads
9. Membrane termination strips, bars, plates, and fasteners
10. Prefabrication flashing components
11. T-Joint membrane patches

F. All membrane manufacturer’s required details shall be considered a part of this project and incorporated into the project details by the Contractor.

G. The roof system and components shall be acceptable for an FM 1-105, FM 1-165 (perimeter), FM 1-225 (corner) ratings, a UL Class A rating and the membrane manufacturer’s Warranty.
2.02 ROOF PROTECTION MEMBRANE

A. Membrane for the crankcase vent protection area shall be:
   1. A non-reinforced, polymer-based elastomeric overlayment membrane that is compatible with the EPDM roof membrane and offers increased resistance to hydrocarbons, solvents, grease, and oils.
   2. Basis of design is a 60-mil thick polyepichlorohydrin membrane.
   3. Coordinate with Section 07 62 00 Flashing and Sheet Metal for oil containment system.

2.03 VAPOR RETARDER/TEMPORARY ROOF

A. Torch-applied vapor retarder shall meet the following criteria:
   1. A high-performance, specially oxidized, heavy-duty Modified Bitumen Sheet conforming to ASTM D5147 that is torch applied to the acceptable concrete substrates. Membrane must be approved for use as temporary roofing and short-term UV exposure.
   2. Minimum thickness shall be approximately 125 mils and weigh approximately 85 pounds per square.
   3. High-quality asphalt solvent blend primer for application to concrete and metal surfaces prior to installation of the temporary roof membrane shall be provided by the selected temporary roof membrane manufacturer.
   4. Temporary flashings shall be a fluid-applied, seamless, fully reinforced waterproofing system installed between the perimeter walls, roof penetrations, curbs, and the like, flashed onto the temporary roof membrane to provide a continuous watertight temporary roof membrane.

2.04 ROOF INSULATION

All roof insulations proposed for this project shall be approved in writing by the membrane manufacturer for use with their membrane and as required to achieve the required roofing warranty.

A. Flat Stock and tapered polyisocyanurate insulation shall be skinned with factory-applied fiberglass glass mat felt as supplied by the membrane manufacturer as required to meet membrane manufacturer’s and FM Global requirements.
   1. The polyisocyanurate insulation shall have a minimum aged R-Value of 5.7 per inch as required to meet the Long Term Thermal Resistance (LTTR) value in accordance with ASTM C518.
   2. Provide multilayer flat stock insulation to achieve 4.5” total thickness. The minimum flat stock insulation thickness shall be 2” for the field of the roof.
   3. Tapered insulation shall be as required to provide a minimum 1/2” per foot slope to drain for field insulation and at insulation crickets and 1/2” per foot at drain sumps.
   4. The insulation board shall be adhered to the substrates utilizing the roofing manufacturer’s recommended adhesives.
   5. The polyisocyanurate insulation board shall conform to ASTM Specification C 1289, Type II, Class 1, Grade 3 (25 psi minimum).
6. Adhered polyisocyanurate insulation board size shall be 4’ x 4’ square and of uniform dimension.
7. Insulation fillers shall be of the thickness required to match surrounding insulation when step tapering tapered edge strips.
8. Polyisocyanurate insulation shall be approved in writing by the roofing membrane manufacturer that the methods of attachment are covered under the membrane manufacturer’s labor and material warranty. Copies of the written acceptance shall be forwarded to the Engineer.

B. Wood fiberboard insulation for use as tapered edge strips under cover boards:
1. Fiberboard shall be high-density; non-asphalt impregnated and conforms to ASTM C208-95 specifications.
2. Tapered edge strips shall be 12” or 18”-wide and 1-5/8” thick, tapering to a feathered edge.
3. Fiberboard insulation shall be approved in writing by the membrane manufacturer. A copy of the written acceptance shall be forwarded to the Engineer.

2.05 COVERBOARD

A. Adhered cover-board insulation shall be 1/2”-minimum thick, high-density polyisocyanurate or cement board as required to satisfy FM Global RoofNav assembly and obtain the manufacturer’s warranty. Wood fiber or gypsum cover boards will not be accepted. The boards shall be a maximum of 4’ x 4’ in size and conforming to FM 4450 and FM 4470. Boards shall be square with uniform thickness and dimensions. The board shall be approved in writing by the membrane manufacturer for the specified warranty and to meet Factory Mutual RoofNav approvals. A copy of the written acceptance shall be forwarded to the Engineer.

2.06 COLD ADHESIVE FOR COVERBOARD AND INSULATION SECUREMENT

A. Adhesive to adhere the cover board system shall be a two-component, cold-process, asbestos-free, low-rise polyurethane foam adhesive conforming to ASTM D276, D2556, D1875, D429, D816, D1876, D412. Adhesive and ribbon spacing shall meet FM 1-60 rating, with enhancements in corners and perimeter zones and shall be approved in writing by the membrane manufacturer and included as part of the warranty coverage and FM Global approvals. Proper cold-weather application processes shall be used as required by the manufacturer.

2.07 FASTENERS

A. In general, fasteners, straps, and other hardware shall be copper, brass, stainless steel, or galvanized steel. Galvanizing shall be hot dip in accordance with ASTM A153 specifications. Electro-galvanized items shall not be used.

B. All accessories, including, but not limited to nails, screws, clips, fastening strips, etc. shall be completely compatible with the material being fastened to prevent galvanic reaction and premature deterioration.
C. Nails for membrane termination shall be stainless-steel, large head (3/8”) annular ring roofing nails of sufficient length to penetrate the wood blocking 1-1/4” minimum.

D. Nails for flashing securement at wood substrates shall be No. 12 Stubbs gauge, large head, threaded shank, stainless-steel nails, of sufficient length for 1-1/4” embedment.

E. Fasteners for terminating roof membrane and flashing at masonry substrates shall be minimum 1-1/2” long by 1/4” diameter removable stainless-steel drive pins in zinc sheaths. Embedment into substrate shall be 1-1/4” minimum.

F. Secure insulation to steel deck with 3” diameter, galvanized plates and no. 14 heavy duty self-drilling, self-tapping fasteners with corrosion resistant coating.

2.08 BONDING ADHESIVE

A. Manufacturer's standard bonding adhesive meeting State of Connecticut Low-VOC regulations and FM Global assembly requirements.

2.09 SEALANT AND ACCESSORIES

A. Sealant required incidental to concealed sheet metal, flashing and roofing work shall be butyl rubber based non-skinning sealant.

B. Sealant for use at all exposed locations shall be a two-part urethane conforming to ASTM C 920, Type M, Grade NS, Class 25, Uses NT, M, A, and O, such as NP-II by Sonneborne, Dymeric 240 FC as manufactured by Tremco, Dynatrol II by Pecora, or approved equal.

PART 3 - EXECUTION

3.01 GENERAL WORKMANSHIP

A. Do not deliver to site or install any material or system that has not been approved. Materials installed without approval may be required to be removed.

B. The prepared roof deck surface must be dry, clean, and smooth. All loose, poorly adhered, or deteriorated materials shall be removed prior to installing the new insulation. Personnel shall be free of bitumen contaminants when installing the new roof membrane. Provide dryers, if necessary, to dry deck surfaces prior to installing new work. Open flame devices shall not be used.

C. Maintain temporary protection of the new and existing roof system. The roof system will be cleaned to the satisfaction of the Owner and Engineer prior to final payment. All areas of stained membrane will be cut out and replaced at no additional cost to the Owner. Multiple patches in close proximity will not be acceptable and will require one large patch.
D. Comply with the manufacturer’s written instructions and these Specifications for all renovations and associated work.

E. Flashings shall be installed along with the membrane to assure weather tight termination.

F. Partial or unmarked cans or rolls of materials cannot be used.

G. Handle materials to prevent damage to building components and project site areas.

H. Do not cut or dilute any material unless approved by the Engineer in writing prior to use.

I. Keep covers tightly sealed on all canned and evaporative products to prevent premature curing.

J. Do not store rolls of membrane or flashings on the roof without the written consent of the Designer and Owner’s representative.

K. The Contractor is cautioned to investigate all existing conditions and materials of construction.

L. Restrict traffic on completed roof areas. Coordinate work to prevent trafficking by working toward roof edges and access ways. Should access to completed roof areas be necessary, provide protection for trafficked areas.

M. Do not apply primer or adhesive during inclement weather, when temperature is below 40° F, or when materials are above or below specified application temperatures.

N. Do not place EPDM in contact with incompatible materials, such as asphalt roof cement, asphalt-based membranes, oil, creosote, or penta-based materials.

3.02 DECK PREPARATION

A. Allow moist deck sections to dry prior to application of roof insulation. Open flames are strictly prohibited from the roof areas.

B. Ensure that deck surface is clean of all debris and roofing materials.

C. Coordinate with Section 03 30 00 Concrete Restoration for deck repair requirements.

3.03 VAPOR RETARDER/TEMPORARY ROOF

A. Pre-treat perimeter and projection details. Properly seal all curbs penetrations and perimeter, prior to application of the vapor retarder.

B. The temporary roof membrane shall be torch applied over broomed, vacuumed, and primed concrete roof-deck surfaces. Asphaltic primer shall be used over the concrete roof deck.
C. Flash the temporary roof membrane into temporary drain sleeves and onto penetrations, perimeters, and rising walls with the specified flashing materials, terminating, and mechanical attachment.

D. The temporary roof and flashings shall be watertight on a daily basis. Drains shall be functional at all times.

E. Temporary roofing is not allowed above critical areas. Complete removal and installation of roof system on a daily basis.

F. Provide temporary water stops at the limits of existing and/or new roofing.

3.04 INSTALLATION OF INSULATION SYSTEM – (ADHERED)

A. The multi-layered polyisocyanurate insulation and cover board system shall be installed on properly prepared clean, dry surfaces.

B. Comply with membrane roofing system manufacturers and FM Global written instructions for installing roof system. Insulation boards shall be free of defects including but not limited to, broken corners, improperly adhered facers, excessive moisture, dimensional irregularities, and the like. Defective insulation boards shall be marked and immediately removed from the site.

C. Allow moisture on roof and insulation surfaces to dry prior to application of insulation. Open flames are strictly prohibited from the roof areas. Ensure that roof surfaces and joints are clean of all debris.

D. Install the insulation boards atop the properly installed base sheet. Stagger all end joints to the middle of the long dimension of adjacent insulation boards and stagger insulation layer to layer.

E. The minimum dimension on cut insulation boards shall be 12” with a minimum surface area of 2 square feet. Maximum size of adhered insulation is 4’x 4’. Only full-sized insulation boards shall be used at roof perimeters and corners.

F. All insulation boards shall be installed tightly butted to adjacent insulation, roof to walls, or wood blocking. If gaps greater than 1/8” exist between boards the board shall be cut out and replaced.

G. Both layers of insulation board shall utilize cold adhesive for system attachment. Install the insulation boards atop the properly prepared vapor retarder and apply the adhesives as recommended by the adhesive manufacturer. Upon installation of the insulation boards, immediately “walk” the insulation into place to spread the adhesive for maximum contact.

H. Ballast the boards to prevent cupping until adhesive set is achieved. Redistribute ballast to ensure full bonding of the system. Poorly adhered insulation shall be removed and replaced at no additional cost to the Owner.
I. Remove a section of newly installed insulation board to confirm adhesion to the prior layer of insulation. The Contractor shall have the manufacturer’s representative on site at the start of construction to confirm application rates and compatibility of the products.

J. Construct tapered insulation where shown on the Contract Drawings as required direct all run-off water to roof drainage. Set tapered insulation in cold adhesive prior to setting cover boards, or as otherwise required by the roof membrane manufacturer to maintain the specified warranty.

K. Utilize fiberboard tapered edge strips and polyisocyanurate fillers to match insulation thicknesses as needed.

3.05 COVERBOARD INSTALLATION

A. Install cover board in cold adhesive applied in strict accordance with the adhesive manufacturer’s printed installation instructions to achieve the required warranty.

B. Cover board shall be adhered at 12” on center in the field and 6” and 4” at the perimeters and corners, unless otherwise noted by FM Global.

C. Install the cover board and immediately “walk” the system into place to spread the adhesive for maximum contact. Stagger all end joints to the middle of the long dimension of adjacent boards, 24” minimum. Continue to “walk” the cover board every 5 to 7 minutes until firm adhesion is achieved.

D. Ballast the boards to prevent cupping. Redistribute ballast to ensure full bonding of the system. Poorly adhered cover boards shall be removed and replaced at no additional cost to the Owner.

E. Ensure that boards are fully adhered prior to application of roof membrane.

3.06 ADHERED MEMBRANE INSTALLATION

A. It is the intent of this Specification Section to provide the Owner with a new, fully adhered membrane, bonded to the insulation, of sufficient bond strength to resist FM Global 1-105 (field) uplift pressures as defined in FM Data Sheet 1-28, current edition.

B. Confirm that all cover board joints have been sealed with the recommended tape prior to the installation of the bonding adhesives.

C. Cover boards shall be swept and blown clean of all dust prior to applying bonding adhesives.

D. Refer to Section 06 10 00 – Rough Carpentry, concerning the installation of the wood blocking, nailers, and similar accessory woodwork. Confirm the proper installation of the wood blocking, nailers, and similar accessory woodwork. Be sure all loose or deteriorated bituminous substances are removed with the original...
system. Clean any items designated to remain of all remaining bitumen or cover with acceptable buffer material.

E. Install fully adhered elastomeric roofing on all roof areas designated to receive such. Install membrane system in accordance with the recommendations and requirements of the membrane materials manufacturer, as amended in these Specifications. Follow manufacturer requirements concerning application rates for cleaners, solvents, adhesives, and similar materials. The application rates for these items given in these Specifications are to be considered nominal and the actual rates will vary from manufacturer to manufacturer.

F. Position roofing membrane without stretching over the insulation. Lay sheets in a shingle fashion. Allow the membrane to relax for minimum one-half hour before bonding. Fold the sheet back onto itself so that one-half of the underside of the sheet is exposed. It is essential that the fold in the sheet be smooth, with no wrinkles or buckles, because these could cause wrinkles in the sheet during installation. Apply the bonding adhesive in accordance with the manufacturer’s published instructions to both the sheet and the substrate, using a 9" plastic-core paint roller. Apply the bonding adhesive evenly avoiding globs and puddles. Correct application of the bonding adhesive will render approximately 60 square feet per gallon of finished surface coverage. This is a contact type adhesive and includes coating for the membrane and coating on the substrate. Allow the adhesive to dry until tacky; the adhesive must not string or stick to a dry-finger touch. Roll the coated membrane into the adhesive, being careful to avoid wrinkles. Brush down the bonded half of the sheet with a push broom to achieve maximum contact. Fold back the unbonded half of the sheet and repeat the bonding procedure. No wrinkles shall be allowed in the completed application. Wrinkled sheets shall immediately be removed and replaced and not patched. Do not apply bonding adhesive in areas that are to be spliced to flashings or adjacent sheets. Apply all sheets in the same manner, lapping adjacent sheet a minimum of 6".

G. Splice adjacent sheets in accordance with the manufacturer’s written instructions using the manufacturer’s double-sided seam tapes (minimum 6” wide). Clean areas to be spliced of all talc, dirt, and other foreign substances using clean rags with manufacturer’s splice wash cleaner or other manufacturer’s recommended cleaner. Clean all seam areas at least twice in two (2) separate applications with new rags and cleaner each time. Change the rags and cleaner frequently. It is imperative that these seam areas be totally clean. Install manufacturer’s in-seam sealant to cleaned seams as recommended by the membrane manufacturer. Apply splice tape for the full width (minimum 6”) of the lap splice. **Clean the completed splice for a distance of 8” and apply 6”-wide flashing membrane over completed field splice.**

H. Press the bonded sheet firmly in place with a large foam-covered lawn roller. Fold back the remaining unbonded half of the sheet and repeat the bonding procedure.

I. The Contractor shall flash all roof drains in conjunction with the new roof system. Extend membrane 1/2” minimum inside clamping ring with a continuous full bead
of water cut-off mastic under the membrane. Ensure installation of roofing membrane will not allow for the penetration of mechanical fasteners within the central sump location.

J. Nail off membrane, after relaxing, adhering, and splicing, along all perimeters and around all flashing units. Membrane shall be nailed off with the hook strip flange along perimeters. The membrane at all flashing locations shall be nailed off 6” on center maximum with the specified roofing nails through tin discs. In areas where no metal flanges are installed (such as at roof-to-wall details), the nailing shall be reduced to 4” on center maximum. All nailing shall be held back 2” from the edge of the membrane. Vertical nailers, when used, shall be fastened 8” on center. Extend membrane behind vertical nailer and secure.

3.07 PROTECTION MEMBRANE INSTALLATION

A. Adhere protection membrane to the adhered EPDM roof membrane using low-VOC bonding adhesive.

B. Do not apply bonding adhesive within 6” of the membrane edge or the underlying membrane, to allow for application of splice tape in accordance with the roof membrane manufacturer’s requirements.

C. Apply protection membrane to all surfaces in the area indicated, including insulation crickets, curbs, drain sumps, penetrations, base flashing membrane, etc.

3.08 LIGHTNING PROTECTION

A. At each lightning protection terminal base, provide 6”x6” cured EPDM patches, adhered to the roof membrane. Secure terminals to the patches using adhesive that is compatible with elastomeric membranes.

3.09 WATERSTOPS

A. All flashings shall be installed concurrently with the roof membrane in order to achieve a watertight condition as the work progresses. Where a break in the day's work occurs in the central area of a roof, a temporary waterstop shall be constructed to provide a 100% watertight seal utilizing a raised temporary water stop. Where stopping work on the new system, maintain the stagger of the insulation joints by installing partial fillers. Seal the edge of the membrane.

B. When restarting work, remove all membrane, insulation fillers, etc. from the work area. Do not reuse any of the temporary water stop material in the new work. Cut off contaminated membrane and dispose of immediately. If inclement weather occurs while a temporary waterstop is in place, the Contractor shall provide the labor necessary to monitor the situation to maintain a water tight condition. Do not impede drainage when installing waterstops.
3.10 MEMBRANE FLASHING

All flashings shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the job progresses. No temporary membrane flashings shall be allowed without the prior written approval of the Owner. Approval, if given, will only be for specific locations on specific dates.

A. Ensure that all substrates are free from contaminate prior to the installation of the new flashing membranes. Install the manufacturer's buffer or protection sheets as required.

B. Follow the membrane manufacturer's requirements and recommendations and these specifications. Do not proceed with work until all shop drawings and submittals are reviewed.

C. Cured membrane shall be used for flashing purposes as much as practical. Uncured sheets are to be used at: inside and outside corners, seams in flashings or at any other location where forming of membrane flashings is required. Prefabricated components are to be used where practical and detailed at vent pipes, hot pipes, pitch pockets, etc.

D. Flashing sheet shall be spliced to the membrane first, and then bonded to the mating surface. Totally clean the roof membrane area to receive flashing sheet using new, clean rags and manufacturer’s splice wash cleaner. All talc, dirt, excess bonding adhesive, and other foreign material shall be totally cleaned from the roof membrane sheet. Clean all seam areas at least twice in two separate applications with new rags and cleaner each time. After cleaning, apply splicing cement to both the underside of the flashing sheet and the prepared roof membrane for a width of minimum 6”. Be sure cement is not on bonding adhesive areas.

E. Apply bonding adhesive to surface of wood, metal, masonry, or other material or surface to be flashed. Also apply bonding adhesive to flashing membrane making sure bonding adhesive is not applied to splice area of flashing and using longest possible lengths of flashing membrane. Apply bonding adhesive using rollers or brushes 100% to all surfaces at a smooth, uniform rate, free of holidays, light spots, globs, or similar irregularities, all at the manufacturer’s application rate. Allow two surfaces of adhesive to dry to a tacky condition, such that adhesive does not stick or string when touched with a dry finger.

After bonding adhesive has set on both surfaces, roll flashing onto surface carefully to prevent wrinkles, fishmouth, bridging or similar flaws. Unless otherwise detailed, top of membrane flashings must be minimum 8” above the surface of the roof membrane, 3” minimum above the bottom of metal counterflashings, and minimum 3” past the limits of nail heads or other fasteners. Membrane flashings shall extend the full width of horizontal metal flashing flanges (i.e., gravel stops). After setting, roll membrane into place using a 2”-wide steel roller and heavy hand pressure. Roll 100% of the surface to assure total adhesion with no wrinkles or bridging. After rolling, splice vertical or side
l laps of flashing sheet using minimum 6” wide splices and splicing cement. After applying splicing cement to both mating surfaces of the flashing sheet vertical laps and allowing it to become tacky, roll splice in place as described above.

F. Install membrane securement disks and fasteners into structural deck(s) or vertical walls at the base of penetrations. Securement disks and fasteners may be required by the membrane manufacturer at the base of tapered edge strips, ridges, or other transitions. Contractor to comply with manufacturer’s requirements if more stringent than these specifications.

G. Inside and outside corners and other changes in direction of flashing sheets shall not be butt-type splices at the point of direction change. All flashing sheets shall be jointed past the change in direction. Inside vertical corners shall be folded with no cuts in the sheet at the corner. Folds shall be “pig’s ear” type on flashing sheets entering a corner. Splice shall be made 16” minimum away from corner. Outside vertical corners, such as around curb units, shall extend a minimum of 2” around the corner for each flashing sheet. Contour flashing sheets in place with light pressure. Flashing sheet may be heated, if ambient temperature is below 60° F, in order to work them in place. Heating shall be done with heat lamp or air gun. No open flames can be used. All flashings shall be installed in accordance with the approved shop drawings and manufacturer’s instruction, unless amended. Flashings shall be turned up and over the tops of curbs as much as practical.

H. Membrane flashing terminating on a vertical surface shall be mechanically fastened at a height not to exceed manufacturer maximum adhered height limitations. Flash over vertical securement.

I. Strip in all metal flanges such as gravel stops with EPDM. Two ply stripping to be used/apply a 5”-wide strip of flashing over which a 9”-wide strip is to be applied. Uncured membrane shall be utilized where required by the manufacturer or by detail conditions. Stripping shall be continuous over the entire flange and extend onto the membrane 6” minimum.

J. Lap sealant shall be applied daily along all edges of membranes which terminate on the horizontal, gravel stops and similar locations. After proper installation of membrane flashings, clean the area of the lap with the manufacturer’s recommended cleaner and apply continuous bead of lap sealant to all seams, including vertical laps of the flashings. Feather the sealant bead using the preformed trowel. Should seams be found to have weathered beneath ponding conditions, the Contractor will be required to strip-in these seams with 6” stripping.

3.11 CLEAN-UP

A. All floor and adjacent areas, both interior and exterior, damaged or stained by the installation of the roofing work shall be repaired and cleaned of all dust, debris, and any other materials to the Owner’s satisfaction.
B. The Contractor shall not demobilize the site until the completed work is toured by the Owner and Engineer. Any unsatisfactory items observed will be reported in “punch-list” form. These items shall be corrected immediately by the Contractor prior to demobilization from the job site. Final payment will not be made until all punch list items are complete and guarantees have been received.

C. All scaffolding, barriers, temporary facilities, and the like shall be removed upon completion of the work. Areas damaged as a result of the Contractors equipment shall be restored to their original condition, all to the satisfaction of the Owner.

D. Refer to the Close-Out Procedures described in Division One for additional information.

END OF SECTION
PART 1 - GENERAL

1.01 IN GENERAL

The General Conditions and all parts of the Bid and Contract Documents are made part of this Section as if fully repeated herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

A. Section 01 03 01 – Available Information - Gale Evaluation Report
B. Section 01 12 16 – Work Sequence
C. Section 01 21 00 – Allowances
D. Section 01 22 00 – Unit Prices
E. Section 01 23 13 – Supplemental Bids
F. Section 01 50 00 – Temporary Facilities and Site Maintenance
G. Section 01 65 00 – Product Delivery, Storage, and Handling
H. Section 01 70 00 – Project Closeout
I. Section 02 41 00 – Selective Demolition
J. Section 03 30 00 – Concrete Restoration
K. Section 04 50 00 – Masonry Restoration
L. Section 06 10 00 – Rough Carpentry
M. Section 07 50 00 – Elastomeric Membrane Roofing
N. Section 07 62 00 – Flashing and Sheet Metal Roofing
O. Section 22 22 22 – Roof Drains
P. Section 23 00 00 – HVAC
Q. Section 26 00 00 – Electrical
R. Section 26 41 00 – Lightning Protection

1.03 SUMMARY OF WORK:

This Section specifies requirements for the following Scope of Work:

A. Clear membrane surfaces of debris by sweeping and vacuuming methods as required.
B. Perform removals in accordance Section 02 41 00 Selective Demolition to prepare substrates for restoration roofing and flashings.
C. At existing sloped perimeter roof areas at the west and south edges of the roof, provide and install new plywood sheathing and EPDM membrane over the existing roof membrane.
D. At existing server room roof (inside the building), strip in all existing membrane seams with 6”-wide uncured flashing membrane, and apply an elastomeric coating.
E. At the server room, detail the existing column penetration in uncured flashing membrane prior to coating.
F. At existing gutters, strip in all existing membrane seams with 6”-wide uncured flashing membrane, and apply an elastomeric coating.

G. At gutters, provide new uncured flashing membrane at leader outlet locations and apply elastomeric coating, extending beneath the existing copper fascia and roof panels.

H. Provide butyl tape at each penetration in the stainless-steel drip pans in the switchgear room.

I. Clean and restore all areas affected by the work.

1.04 JOB CONDITIONS:

A. This building houses critical infrastructure for campus operations and life safety communications. The Contractor will provide the greatest level of care in protecting these vital areas and systems during construction. Contractor will need to be on call 24/7 to respond to any issues arising from these construction activities, to remedy issues immediately. CCSU will back-charge the Contractor for any emergency measures undertaken to correct field deficiencies.

B. Weather must be considered both in short and long-term schedule approach. By undertaking this project, the Contractor understands that they will need to install the roof systems as required by the documents and manufacture’s requirements. The Contractor will need to consider the approaching fall/winter weather. No extra costs will be considered due to cold (or otherwise adverse) weather conditions. Contractor will incorporate all provisions necessary to complete the work prior to September 26, 2018. This includes overtime, temporary heat, temporary protective measures, and any other aspects required to execute work.

C. Take all necessary precautions regarding worker health and safety when using solvents, adhesives and hot asphalt and occupant health and safety when using adhesives and solvents near fresh-air intakes.

D. Store flammable liquid and materials away from open sparks, flames, and extreme heat.

E. Comply with all OSHA requirements for construction. It is the roofing contractor’s responsibility to comply with all state, federal, and local codes, guidelines, and safety requirements.

F. All surfaces to receive new insulation, membrane, or flashings shall be thoroughly dry. Should surface moisture such as dew exist, the Contractor shall provide the necessary equipment to dry the surface prior to application. No open flames shall be permitted on the roof at any time.

G. Phased work is not allowed at critical areas identified on the Contract Drawings. Excluding critical areas, the Contractor shall remove only as much roofing,
flashing and associated components and other exterior waterproofing components as can be made water tight in a given day's work, including all flashings and associated components.

H. Should unforeseen conditions be encountered, the Contractor will be responsible for temporary protection and weather tightness until a solution is determined by the Engineer and implemented by the Contractor.

I. Cover sidewall areas with canvas tarps where existing roof system is discarded into refuse containers via trash chutes. Plastic or "poly" tarps shall not be used. Do not cover or block air intake or discharge louvers.

J. Equipment required to hoist materials to the roof and remove debris from the roof shall be supplied, maintained, and operated by the Contractor.

K. Remove rubbish and debris from the project site daily; do not allow accumulations inside or outside the buildings.

L. Fire suppression equipment will be readily available on the rooftop whenever combustible roofing material is being handled. Protect against fire and flame spread at all times.

M. Roofing contractor will establish a safety plan and rooftop evacuation procedures and brief his personnel on appropriate emergency actions.

N. The Contractor shall provide protection of entrance ways, sitework, plantings, landscaping, building surfaces, and similar items to protect from damage. Items damaged as a result of the work in this section shall be repaired or replaced by the Contractor to the satisfaction of and at no additional cost to the Owner.

1.05 SUBMITTALS

A. Provide the manufacturer's product and installation literature for approval, including manufacturer's standard details. Include shop drawings for project specific details.

B. Provide documentation indicating that the Contractor is a Certified Installer of the materials to be used.

1.06 WARRANTY

A. Coating System Manufacturer's Warranty: The coating manufacturer shall guarantee the restoration areas to be in a watertight condition and free defects for a period of 10 years, from the date of Substantial Completion of the roofing system. The warranty shall be a 10-year no dollar limit, non-prorated total system labor and material warranty. The manufacturer shall repair leaks and defects, in materials and workmanship as promptly after observation as weather and site conditions permit.
B. Upon completion of the work, and prior to final payment, the Contractor shall submit a Guarantee of his work to be free from defect in materials and workmanship. This Guarantee shall be for a period of **three (3) years from the date of Substantial Completion**, and shall be signed by a Principal of the Contractor’s firm, and sealed if a corporation.

1.07 DIMENSIONS AND QUANTITIES

All dimensions and quantities shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the time of construction. The Contractor is advised to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.08 QUALITY ASSURANCE

A. Acceptable Products: Provide primary roofing products, including each type of sheet, all manufactured in the United States, supplied by a single manufacturer, which has been successfully producing the specified types of primary products for not less than 10 years. Provide secondary or accessory products which are acceptable to the manufacturer of the primary roofing products.

B. Scope of Work: The work to be performed under this specification shall include but is not limited to the following: Attend necessary job meetings and furnish competent and full-time supervision, experienced roof mechanics, all materials, tools, and equipment necessary to complete, in an acceptable manner, the roof installation in accordance with this specification. Comply with the latest written application instructions of the manufacturer of the primary roofing products. In addition, application practice shall comply with requirements and recommendations contained in the latest edition of the Handbook of Accepted Roofing Knowledge (HARK) as published by the National Roofing Contractors Association, amended to include the acceptance of a phased roof system installation.

C. It will be the responsibility of the roofing contractor to initiate and maintain a QC program to govern all aspects of the installation of the Membrane Roofing System. The project foreman and or supervisor will be responsible for the daily execution of the QC program.

D. If inconsistencies in the quality of the installation are found, all work shall cease until corrective actions are taken to ensure the continuity the installation.

E. The roofing contractor shall maintain an adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts, and who are completely familiar with the specified requirements and methods necessary for the proper performance of the work. No allowance will be made for lack of skill on the part of the workers. Roofing contractor’s key personnel shall have received training by the membrane manufacturer.
PART 2 - MATERIALS

2.01 ELASTOMERIC COATING

A. Provide a two-coat, water-based, high-solids, elastomeric coating system for use on EPDM membranes, including manufacturer’s accessories and preparation materials. System to include:
   1. Seam reinforcement and detailing using the coating manufacturer’s recommended tape or fabric embedded in the coating material
   2. Base / primer application of elastomeric coating (this may be the same product as the finish coat, depending on manufacturer).
   3. Finish application of elastomeric coating

B. Performance Characteristics:
   1. Tensile strength: 284 psi at 75°F (ASTM D2370)
   2. Elongation at break: 258% at 75°F (ASTM D2370)
   3. Hardness: 55-65 Shore A (ASTM D2240)
   4. Permeance: 5.7 Perms (US) (ASTM D1653)
   5. Bond strength: Greater than cohesive strength of coating (ASTM C297)
   6. UV resistance: No effects after 5,000 hours (ASTM D822, ASTM G23)
   7. High temperature stability: No age hardening up to 250°F (ASTM D794)

C. Provide system that complies with State of Connecticut VOC Regulations.

D. Submit color chart and samples for Owner selection.

2.02 ROOFING AND FLASHING MEMBRANES

A. EPDM Roofing Membrane: ASTM D 4637, Type I non-reinforced such as:
   1. Manufacturers: Subject to compliance with requirements, provide products by the following manufacturers:
      a. Same manufacturer as the main roof area.
   2. Thickness: **60 mils fleece-back**, nominal.
   3. Exposed Face Color: Black

C. Factory fabricated membrane seams shall be step tapered to achieve a smooth transition across the seam. Seams shall be vulcanized.

D. Flashing membrane to be used at corners of walls or penetrations shall be of the same manufacturer as the roof membrane and shall be 0.060”-thick uncured elastomer completely compatible with all other components used in the new roofing system. Seams shall be stripped-in with uncured membrane. Color to match the field roof membrane.
E. All materials and accessories used to install the roofing and flashing membrane systems shall be of the same manufacturer as the sheet membrane. These materials include, but are not limited to, the following:

1. Surface cleaners and primers
2. Bonding adhesive
3. Splicing cement
4. Lap Sealant
5. Water Cut Off Mastics
6. Caulking and sealants
7. Pipe seals
8. Walkway Pads
9. Membrane termination strips, bars, plates, and fasteners
10. Prefabrication flashing components
11. T-Joint membrane patches

2.03 BONDING ADHESIVE

A. Manufacturer's standard bonding adhesive meeting State of Connecticut Low VOC regulations.

2.04 SEALANT AND ACCESSORIES

A. Sealant required incidental to sheet metal and flashing work shall be butyl rubber based non-skinning sealant.

B. Butyl tape shall be a 100% solid by weight, polyisobutylene, cross-linked butyl sealant tape.

PART 3 - EXECUTION

3.01 GENERAL WORKMANSHIP

A. Do not deliver to site or install any material or system that has not been approved. Materials installed without approval may be required to be removed.

B. The prepared roof deck surface must be dry, clean, and smooth. All loose, poorly adhered, or deteriorated materials shall be removed prior to installing the new insulation. Personnel shall be free of bitumen contaminants when installing the new roof membrane. Provide dryers, if necessary, to dry deck surfaces prior to installing new work. Open flame devices shall not be used.

C. Maintain temporary protection of the new and existing roof system. The roof system will be cleaned to the satisfaction of the Owner and Engineer prior to final payment. All areas of stained membrane will be cut out and replaced at no additional cost to the Owner. Multiple patches in close proximity will not be acceptable and will require one large patch.
D. Comply with the manufacturer's written instructions and these Specifications for all renovations and associated work.

E. Flashings shall be installed along with the membrane to assure weather tight termination.

F. Partial or unmarked cans or rolls of materials cannot be used.

G. Handle materials to prevent damage to building components and project site areas.

H. Do not cut or dilute any material unless approved by the Engineer in writing prior to use.

I. Keep covers tightly sealed on all canned and evaporative products to prevent premature curing.

J. Do not store rolls of membrane or flashings on the roof without the written consent of the Designer and Owner's representative.

K. The Contractor is cautioned to investigate all existing conditions and materials of construction.

L. Restrict traffic on completed roof areas. Coordinate work to prevent trafficking by working toward roof edges and access ways. Should access to completed roof areas be necessary, provide protection for trafficked areas.

M. Do not apply primer or adhesive during inclement weather, when temperature is below 40 degrees F, or when materials are above or below specified application temperatures.

N. Do not place EPDM in contact with incompatible materials, such as asphalt roof cement, oil, creosote, or penta-based materials.

3.02 ELASTOMERIC COATING

A. Inspect the area to be coated, including penetrations. Identify low points located away from leader outlets for slope adjustment prior to coating.

B. Clean the existing EPDM membrane areas to receive coating. Use low-pressure water and a non-filming detergent.

C. Mask areas and adjacent materials that do not receive coating.

D. Detail any tears or voids in the existing EPDM, apply EPDM flashing at gutter outlets, and allow to cure prior to applying the field coat.
E. Apply at 50 degrees F and rising with no rain, dew, fog, or freezing temperatures in the forecast for 24 hours. Membrane surface temperature must be at or less than 105 degrees Fahrenheit during application.

F. Apply the base coat in accordance with the manufacturer’s instructions. Allow to dry before applying a second coat, in the opposite direction as the first coat.

G. Extend coatings a minimum of 3” behind existing counterflashings, roof panels, flashings, facias, etc.

H. Select work areas that allow application of both coats in the same work day.

3.03 SEAM STRIPPING

A. Clean the existing lap joints for a distance of 8” and apply 6”-wide flashing membrane over laps.

3.04 MEMBRANE SEAM STRIP FLASHING

All flashings shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the job progresses. No temporary membrane flashings shall be allowed without the prior written approval of the Owner. Approval, if given, will only be for specific locations on specific dates.

A. Ensure that all substrates are free from contaminants prior to the installation of the new flashing membranes. Install the manufacturer’s buffer or protection sheets as required.

B. Follow the membrane manufacturer’s requirements and recommendations and these specifications. Do not proceed with work until all shop drawings and submittals are reviewed.

C. Cured membrane shall be used for flashing purposes as much as practical. Uncured sheets are to be used at: inside and outside corners, seams in flashings or at any other location where forming of membrane flashings is required. Prefabricated components are to be used where practical and detailed at vent pipes, hot pipes, pitch pockets, etc.

D. Totally clean the roof membrane area to receive flashing sheet using new, clean rags and manufacturer’s splice wash cleaner. All talc, dirt, excess bonding adhesive, and other foreign material shall be totally cleaned from the roof membrane sheet. Clean all seam areas at least twice in two (2) separate applications with new rags and cleaner each time. After cleaning, apply splicing cement to both the underside of the flashing sheet and the prepared roof membrane for a width of minimum 6”. Be sure cement is not on bonding adhesive areas.
E. After setting, roll membrane into place using a 2"-wide steel roller and heavy hand pressure. Roll 100% of the surface to assure total adhesion with no wrinkles or bridging.

F. Lap sealant shall be applied daily along all edges of membranes, which terminate on the horizontal, gravel stops and similar locations. After proper installation of membrane flashings, clean the area of the lap with the manufacturer’s recommended cleaner and apply continuous bead of lap sealant to all seams, including vertical laps of the flashings. Feather the sealant bead using the preformed trowel. Should seams be found to have weathered beneath ponding conditions, the Contractor will be required to strip-in these seams with 6" stripping.

3.05 BUTYL TAPE

A. Prepare stainless-steel substrates in accordance with manufacturer’s requirements.

B. Apply butyl tape around the base of each penetration through the drip pan.

3.06 CLEAN-UP

A. All floor and adjacent areas, both interior and exterior, damaged or stained by the installation of the roofing work shall be repaired and cleaned of all dust, debris, and any other materials to the Owner’s satisfaction.

B. The Contractor shall not demobilize the site until the completed work is toured by the Owner and Engineer. Any unsatisfactory items observed will be reported in “punch-list” form. These items shall be corrected immediately by the Contractor prior to demobilization from the job site. Final payment will not be made until all punch list items are complete and guarantees have been received.

C. All scaffolding, barriers, temporary facilities, and the like shall be removed upon completion of the work. Areas damaged as a result of the Contractors equipment shall be restored to their original condition, all to the satisfaction of the Owner.

D. Refer to the Close-Out Procedures described in Division One for additional information.

END OF SECTION
PART 1 - GENERAL

1.01 IN GENERAL

The General Conditions and all parts of the Bid and Contract Documents are made part of this Section as if fully repeated herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

A. Section 01 03 01 – Available Information - Gale Evaluation Report
B. Section 01 12 16 – Work Sequence
C. Section 01 21 00 – Allowances
D. Section 01 22 00 – Unit Prices
E. Section 01 23 13 – Supplemental Bids
F. Section 01 50 00 – Temporary Facilities and Site Maintenance
G. Section 01 65 00 – Product Delivery, Storage, and Handling
H. Section 01 70 00 – Project Closeout
I. Section 02 41 00 – Selective Demolition
J. Section 03 30 00 – Concrete Restoration
K. Section 04 50 00 – Masonry Restoration
L. Section 06 10 00 – Rough Carpentry
M. Section 07 50 00 – Elastomeric Membrane Roofing
N. Section 07 51 00 – Elastomeric Membrane Restoration
O. Section 22 22 22 – Roof Drains
P. Section 23 00 00 – HVAC
Q. Section 26 00 00 – Electrical
R. Section 26 41 00 – Lightning Protection

1.03 SUMMARY OF WORK:

A. Install sheet metal flashings in conformance with Factory Mutual Data Sheet 1-49 (latest issue).
B. Provide and install new copper edge metal/facia to complete roofing systems.
C. Re-secure the existing copper fascia with new fasteners into the perimeter wood fascia blocking or steel angle supports.
D. Remove standing seam copper roof and wall panels, including ridge flashings, to provide new roof membrane terminations and counterflashing.
E. Provide new counterflashings at transitions between existing standing-seam copper metal roof/wall panels and new roof membrane terminations.
F. Provide new stainless-steel hood flashings at hot pipe penetrations.
G. Provide new stainless-steel skirt flashings at mechanical curbs.
H. Provide new stainless-steel cap flashings for mechanical RTCU sleepers.

I. Provide stainless steel oil catch pan around the crankcase vents.

J. Supplemental Bid - Remove and replace existing stepped reglet flashings in brick masonry at gable ends. Coordinate with Sections 02 41 00 Selective Demolition and 04 50 00 Masonry Restoration.

K. Supplemental Bid - Provide aluminum reglet cap flashing over existing stones, two (2) locations below the northeast corner.

L. The Contractor shall provide all necessary temporary protection for the roof systems to prevent damage to the interior and for weather protection. Remove only as much of the existing roofing and flashing as can be made weather tight within the same day’s work.

M. Clean and restore all areas affected by the work.

1.04 JOB CONDITIONS

A. This building houses critical infrastructure for campus operations and life safety communications. The Contractor will provide the greatest level of care in protecting these vital areas and systems during construction. Contractor will need to be on call 24/7 to respond to any issues arising from these construction activities, to remedy issues immediately. CCSU will back-charge the Contractor for any emergency measures undertaken to correct field deficiencies.

B. Weather must be considered both in short and long-term schedule approach. By undertaking this project, the Contractor understands that they will need to install the roof systems as required by the documents and manufacturer's requirements. The Contractor will need to consider the approaching fall/winter weather. No extra costs will be considered due to cold (or otherwise adverse) weather conditions. Contractor will incorporate all provisions necessary to complete the work prior to September 26, 2018. This includes overtime, temporary heat, temporary protective measures, and any other aspects required to execute work.

C. Coordinate the work in this Section with the work in other sections to maintain a watertight condition and to ensure the orderly progress of work.

D. Edge metal installation shall be in conformance with FM Global Data Sheet 1-49 and these specifications.

E. All surfaces to receive flashings shall be thoroughly dry. Should surface moisture such as dew exist, the Contractor shall provide the necessary equipment to dry the surface prior to application. Do not dry with open flames.

F. Complete metal work in conjunction with roofing and flashing so that a watertight condition exists daily.
G. Metal shall be installed to provide adequate resistance to bending to allow for normal thermal expansion and contraction.

H. Metal joints shall be watertight.

I. Airtight and continuous metal hook strips are required behind metal fascias. Hook strips are to be fastened 8" maximum on-center into the wood nailer or masonry wall.

J. Counter flashings shall overlap base flashings at least 4".

K. Hook strips shall extend past wood nailers over wall surfaces by 1.5"-minimum and shall be securely sealed from air entry.

L. End dams shall be provided at limits of through-wall flashing locations.

1.05 SUBMITTALS

A. Submittals shall be made in accordance with Division 1.

B. The Contractor shall submit the following procedural items with their submittal package:
   1. Methods of removal of materials;
   2. Temporary protection procedures;
   3. Fire watch procedures;
   4. List of local emergency numbers; and
   5. Staging/set-up procedures.

C. The Contractor shall submit the following samples with their submittal package:
   1. 3"X3" samples of each type of metal and flashing to be used.

D. Shop drawings for each shop or field fabricated sheet metal component. Submit complete, detailed large scale (min 3: = 1'-0") shop drawings for each shop or field fabricated sheet metal component indicating profiles, seams, terminations, dimensions, attachment, and interface with other materials and substrates.

1.06 TEST AREAS

A. Before full scale work is commenced, execute the following work for trial work areas to be located and reviewed by the Engineer as to acceptability of installation:
   1. Edge metal
   2. Fascia
   3. Hook strips and cleats
   4. Skirt flashing
   5. Counterflashing
   6. Clips
B. Trial areas shall be repeated until acceptable results are obtained. The accepted work shall be a standard for all subsequent work.

1.07 GUARANTEE

A. Upon completion of the work, and prior to final payment, the Contractor shall submit a Guarantee of his work to be free from defect in materials and workmanship. This Guarantee shall be for a period of three (3) years from the date of Substantial Completion, and shall be signed by a Principal of the Contractor’s firm, and sealed if a corporation.

1.08 PERFORMANCE REQUIREMENTS

A. System shall accommodate movement of components without buckling, failure of joint seals, undue stress on fasteners, or other detrimental effects when subjected to seasonal temperature changes and live loads.

B. Edge metal assembly must be fabricated and installed in accordance with ANSI/SPRI ES-1 and be tested in accordance with Test Methods RE-1, RE-2, and RE-3. Contractor shall submit an approved NRCA edge metal detail that is rated to meet or exceed wind uplift pressures.

1.09 DIMENSIONS AND QUANTITIES

A. All dimensions and quantities shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the time of construction. The Contractor is advised to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.10 QUALITY ASSURANCE

A. Factory Mutual Inspections: Contractor shall coordinate and schedule inspections by a Factory Mutual Global representative at the start of roofing installation, interim in-progress and at substantial completion, a minimum of three (3) visits.

B. Scope of Work: The work to be performed under this specification shall include but is not limited to the following: Attend necessary job meetings and furnish competent and full-time supervision, experienced mechanics, all materials, tools, and equipment necessary to complete, in an acceptable manner, the installation in accordance with this specification.

C. It will be the responsibility of the roofing contractor to initiate and maintain a QC program to govern all aspects of the installation. The project foreman and or supervisor will be responsible for the daily execution of the QC program.
D. If inconsistencies in the quality of the installation are found, all work shall cease until corrective actions are taken to ensure the continuity of the installation.

E. The contractor shall maintain an adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts, and who are completely familiar with the specified requirements and methods necessary for the proper performance of the work. No allowance will be made for lack of skill on the part of the workers.

1.11 REFERENCES

A. CDA Copper Design Manual, published by the Copper Development Association. See also “Copper and Common Sense – Sheet Copper Design Principles and Construction Techniques Manual”, Published by Revere Copper Products.


PART 2 - MATERIALS

2.01 SHEET METAL AND PREFORMED FLASHINGS

A. Copper shall be minimum 16 oz. per square foot conforming to ASTM B370. Copper shall be 1/8 hard, Temper H00 except Temper 060 where hand forming is required. Refer to Fabrication Schedule for requirements.

B. Stainless steel shall be 20 and 24-gauge AISI 18-8 type 304, 2D finish. Sheet length shall be 8’ maximum.

C. Aluminum shall be 0.040” and 0.050” thick. Aluminum shall have a mill finish for concealed items. Provide a Polyvinylidene Fluoride finish for exposed aluminum. Aluminum shall be 3003 alloy, H-14 temper.

D. All accessories, including but not limited to nails, screws, and clip strips shall be stainless steel and completely compatible with the surrounding metal to prevent galvanic reaction.

E. Nails for flashing securement at wood substrates shall be No. 12 Stubbs gauge, large head, threaded shank, minimum 1.25” long.

F. Rivets shall be 3/16”-diameter copper, aluminum, or stainless steel as required by the metal being secured.

G. Sealant required incidental to sheet metal and flashing work shall be one-part non-skinning butyl.
H. Fabrication Schedule:
1. 0.040" Polyvinylidene Fluoride Finished Aluminum
   a. Stone reglet cap flashing
2. 0.050" Mill Finish Aluminum
   a. Continuous Hook Strips/Cleats for aluminum flashings
3. 16 Ounce Red Copper
   a. Counterflash at copper panels
   b. Stepped reglet flashing
   c. Pourable sealer pocket
4. 20 Ounce Red Copper
   a. Edge metal
   b. Fascia
   c. Continuous Hook Strips/Cleats for 16 Ounce copper
   d. 24 Ounce required for Hook Strips and Cleats for 20 Ounce copper
5. 20 Gauge Stainless Steel
   a. Skirt flashing
   b. Sleeper flashing caps at RTCU
6. 24 Gauge Stainless Steel
   a. Hot Pipe Hood
   b. Hot Pipe Sleeve

I. Joints shall conform to the following requirements:
1. Flat-lock joints shall finish not less than 3/4” wide.
2. Lap joints subject to stress shall finish not less than 1” wide and shall be soldered and riveted.
3. Unsoldered lap joints shall finish not less than 4” wide.

J. Soldering:
1. Pre-tin both mating surfaces with solder for a width not less than 1-1/2” of uncoated copper or stainless steel.
2. Treat other sheet metal required to be soldered in accordance with metal producer’s recommendations.
3. Completely remove acid and flux after soldering is completed.
4. All lap or lock seams shall be pre-tinned.

K. Expansion and Contraction Joints:
1. Fabricate in accordance with the Architectural Sheet Metal Manual recommendations for expansion and contraction of sheet metal work in continuous runs.
2. Space expansion and contraction joints for copper and stainless steel at intervals not exceeding 24’.
3. Fabricate joint covers of same thickness materials as sheet metal served.
L. Securement Clips:
   1. Provide securement clips to secure flashing and sheet metal work over 12” wide and where specified.
   2. Form securement clips of same metal and one weight heavier as the sheet metal being installed.
   3. Fabricate securement clips from 2”-wide strips. Form end with not less than 3/4”-wide loose lock to item for anchorage. Fold clips over flashing and crimp tightly.

M. Edge Strips or Continuous Cleats:
   1. Fabricate continuous edge strips where shown and specified to secure loose edges of the sheet metal work.
   2. Use material compatible with sheet metal to be secured by the edge strip.
   3. Fabricate in 10’ maximum lengths with not less than 3/4” loose lock into metal secured by edge stip.
   4. Fabricate strips for fascia anchorage to extend below the supporting wood construction to form a drip and allow the flashing to be hooked over the lower edge at least 3/4”.
   5. Fabricate anchor edge maximum width of 3” or of sufficient width to provide adequate bearing area to insure a rigid installation.

N. Edges:
   1. Finish edges of flashing with a 1/4” hem formed by folding edge of flashing back on itself when not hooked to edge strip or cleat. Use 1/4” minimum penetration beyond wall face with drip for through-wall flashing exposed edge.

O. Gravel Stops
   1. Fabricate in lengths of not less than 8’ long and maximum of 10’.
   2. Fabricate internal and external corners as one-piece with legs not less than 2’ or more than 4’ long.
   3. Fabricate roof flange not less than 4” wide.
   4. Fabricate lower edge outward at an angle of 45 degrees to form drip and as fascia or as counterflushing as shown.
      a. Fabricate of one-piece material of suitable width for fascia height of 8” maximum or counterflushing lap of not less than 4” over base flashing.
   5. Provide backer and cover plates at joints in the gravel stop with in-seam sealant between all layers.

P. Flat and lap joints shall be made in direction of flow.

Q. Sheet metal flashings shall be shop fabricated. All breaks, bends and hems shall be uniform, clean, straight lines.
   1. Flanges shall be 4” wide minimum
   2. Drip edges shall be hemmed 3/4” wide minimum and break at a 30-degree angle.
   3. Clips shall be 2” wide.
4. Where cleats and clips are fastened to substrate, edge of metal shall be folded back over the fastener head.
5. All flanges to be covered with roofing or flashing membrane shall have a 1/4” minimum hem on the edge.
6. Copper seams shall be formed of a pre-tinned, single lock, crimped, and soldered.
7. Blind nailers shall be 4” wide and hemmed on both edges, folded to 2” wide final dimension.

2.02 FASTENERS AND ACCESSORIES

A. All accessories, including but not limited to nails, screws, straps, hangers, and clips shall be copper, stainless steel, or aluminum and completely compatible with the surrounding metal to prevent galvanic reaction.

B. Termination Bars – Stainless Steel or Copper
   1. 1/8" x 1" x 10'-0" lengths
   2. Fastener holes located at 8" on center, maximum
   3. 3/8" flange as sealant receiver

2.03 OIL CONTAINMENT SYSTEM

A. Provide a 60”, pre-fabricated, stainless-steel, oil containment system that includes removable filters and a box frame designed to be placed on the roof surface.

B. Basis of design is Roof Guardian Omni Containment System.

PART 3 - EXECUTION

3.01 GENERAL WORKMANSHIP

A. Refer to the publication, “CDA Copper Design Manual”, "Copper and Common Sense" by Revere Copper and Brass and all recommendations of the Sheet Metal and Sheet Metal and Air Conditioning Contractors National Association (SMACNA) concerning methods and materials to be used in the fabrication and construction of sheet metal flashings.
   1. All sheet metal sections that are to rest over modified bitumen membranes shall be separated by a slip sheet.

B. It is the intent of this Specification to utilize the most effective joint configuration with the fewest seams possible to properly install strong, weather tight metal flashings. Comply with the following standards unless otherwise specified when fabricating metal components to be joined:
   1. Prefabricate corners of edge metal, counter-flashings and skirt flashing in one-piece sections with minimum lengths of 18” in each dimension from the corner whenever possible.
2. Whenever one-piece construction is not possible, solderable metals shall utilize interlocked, crimped, and fully soldered seams and joints.

3. Seams and joints of non-solderable metals shall be interlocked, riveted, and completely filled with sealant. Strip in concealed flashing locations with modified bitumen membrane.

4. Provide sheet metal closure components at transitions to rising walls and similar changes in plane for edge metal, expansion joint covers, and other termination flashings. Fully crimp and seal closures to continuous blind nailed cleats.

C. Shop fabricate sheet metal flashings to the fullest extent possible. Fabricate all breaks, bends, and hems with uniform, clean, straight lines.

D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

E. Do not install bent, twisted, scratched, or otherwise damaged sheet metal fabrications.

F. Erect sheet metal plumb and level without bulges or waves.

G. Provide watertight joints to accommodate thermal expansion and contraction.

H. Fit sheet metal fabrications tight in place. Make corners square, and surfaces true and straight in planes.

I. Secure sheet metal in place using concealed fasteners unless shown otherwise. Lap and seal all joints.

J. Protect finishes of exposed to view sheet metal fabrications. Avoid gouging, scratching, and denting. Use cotton gloves when handling and installing unprotected sheet metal in order to avoid soiling exposed to view surfaces.

3.02 EDGE METAL FASCIA

A. Coordinate the installation of new wood blocking and continuous shim on top of the existing concrete parapet with Section 06 10 00 – Rough Carpentry.

B. Extend flashing membrane over wood blocking and onto the sloped perimeter roof.

C. Backer and cover plates shall be installed behind all edge metal joints. Sealant shall be applied with full beads between backer plates, edge metal, and cover plates.

D. Multi-piece fascia layers shall have 3” minimum laps behind pieces above.
E. Provide blind nailers at exposed ends where thermoplastic clad fascias meet rising walls as necessary and other locations as required to provide an aesthetic watertight termination of metal flashings.

3.03 BLIND NAILERS

A. Fabricate and install blind nailers with a 2” minimum leg inserted behind membrane, edge metal/fascia, or dormer cladding. Fasten flashing through leg of blind nailer.

B. Fold blind nailer with 1/2” hemmed edge over fastener.

C. Provide continuous beads of sealant at back and leading edges

3.04 CONTINUOUS CLEATS AND HOOK STRIPS

A. Form continuous cleats/hook strips with 3/4” kicks, bent out at a 30° angle to the face of wall. Height of continuous cleats/hook strips shall be as indicated on the Detail Drawings and long enough to be fastened into solid blocking and extend 2” minimum past bottom of blocking.

B. Secure continuous cleats/hook strips to wood blocking with the specified fasteners spaced at 4” on center/staggered.

C. Provide 1/8” butt joints between hook strip sections.

3.06 SKIRT/COUNTERFLASHING

A. Install sheet metal skirt and counterflashings where indicated at roof to wall terminations, unit curbs, etc. Skirt metal flashings shall be fastened with the specified fasteners.

B. Secure bottom edges of skirt flashings and counterflashings at 6” on center.

3.07 POURABLE SEALER POCKETS

A. Reasonable effort shall be made to eliminate the need for pourable sealer pockets including the removal of existing pockets.

B. Fabricate stainless steel metal boxes, installed in accordance with manufacturer details, ensuring proper attachment, maintaining a minimum of 2” of clearance around the penetration.

C. Pockets shall be filled with non-shrinking grout to within 1” of the top of the pocket. Allow the grout to dry and fill the remainder of the pocket with pourable sealant.

D. Pitch pockets and the sealant will require periodic maintenance by the building owner’s maintenance personnel.
3.08 **RESECURE EXISTING FASCIA**

A. Existing copper fascia to remain. Re-secure the bottom edge with stainless-steel screws spaced at 2'-0" on center into existing fascia board or steel angle support. Provide EPDM-grommeted washers.

3.09 **STEPPED REGLET COUNTERFLASHING**

A. Install stepped reglet flashing at gable end walls, four (4) locations. Reglet flashing shall be secured in freshly cut mortar joints with lead wedges.

B. Provide sealed blind nailer closures at vertical sheet metal terminations.

C. Seal reglet joints and tool sealant at the brick face to shed water.

3.10 **REMOVAL AND REINSTALLATION OF COPPER PANELS**

A. Remove the existing copper ridge caps at rising walls in order to perform the work.

B. Install self-adhered membrane flashing between the wall panels and the sloped mansard roof panels prior to re-installing the ridge caps.

C. Remove and reinstall lightning protection clips using existing fasteners. Supplement with new fasteners and/or clips as needed using like materials. Coordinate with Lightning Protection scope to maintain the system in operation at all times.

D. Remove or disengage cleats, clips, and standing seams as needed to perform restoration work at the gutters and to install roof terminations, and counterflashing.

E. New materials including fasteners, clips, cleats, etc. shall match existing.

3.11 **HOOD FLASHINGS**

A. Provide stainless-steel hood flashings at hot pipe penetrations.

B. Secure hoods to the penetrations with stainless-steel band clamps. Set the hood in sealant and apply a tooled bead along the top of the clamp.

3.12 **OIL CONTAINMENT SYSTEM**

A. Set the catch pan on the roof surface over the protection membrane layer. Use membrane walkway pads beneath each foot.
3.13 ALUMINUM REGLET CAP FLASHING AT STONES

A. Two (2) stones below the northeast corner are open on the top surface.

B. At each, fabricate and install a coated aluminum reglet cap flashing and tie-in to the existing aluminum louver sill flashing.

C. Lap new cap over existing louver sill flashing by 2” and set into a bead of sealant.

3.14 CLEAN-UP

A. Remove protective film (if any) from exposed surfaces of metal promptly upon installation. Strip with care to avoid damage to finishes.

B. Upon completion of each area of soldering copper, carefully remove flux and other residue from surfaces. Neutralize acid flux by washing with baking soda solution, and then flushing with clear water rinse. Use special care to neutralize and clean crevices.

C. Clean exposed metal surfaces of substances that would interfere with uniform oxidation and weathering.

D. All floor and adjacent areas, both interior and exterior, damaged, or stained by the installation of the roofing work shall be repaired and cleaned of all dust, debris, and any other materials to the Owner’s satisfaction.

E. The Contractor shall not demobilize the site until the Owner and Engineer tour the completed work. Any unsatisfactory items observed will be reported in “punch-list” form. These items shall be corrected immediately by the Contractor prior to demobilization from the job site. Final payment will not be made until all punch list items are complete and guarantees have been received.

F. Remove all scaffolding, barriers, temporary facilities, and the like upon completion of the work. Restore areas damaged as a result of the Contractors equipment to their original condition to the satisfaction of the Owner.

END OF SECTION
PART 1 - GENERAL

1.01  IN GENERAL

The General Conditions and all parts of the Bid and Contract Documents are made part of this Section as if fully repeated herein.

1.02  RELATED WORK SPECIFIED ELSEWHERE:

A. Section 01 03 01 – Available Information - Gale Evaluation Report
B. Section 01 12 16 – Work Sequence
C. Section 01 21 00 – Allowances
D. Section 01 22 00 – Unit Prices
E. Section 01 23 13 – Supplemental Bids
F. Section 01 50 00 – Temporary Facilities and Site Maintenance
G. Section 01 65 00 – Product Delivery, Storage, and Handling
H. Section 01 70 00 – Project Closeout
I. Section 02 41 00 – Selective Demolition
J. Section 03 30 00 – Concrete Restoration
K. Section 04 50 00 – Masonry Restoration
L. Section 06 10 00 – Rough Carpentry
M. Section 07 50 00 – Elastomeric Membrane Roofing
N. Section 07 51 00 – Elastomeric Membrane Restoration
O. Section 07 62 00 – Flashing and Sheet Metal Roofing
P. Section 23 00 00 – HVAC
Q. Section 26 00 00 – Electrical
R. Section 26 41 00 – Lightning Protection

1.03  SUMMARY OF WORK:

A. Existing drain bowls to remain. During replacement work, provide temporary drain sleeves with flashing to the temporary roof or completed roof drain assemblies.

B. Provide new cast iron roof drain collar extensions, support rings, sump pans, strainers, and associated hardware.

C. Test each new drain bowl and leader assembly.

D. Replace, patch, seal and repair all existing construction assemblies removed, damaged, or cut to allow for the installation of the new drain accessories. Repaired areas shall match the surrounding existing construction.

E. Coordinate with concrete deck repairs under Section 03 30 00 Concrete Restoration.
1.04 JOB CONDITIONS

A. Coordinate the work in this Section with the work by other trades to ensure a watertight condition and the orderly progress of the Work.

B. Notify the Owner at least 72 hours in advance of doing any demolition work so that the Owner may coordinate with occupants and/or provide entry into required areas.

C. The Contractor is required to remove and replace drain components as part of the new roof system, to accommodate increased insulation heights. Existing drain bowls are to be reused in the new work.

D. If sections of the existing building finishes will require removal in order to properly install the new work, these areas should be reviewed with the Owner and Engineer prior to removal. Work areas shall be clearly defined and closed off from building occupants. Areas of finish removal shall be as small as possible to effectively install the work. Any finishes damaged, including pipe insulation shall be repaired or replaced by the Contractor at no cost to the Owner.

E. The Contractor is cautioned to take all necessary precautions and make investigations necessary to install the Work. Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

F. The Contractor is responsible to verify the size and type of roof drain components for the existing building.

G. The plumbing work shall be coordinated with the roof work in such a manner that no interior portions of the building are left exposed to the elements at the end of a day’s work. All drains should be in working order at the end of each work day.

1.05 REFERENCES

A. ASTM A 74 Cast Iron Soil Pipe and Fittings

B. ASTM C 564 Rubber Gaskets for Cast Iron Soil Pipe and Fittings


E. CISPI Standard 301 Standard Specification For Hub-less Cast-Iron Soil Pipe And Fittings For Sanitary And Storm Drain, Waste, And Vent Piping Applications
F. CISPI Standard 310 Specification For Coupling For Use In Connection With Hubless Cast-Iron Soil Pipe And Fittings For Sanitary And Storm Drain, Waste, And Vent Piping Applications

1.06 SUBMITTALS

A. Manufacturer’s literature shall be submitted on all items specified in Part 2 of this section and in conformance with the Supplemental General Conditions.

1.07 QUALITY ASSURANCE

A. The plumbing shall be performed by licensed tradesmen.

1.08 WARRANTY

A. Manufacturer’s standard warranty: Materials shall be free of defects in material and workmanship for a period of five (5) years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

B. Upon completion of the work, and prior to final payment, the Contractor shall submit a Guarantee of his work to be free from defect in materials and workmanship. This Guarantee shall be for a period of three (3) years from the date of Substantial Completion, and shall be signed by a Principal of the Contractor’s firm, and sealed if a corporation.

PART 2 - MATERIALS

2.01 ROOF DRAIN ACCESSORIES

A. All accessories necessary for the proper installation of the new drain bowl assemblies, including but not limited to extension collars, support rings, strainers, and clamping rings with integral gravel stops, shall be coated cast iron of the same manufacturer as the drain bowls and be completely compatible with the existing piping and surrounding materials.

B. Adjustable extension sleeves and collars shall be sized to accommodate increased insulation heights.

C. All replacement hardware shall be stainless steel hardware.

D. Acceptable manufacturers for drain accessories are: Josam, Zurn, and Jay R. Smith Manufacturing Company.
PART 3 - EXECUTION

3.01 REPLACEMENT ROOF DRAIN COMPONENTS

A. Existing drain bowls to remain in place.

B. Remove and discard existing drain strainers, membrane clamping rings, and associated hardware.

C. During re-roofing operations, provide and install temporary drain inserts and flashing between the inserts and the roof membrane.

D. Roof drainage system to remain functional for the duration of the project.

E. Provide and install new support rings, extension sleeves, collars, and accessories as needed to accommodate increased insulation.

F. Coordinate new drain elevation(s) with tapered insulation drain sumps.

END OF SECTION
PART 1- GENERAL

1.01 IN GENERAL

A. The general provisions of the contract, including the general conditions and the supplementary general conditions apply to all work specified or relating to this section.

B. Refer to Section 01 23 13 Supplemental Bids and Sheet M100 for work associated with Supplemental Bid Nos. 3 and 4.

1.02 SCOPE OF WORK

A. Temporary disconnection and reconnection of roof top mechanical equipment including gooseneck exhaust and intake hoods, ductwork, and condensing units.

B. Prior to disconnection of roof top condensing units, evacuate refrigerant, cut and cap refrigerant piping and temporarily remove roof top condensing unit.

C. Provide temporary roof support stand for refrigerant piping during removal of existing roof top condensing unit.

D. Provide (3) temporary 5-ton portable spot cooler units in place of existing condensing units. (2) spot coolers to serve as primary cooling and (1) to serve as backup. Provide temporary and continuous cooling measures in the Server Room as a turn-key system; to include all required provisions for any exterior air, venting, ductwork, and condensate drainage. Coordinate the sequencing/overlap of the temporary cooling system (in coordination with the decommissioning & recommissioning of the main system) so that there is no point during the project that the server room is without conditioned air.

E. Provide all necessary supports and stands for refrigerant piping, ductwork, hoods, and roof top condensing units.

F. Secure rooftop units to curbs to resist the resultant wind uplift for 135 mph ultimate wind speed in accordance with FMG requirements.

1.03 SUBMITTALS

A. General: submit the following in accordance with conditions of contract and Division 1 specification sections.

B. Contractor to submit schedule indicating proposed sequence for selective demolition work to owner’s representative for review prior to start of work. Include coordination for shutoff, capping, and continuation of utility services as required, together with details for dust and noise control protection.

C. Photographs of existing conditions of structure surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations. File with owner’s representative prior to start of work.
D. Conditions of structures: owner assumes no responsibility for actual condition of items or structures to be demolished.

E. Conditions existing at time of inspection for bidding purposes will be maintained by owner so far as it’s practicable. However, minor variations within structure may occur by owner’s removal and salvage operations prior to start of selective demolition work.

F. Partial demolition and removal: items indicated to be removed but of salvageable value to contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed.

G. Storage or sale of unregulated removed items on site will not be permitted.

H. Storage or sale of regulated items, such as refrigerant brines, etc. Shall be handled as specified elsewhere in this specification.

I. Damages: promptly repair damages caused to adjacent facilities by demolition work.

J. Flame cutting: do not use cutting torches for removal until work area is cleared of flammable materials. At concealed spaces, such as interior of ducts and pipe spaces, verify conditions of hidden space before starting flame-cutting operations. Maintain portable fire suppression devices during flame-cutting operations.

K. Provide temporary ventilation equipment to control spread of fumes and smoke and to maintain a healthy work environment.

L. Utility services: existing utilities to remain in service and be protected against damage during demolition operations.

M. Certain items of existing equipment and piping or ductwork may be indicated for removal, or relocation. Items noted for removal shall be disconnected and turned over to the owner or disposed of by the contractor if the owner so requests. If instructed to dispose of items, the contractor shall remove the items from the premises and dispose of them in a safe, legal and responsible manner and location. Items noted for relocation are intended for reuse in another location as designated on the drawings. It shall be the responsibility of the contractor to remove the material from its present location, store the material in a safe place, and reinstall the material in its new location. Questions regarding the suitability of the material or equipment shall be brought, in written form, to the attention of the owner/engineer.

N. Shop drawings to be submitted for review prior to installation of temporary cooling components and equipment. Shop drawings shall include proposed openings and wall cuts for ductwork.

O. Submit a written plan and schedule for review prior to installation of temporary cooling equipment, it’s activation and temperature measurements, and decommissioning/recommissioning of the existing RTCU’s.
1.04 CLEANUP & REPAIR

A. Upon completion of demolition work, remove tools, equipment, and demolished materials from site.

B. Remove protections and leave interior areas broom clean.

C. Repair demolition performed in excess of that required. Return elements of construction and surfaces to remain to condition existing prior to start of operations. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

PART 2 – PRODUCTS

2.01 GENERAL

A. Specifications are applicable to all contractors and/or subcontractors for mechanical systems.

B. Check other plans and specifications and fully coordinate with other trades, owner and architect requirements.

C. Conform to all general and special conditions of contract as specified by architect and/or owner.

D. Visit site, check facilities and conditions and make all necessary observations and measurements. Note conditions under which work is to be performed and take all items into consideration in bid.

E. Systems are to be complete and workable in all respects, placed in operation and properly adjusted.

F. Each contractor shall provide his own clean-up, removal and legal disposal of all rubbish daily.

G. Contractor shall protect new work, existing work and adjacent property against weather.

H. Contractor shall protect his work, materials, apparatus and fixtures from damage. Any work damaged by failure to provide protection required, shall be removed and replaced with new material at the contractor's expense.

I. Contractor must confirm all utility company requirements and connection points in field prior to starting work.

J. Arrange for and obtain owner's and insurance representative's permission for any service shutdowns.
K. The contractor shall be solely responsible for construction means, methods, sequences of construction and the safety of workers.

L. No piping, ductwork, wiring, etc. Shall be installed or routed above electrical panels and equipment.

M. The mechanical contractor shall coordinate with the electrical contractor and obtain a written approval identifying the electrical characteristics of all mechanical equipment prior to ordering of equipment. No additional payment will be made for lack of contractor coordination of electrical characteristics.

N. During construction, the contractor may uncover an existing condition that will have to be modified. Any such work which comes under the jurisdiction of this contractor shall be done by this contractor without extra cost to the owner, as though fully detailed on plans and/or described in the specifications.

2.02 CODES, PERMITS, STANDARDS AND REGULATIONS

A. Conform to all applicable codes (local, state, national codes, NFPA, osha, etc.). Government regulations, utility company requirements, and applicable standards.

   • 2012 International Building Code
   • 2012 International Plumbing Code
   • 2012 International Mechanical Code
   • 2012 International Fire Code
   • 2014 NFPA 70 National Electrical Code

B. Obtain permits and pay all fees arrange for all required inspections and approvals.

2.03 RELATED WORK SPECIFIED ELSEWHERE

A. Openings and chases, when shown on architectural drawings.

B. Temporary water service, sanitary facilities, and heating during construction.

C. Electric power wiring

2.04 DRAWINGS

A. The systems as shown on mechanical drawings are diagrammatic. Confirm all dimensions by field measurement.

B. The exact locations for fixtures, equipment and piping which is not covered by drawings, shall be obtained from the architect or his representative in the field and the work shall be laid out accordingly.

C. Drawings and specifications are intended to supplement one another. Any materials or labor called for in one but not the other shall be furnished as if both were mentioned in the specifications and shown on the drawings.
2.05 **BASE EQUIPMENT, MATERIALS AND SUBSTATIONS**

A. All equipment and materials shall be new, free of defects and UL labeled.

B. Base bid manufacturers are included in the specifications or listed in schedules on the drawings. All other manufacturers are considered a substitution.

C. The name or make of any article, device, material, form of construction, fixture, etc. Stated in these specifications, whether or not the words "or approved equal" are used, shall be known as a "standard".

D. All proposals shall be based on "standards" specified.

E. The equipment schedules on the drawings indicate manufacturers equipment model numbers that this design has been based on. The use of other manufacturers' equipment that is listed as acceptable alternates that entails general trades, structural, mechanical, electrical, etc. Revisions is this contractor's responsibility. Any additional cost of such changes shall be paid by the contractor submitting the acceptable alternates which necessitates changes in installing such submitted alternate equipment, even though such costs may be part of another division of work.

F. Substitutions are subject to the approval of the owner. If a substitution is submitted, it is the contractor's responsibility to evaluate it and certify that the substitution is equivalent in all respects to the base specifications.

G. If substitutions are approved, notify all other contractors, subcontractors, etc. Affected by the substitution and fully coordinate with them. Any costs resulting from substitution, whether by this contractor or others, shall be the responsibility of and paid for by the substituting contractor. Approved shop drawings do not absolve this contractor from this responsibility.

H. All equipment shall be installed in full accordance with the manufacturer's data and installation instructions. It is this contractor's responsibility to check and confirm these requirements prior to starting work.

2.06 **WARRANTY**

A. Fully warrant all materials, equipment and workmanship for (3) years from date of acceptance.

B. Repair or replace without charge to the owner all items found defective during the warranty period. In the case of replacement or repair due to failure within the warranty period, the warranty on that portion of the work shall be extended for a minimum period of one (1) year from the date of such replacement or repair.

2.07 **SHOP DRAWING SUBMITTALS**

A. Submit shop drawings for mechanical systems, including but not limited to sheet metal, with adequate details and scales to clearly show construction. Indicate the operating characteristics for each required item. Clearly identify each item on the submittal as to
mark, location and use, using same identification as provided on the construction documents.

B. Sheet metal drawings shall be fully dimensioned and coordinated based on field verified building clearances and architectural ceiling layouts. Indicate structural, lighting, ductwork and piping at all critical locations.

C. Contractor shall review and indicate his approval of each shop drawing prior to submittal for review. Shop drawings will not be reviewed by the engineer unless the contractor's approval is noted. Do not start work or fabrication until shop drawings have been reviewed by the engineer and returned to the contractor.

D. Submittals will be reviewed only for general compliance with the contract documents and not for dimensions or quantities. The submittal review shall not relieve the contractor of responsibility for purchase of any item in full compliance with the contract documents or its complete and proper installation.

E. Where submittals vary from the contract requirements, the contractor shall clearly indicate on submittal or accompanying documents the nature and reason for the variations.

F. Each manufacturer or his representative must check the application of his equipment and certify at time of shop drawing submittal that the equipment specified has been properly applied and can be installed, serviced and maintained where indicated on the drawings. Advise engineer in writing with submittal drawings of any potential problems. The manufacturer shall be responsible for any changes that might be necessary because of physical characteristics of equipment that have not been called to the engineer's attention at the time of submittal.

2.08 RECORD DRAWINGS

A. Each contractor or subcontractor shall keep one (1) complete set of the contract drawings on the job site on which he shall regularly record any deviations or changes from such contract drawings made during construction.

B. These drawings shall record the installed location of all concealed equipment, piping, electric service, sewers, wastes, vents, ducts, conduit, etc. By measured dimensions to each such item from column centerlines or readily identifiable and accessible walls or corners of the building. Plans also shall show invert elevation of sewers and top elevation of all other below-grade lines.

C. Record drawings shall be kept clean and undamaged and shall not be used for any purpose other than recording deviations from working drawings and exact locations of concealed work.

D. After the project is completed, these drawings shall be delivered to the architect in good condition, as a permanent record of the installation as actually constructed.
PART 3 – EXECUTION

3.01 GENERAL

A. Provide all materials, labor, equipment, and accessories required to furnish and install the mechanical items identified in this section.

B. This section includes basic mechanical materials and methods to complement other sections in this specification and requirements indicated on the mechanical drawings.

3.02 EXECUTION DEMOLITION

A. General: perform selective demolition work in a systematic manner. Use such methods as required to complete work in accordance with demolition schedule and governing regulations.

B. Provide all dumpsters and containers necessary to hold, store and transport demolished materials as required.

C. Where concrete and/or masonry demolition is included, demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.

D. Locate demolition equipment throughout structure, and promptly remove debris to avoid imposing excessive loads on supporting walls, floors, or framing.

E. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.

F. If unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to owner's representative in written, accurate detail. Pending receipt of directive from owner's representative, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

G. Salvaged items: where indicated on drawings as "salvage - deliver to owner", carefully remove indicated item, clean, store, and turn over to owner and obtain receipt.

H. Remove from building site debris, rubbish, and other material resulting from demolition operations. Transport and legally dispose off site.

I. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.

J. Burning of removed materials is not permitted on project site.
3.03 SUPPORTS AND HANGERS

A. Install hangers, supports, clamps and attachments as required to properly support piping from building structure. The installation shall comply with the requirements of MSS SP-69 and SP-89.

3.04 ESCUTCHEONS

A. Fit all pipe passing through walls, floors or ceilings in finished rooms with steel or brass escutcheons. Where surface is to receive a paint finish, make escutcheons prime painted; otherwise make escutcheons nickel or chrome plated. Where piping is insulated, fit escutcheons outside insulation.

3.05 IDENTIFYING DEVICES AND LABELS

A. Provide metal equipment nameplates permanently fastened to new equipment with operational data engraved or stamped.

B. Identify all pipes and valves in exposed areas, and accessible ceilings and shafts.

C. Color code identification bands or marker backgrounds to identify contents of pipe and direction of flow located near each valve and fitting, on both sides of pipe passing through walls and on long runs at not over 20-foot intervals.

3.06 CUTTING, PATCHING AND DRILLING

A. All cutting and patching of the building construction required for this work shall be by this contractor unless shown on the architectural drawings and confirmed as to size and location prior to new construction.

B. Neatly saw cut all rectangular openings, set sleeve through opening, and finish patch or provide trim flange around opening.

C. Neatly saw cut and patch to match existing, including covering.

D. Core drill and sleeve all round openings.

E. Do not cut any structural components without architect's written approval, including, but not limited to roof joists, columns, floor joists, beams, girders, structural floor slabs, etc.

F. Patch and finish to match adjacent areas that have been cut, damaged or modified as a result of the installation of the mechanical systems.

G. All contractors shall confirm with owner, prior to bid, times available for noise producing work such as cutting and core drilling of floors, walls, etc., as well as times for work which requires access into adjoining tenant spaces. Include any premium time in bid.

H. The mechanical contractor shall coordinate with the general contractor prior to construction. The mechanical contractor shall provide information regarding openings in walls, floors, etc., concrete equipment pads and foundations to the general contractor. If
the mechanical contractor fails to comply with this request, or if incorrect information is given, the necessary cutting and patching will be performed by the general contractor, at the mechanical contractor's expense.

3.07 INSULATION

A. Furnish all material, labor and equipment as required to install complete plumbing and HVAC insulation as indicated on mechanical drawings and in these specifications.

B. Install in full accordance with manufacturer's recommendations.

3.08 HVAC INSULATION (AS MANUFACTURED BY OWENS CORNING, KNAUF, SCHULLER, OR CERTAINTEEDE)

A. Insulate all non-lined supply, return, and exhaust ducts with 1-1/2" thick foil faced reinforced Kraft jacket, fiberglass duct wrap fully secured to duct. Lap and tape seams and secure tightly to the ducts with wire or stick pins. All insulation to be applied in full accordance with the manufacturer's recommendations and comply with 25/50 flame and smoke hazard ratings per ASTM e-84, NFPA 255 and UL 723.

3.09 HVAC SYSTEMS AND EQUIPMENT

A. Furnish all equipment, materials, labor, tools, etc., for the complete HVAC system.

B. Install in full accordance with manufacturer's recommendations and place in satisfactory operation.

C. Contractors bidding this project shall visit the site and familiarize themselves with all conditions affecting their work. Submission of a bid on this project shall be construed as having such knowledge.

D. Verify exact conditions in field and coordinate with these drawings and other trades before beginning new work.

E. Determine exact locations for all equipment, piping, conduits and ductwork in field.

F. Coordinate work of this contract with other trades. Conflicts shall immediately be brought to the attention of the architect. Architect's resolution to conflicts shall be final.

G. Any discrepancies between what is shown on drawings or specified and the actual conditions in the field shall immediately be brought to the attention of the architect before proceeding.

H. Building and surfaces damaged during installation shall be repaired, replaced, and/or restored to original condition after completion of work and before acceptance by owner.
3.10  EQUIPMENT

A. Mechanical contractor to furnish all HVAC equipment indicated and/or scheduled on the drawings complete with bases, isolators, supports and other required accessories,

B. Install complete systems and place in proper operation per manufacturer's recommendations, lubricate and adjust as required. Furnish and install clean set of filters prior to balancing.

3.11  AIR DISTRIBUTION SYSTEMS

A. Furnish all materials, labor, equipment and accessories required to install complete air distribution systems.

B. Contractors bidding this project shall visit the site and familiarize themselves with all conditions affecting their work. Submission of a bid on this project shall be construed as having such knowledge.

C. Verify exact conditions in field and coordinate with the drawings and other trades before beginning new work.

D. Determine exact locations for all new ductwork and accessories in the field.

E. Coordinate work of this contract with other trades.

F. Any discrepancies between what is shown on drawings or specified and the actual conditions in the field shall immediately be brought to the attention of the architect before proceeding.

G. Building and surfaces damaged during installation shall be repaired, replaced, and/or restored to original condition after completion of work and before acceptance by owner.

3.12  REFRIGERANT PIPING

A. Refrigerant piping shall be ACR type with wrought copper, silver brazed fittings.

B. Piping insulation:
   a. Refrigerant liquid and vapor piping shall be insulated with ARMAFLEX ii, INSUL-TUBR, or RUBATEX r-180-fs tubing insulation. Outdoor section of insulation shall be coated with ultraviolet and weather resistant paint.
   b. Insulation thickness shall meet the requirements of the international energy conservation code referenced herein and the manufacturers recommendations.

C. Piping installation:
   a. Install refrigerant piping in accordance with the requirements of the international mechanical code referenced herein, ASHRAE standard 15; safety
code for mechanical refrigeration, current edition and the manufacturers written installation instructions.

b. Route piping in an orderly manner, parallel to building structure, and maintain gradient. Group piping whenever practical at common elevations. Sleeve piping passing through partitions, walls and floors. Slope condensate drain piping as indicated herein.

3.13 TESTING, ADJUSTING AND BALANCING

A. After installation, check all equipment and perform start up in accordance with the manufacturer's instructions.

B. Work that is scheduled to be concealed or insulated shall remain uncovered until required tests have been completed. If the construction schedule requires, arrange for tests on sections of the system at a time.

C. Balance all systems, calibrate controls, check for proper operation and sequence under all conditions and make all necessary adjustments.

D. Instruct owner in operation of systems and operating and maintenance manual for all equipment and systems.

End of section
PART 1- GENERAL

1.01 GENERAL PROVISIONS

A. Requirements specified on drawings, along with electrical specifications and all its sections, comprise the contract documents for the electrical contract. Drawings and all their revisions up to the bid submittal date become a binding part of the contract, along with these specifications as though they were one, and anything implied by the specifications shall be interpreted as also implied by the drawings and vice versa. Provide necessary items for a complete installation of all electrically operated equipment listed in the specifications or shown on the contract drawings.

B. The architectural, structural, mechanical, plumbing and equipment drawings and specifications are incorporated into, and become a part of this division. This contractor shall examine all such drawings and specifications and become thoroughly familiar with the provisions contained therein. The submission of his bid shall indicate such knowledge.

C. Electrical drawings are diagrammatic. They are intended to show the approximate locations of equipment and conduit. Dimensions given on the plans, in figures, shall take precedence over scaled dimensions and shall be verified in the field. The electrical contractor shall layout all equipment rooms to make sure the equipment, as purchased, fits in the room or space shown. Exact location of all equipment shall be verified in the field and routing of conduits shall suit field conditions.

D. Until the time of installation, the architect reserves the right to make minor changes in the location of conduit and equipment without additional cost to the contract.

E. The drawings and specifications are intended to supplement each other. Material and labor necessary to the project shall be furnished and installed even though not specifically mentioned in both. Labor and/or materials neither shown nor specified, but obviously necessary for the completion and proper functioning of the system, shall be furnished and installed by the electrical contractor at no additional cost.

F. Arrange all equipment substantially as shown on the drawings. Make deviations only where necessary to avoid interference. Check all equipment sizes against available space prior to shipment to avoid interference.

G. Examine the work of other trades insofar as their work comes in contact with or is covered by this work. In no case attach to, or finish against any defective work or install work in a manner which will prevent proper installation of the work of other trades.

H. Electrical contractor shall verify with other trades all electrical characteristics of equipment requiring electrical connections. Contractor shall verify voltage, phase and horsepower and shall notify engineer of any discrepancies prior to start of work. Electrical contractor shall provide disconnecting means and overload protection for all equipment, unless furnished integral with equipment package.
I. It is the intent of these drawings that this be a complete electrical job. Any errors or omissions shall be brought to the attention of the engineer prior to bidding the job.

J. Refer to Section 01 23 13 Supplemental Bids and Sheet M100 for work associated with Supplemental Bid Nos. 3 and 4.

1.02 SCOPE OF WORK

A. The electrical contractor shall provide all labor, material, storage, unpacking and placement; to include but not be limited to, the following items:

a. Complete power wiring for all air-conditioning equipment, plumbing system, heating equipment, ventilating and exhaust equipment, including temporary installations.

b. Testing of all cables and circuit wiring after installation.

c. Temporary disconnection and reconnection of roof top mechanical unit electrical components.

d. Temporary/final supports of existing conduits penetrating roof where supported by structures being removed/replaced.

e. Patching of all finishes disturbed as a result of temporary installations.

B. Provide and install new wiring, conduit, connectors, switches as required.

C. Provide power to temporary and continuous cooling measures in the Server Room as a turn-key system; to include all required provisions including receptacles, wiring, boxes, supports, etc.

D. Coordinate the sequencing/overlap of the temporary cooling system (in coordination with the decommissioning & recommissioning of the main system) so that there is no point during the project that the server room is without conditioned air.

E. Supplemental Bid No. 4 - Provide and install new goose neck opening for wire management of satellite dishes. Provide a 6” diameter galvanized conduit on pipe supports to capture all conduits heading to the satellite dish platform. Provide Uni-Strut mounted to the platform for the conduit to turn-up and goose-neck above the platform before the cables exit and connect to the dishes.

1.03 SUBMITTALS

A. The electrical contractor shall submit an electrical set of shop drawings. The shop drawings of the following equipment using the indicated numbering system and titles, shall be submitted through the architect to the engineer and then resubmitted for final approval, if necessary. Shop drawings shall be submitted for the following items:

a. Wiring devices
b. Molded case circuit breakers.
c. Cabling and conduit.
d. Supports
B. All submitted shop drawings (manufacturers "equipment descriptive sheets or vendors" prepared drawings) shall have the general contractor's or subcontractor's "stamp of approval" indicating that the item submitted is as called for on the plans and specifications, is approved by the general contractor or subcontractor, the date of approval and initialed by the person approving the submittal and the name of the company submitting said equipment for approval.

C. Every effort shall be made, in checking the shop drawings, to detect and correct all errors, omissions and inaccuracies. Failure to do this will not relieve the electrical contractor of the responsibility for the proper and complete installation in accordance with the contract documents.

D. Shop drawings to be submitted for review prior to start of construction.

E. Submit a written plan and schedule for review, including sequencing, prior to start of construction.

1.04 VISIT TO THE SITE

A. The contractor shall visit the site of the work and familiarize himself with all conditions affecting his work. The submission of his proposal shall indicate such knowledge. No additional payment shall be made on claims that arise from a lack of knowledge of the existing conditions.

1.05 CODE AND PERMITS

A. Installation shall be in full accordance with all codes, rules and regulations of municipal, city, county, state and public utilities and all other authorities having jurisdiction over the premises.

B. Comply with any specification requirements that are in excess but not in conflict with code requirements.

C. The contractor shall secure and pay for all permits, plan reviews and certificates of inspection in connection with his work, required by the foregoing authorities. Before final payment of the contract is allowed, all certificates shall be delivered to the architect in duplicate.

D. Electrical material and equipment shall bear the UL label except where UL does not label such types of material and equipment.

1.06 INTERFERENCES

A. Before the installation of any item begins, the electrical contractor shall carefully ascertain that it does not interfere with clearances for the erection of finish beams, columns, pilasters, walls or other structural or architectural members as shown on the architectural drawings. If any work is installed and the architectural design cannot be followed, this contractor shall, at his own expense, make changes in his work as directed by the architect to permit the completion of the architectural work in accordance with drawings and specifications.
B. It shall be the duty of this contractor to report any interferences between his work and that of any of the other contractors as soon as they are discovered. The architect shall determine which equipment will be relocated, regardless of which was installed first. His decision will be final.

1.07 QUALITY ASSURANCE

A. All products shall be new and of the type and quality specified. Where materials, equipment, apparatus or other products are specified by manufacturer, brand name, type of catalog number, such designation shall establish the standards of the desired quality and style. It is the intent of these specifications to establish a standard of quality of materials and equipment installed.

1.08 BASIC ELECTRICAL MATERIALS AND METHODS

A. Mounting Accessories

1. This contractor shall furnish and install all angle iron, channel iron, rods, supports, hangers, concrete or plywood required to install, mount and support any electrical equipment or device called for on the plans.

2. Supporting material shall be complete with hangers, connectors, bolts, clamps and necessary accessories to make a complete installation. Supporting material shall be galvanized, painted or otherwise suitably finished. Products by Brinkley, Steel City or RACO will be acceptable.

1.09 MATERIALS AND WORKMANSHIP

A. All work shall be installed in a practical and workmanlike manner, by mechanics skilled in the several trades necessary.

B. All materials shall be new and free from defects and shall be the best of their several kinds unless specified or indicated on the drawings to the contrary.

C. During each phase and at the completion of the construction, this contractor shall remove all debris and excess materials caused by his work. He shall leave the area of operation broom clean.

D. All electrical equipment shall bear the underwriters laboratories label or ETL label.

1.10 WARRANTY

A. This contractor shall guarantee his workmanship and material for a period of one year from the date of building opening and leave his work in perfect order at the completion. Should defects develop within the guarantee period, the contractor shall, upon notice of the same, remedy the defects and have all damages to other work or furnishings caused by the repairs corrected at his expense to the condition before such damage.
PART 2- PRODUCTS

2.01  GROUNDING AND BONDING

A. Ground all equipment per N.E.C.

B. All conduits shall contain a code-sized ground wire sized per N.E.C. In addition to the conductors shown on the plans. Where circuit conductors are increased in size for voltage drop, the ground wire size shall be increased proportionately.

C. After installing grounding system but before permanent electrical circuitry has been energized, test for compliance with requirements.

2.02  WIRE AND CABLE

A. Color code conductors (except control and instrumentation conductors) as follows:
   a. 208/120V System=Phase A black; Phase B red; Phase C blue; neutral white; ground green.
   b. #12 and #10 conductors shall have continuous insulation color, as listed above.
   c. Color code conductors larger than above, which do not have continuous insulation color by application of at least two laps of colored tape on each conductor at all points of access including junction boxes. Color tape shall be the equal of 3m products scotch #35.

B. Conductors shall be soft annealed copper insulated for 600 volts unless specifically indicated otherwise. Aluminum conductors are not allowed on this project.

C. Insulation type shall be type THWN for wire sizes #8 AWG and larger and THHN or THWN for #10awg and smaller. THHN shall not be used in wet or damp locations.

D. Flexible cord shall be heavy duty type so with an equipment ground conductor in addition to the current carrying conductors.

E. Provide #12 conductors, unless otherwise indicated.

F. Control conductors shall be #14 minimum for NEC class I and #16 for NEC class II.

G. Conductors #8 AWG and larger shall be stranded.

H. Conductors #10 AWG and smaller shall be solid.

I. Install final wiring in conduit. Concealed wiring in walls or above ceilings, or exposed in unfinished areas (where not subject to physical damage) may be run in MC or AC cable. Temporary wiring may be type NM-B.
J. Connect #10 and smaller wires with constant pressure expandable spring type connectors, "SCOTCHLOK" by 3M or B-CAP by BUCHANAN.

K. Connect #8 and larger wires with compression connectors or splices as manufactured by BURNDY or T&B.

L. Insulate splicing connectors to at least 200% of the wire insulation. Use pre-stretched tubing connector insulators, 3M PST for #2 and larger conductors.

M. Pull conductors using recognized methods and equipment leaving at least 6" wire at all junction boxes for connections.

N. Cleanout each conduit system before pulling wire.

O. Branch circuit wire sizes (and conduits) shall be increased from those indicated on the plans to prevent excessive voltage drop. Branch circuits shall be installed with wires of sufficient size so that voltage drop between the panel and the loads does not exceed limit of 3%.

P. Wire sizes shall be based on the 60 degrees C. ampacities for wire sizes no. 14-1 A.W.G., and 75 degrees C. ampacities for wire sizes #1/0 A.W.G. and larger.

Q. Circuits may be multi-plexed in conduit provided wire is properly derated and conduit sized per code. Under no circumstance shall more than (8) current carrying conductors be run in a single conduit.

2.03 RACEWAYS

A. All wire shall be run in accordance with code in corrosion resistant, rigid, threaded, metal conduit or electrical metallic tubing (e.m.t.) Unless otherwise specifically stated herein.

   a. Conduit in exterior walls, below floor slab, or underground shall be rigid, threaded, galvanized, heavy wall type.

   b. CARLON PVC type 40 heavy wall conduit with ground wire may be used below floor slab or underground in lieu of rigid, threaded, galvanized conduit. PVC 40 conduit shall not be run in or above floor slab. PVC conduit shall terminate below floor slab with rigid, threaded metal conduit adapter. Conduit above slab shall be metal.

   c. Conduit run exposed to the weather shall be heavy wall, metal threaded type.

B. Provide branch circuit conductors that are type THHN or THWN as required.

C. Conduit size shall be 3/4" minimum.

D. Conduit shall be securely fastened in place.

E. All final conduit shall be concealed in walls, floor and ceilings wherever possible. Exposed conduit in finished areas will not be permitted. Exposed conduit will be
permitted in unfinished areas with the specific approval of the architect, and in temporary installations.

F. Use liquid tight metal conduit for all connections to motors and other equipment subject to vibration and in areas subject to moisture.

G. Use watertight joints with buried and concrete encased conduit. All buried conduits outside of buildings shall have a minimum of 24” of cover. Metal conduits buried in earth shall be painted (two coats) with heavy Asphaltum paint.

H. Support runs of conduit as detailed in the appropriate table of the national electrical code (NEC).

I. If a conduit is suspended, it shall be supported on trapeze hangers which use "all-thread" rods from the structural steel. The use of ceiling support wire or similar material will not be accepted.

J. Provide Pitchpockets where conduits penetrate the roof.

K. Thread lubrication/sealant is required on outdoor and underground threaded metal joints.

L. Install fire seal fittings where conduits penetrate concrete floor slabs or masonry walls required to be fire rated.

M. Horizontal portion of conduit exposed on the roof and feeding equipment shall not be more than 5'-0" unless the written approval from architect or engineer is obtained.

2.04 PULL AND JUNCTION BOXES:

A. Install pull and junction boxes where shown on the drawings, and where required for changes in direction, at junction points, and to facilitate wire pulling. Furnish box sizes in accordance with NEC unless larger boxes are indicated.

B. Provide steel boxes and removable covers of code gage, hot rolled sheet steel, hot dipped galvanized inside and outside, for above ground work. Furnish weatherproof boxes when installed above ground outside.

C. Provide cast iron boxes, hot dipped galvanized inside and outside where shown on the drawings. Furnish removable covers with gaskets and stainless steel, brass or bronze screws.

2.05 SAFETY SWITCHES

A. Safety switches shall be the enclosed heavy-duty type (type HD) with quick-make, quick-break mechanism and external pad lockable operating handle.

B. Safety switches shall be rated for 240 or 600 volts as applicable. They shall be horsepower rated when used in motor circuits.
C. Safety switches shall be fusible or non-fusible, 2, 3, or 4 pole as indicated on the drawings.

D. Safety switches shall be single throw unless otherwise indicated on the drawings.

E. Enclosures shall be NEMA 1 indoors and NEMA 3r outdoors unless otherwise indicated on drawings.

F. Manufacturer shall be square d, siemens, or cutler-hammer. All safety switches shall be by one manufacturer.

G. Mount the safety switches securely between 3' & 6' levels above the floor unless otherwise indicated on the drawings.

PART 3 – EXECUTION

3.01 EXECUTION

A. The electrical work for construction proposed shall conform to all federal (OSHA), state, all specific safety requirements and the requirements of the current edition of the NEC.

B. Check the HVAC specifications for electrical requirements and include the same in the contract cost.

C. Equipment connections, starters, disconnect switches, control transformers and pushbutton stations for the equipment furnished by the owner or under a separate contract shall be installed and connected under this division, as indicated on the contract drawings.

D. All cutting, patching, excavating, backfilling and concrete work related to this contract will be the responsibility of the electrical contractor. This contractor shall assume the responsibility of providing the sleeves, chases and openings necessary for the electrical installation and for their repair in an acceptable manner, as determined by the architect. All holes shall be core-drilled. Provide fire stop in all openings created through fire-rated walls, floors or ceilings.

E. This contractor shall be responsible for providing all required access panels necessary for his work, coordinate with architect prior to installation.

End of section
PART 1 - GENERAL

1.01 GENERAL

The General Conditions and all parts of the Bid and Contract Documents are made part of this Section as if fully repeated herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

A. Section 01 03 01 – Available Information - Gale Evaluation Report
B. Section 01 12 16 – Work Sequence
C. Section 01 21 00 – Allowances
D. Section 01 22 00 – Unit Prices
E. Section 01 23 13 – Supplemental Bids
F. Section 01 50 00 – Temporary Facilities and Site Maintenance
G. Section 01 65 00 – Product Delivery, Storage, and Handling
H. Section 01 70 00 – Project Closeout
I. Section 02 41 00 – Selective Demolition
J. Section 03 30 00 – Concrete Restoration
K. Section 04 50 00 – Masonry Restoration
L. Section 06 10 00 – Rough Carpentry
M. Section 07 50 00 – Elastomeric Membrane Roofing
N. Section 07 51 00 – Elastomeric Membrane Restoration
O. Section 07 62 00 – Flashing and Sheet Metal Roofing
P. Section 22 22 00 – Roof Drains
Q. Section 23 00 00 – HVAC
R. Section 26 00 00 – Electrical

1.03 SUMMARY OF WORK

This Section specifies requirements for the following Scope of Work:

A. This section specifies the temporary relocation of existing lightning protection system in order to perform roof replacement, restoration, and associated work.

B. Provide additional terminals, accessories, cabling, and through-roof connections as indicated in Section 01 22 00 – Unit Prices.

C. Lightning protection for the building must remain in operation on a daily basis for the duration of the project. Temporary disconnections are permitted when the weather forecast does not predict electrical storms.

D. The Contractor may choose to design and use a temporary lightning protection system so long as building protection is uninterrupted.

E. Complete ground testing of the existing system before and after the roof replacement project.
1.04 QUALITY ASSURANCE

A. Evaluation, inspection, modification, and renovation of the lightning protection system shall be performed by:
   1. A licensed Lightning Protection Installer (LPI), working for a
   2. Licensed Lightning Protection Contractor (LPC),

B. The system temporary relocation and reinstallation shall be made under the supervision of an LPI Certified Master Installer.

1.05 SUBMITTALS

A. Submit the following:
   1. Shop Drawings:
      a. Submit sufficient information to demonstrate compliance with NFPA 780, UL Standard 96A, and LPI Standard 175.
      b. Show locations of air terminals, connections to required metal surfaces, and down conductors.
      c. Show the mounting hardware and materials used to attach air terminals and conductors to the structure.
      d. The shop drawing will show the extent of the system layout along with details of the products to be used in the installation.

   2. Certifications: Two weeks prior to final inspection, submit the following.
      a. Certification by the manufacturer that the lightning protection system conforms to the requirements of the specifications.
      b. Certification by the Contractor that the lightning protection system has been properly installed and inspected.

1.06 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by designation only.

B. National Fire Protection Association (NFPA):
   70-11 ......................... National Electrical Code (NEC)
   780-11 ....................... Standard for the Installation of Lightning Protection Systems

C. Underwriters Laboratories, Inc. (UL):
   96-05 ......................... Lightning Protection Components
   96A-07 ...................... Installation Requirements for Lightning Protection Systems
   467-07 ...................... Standard for Grounding and Bonding Equipment

1.07 UNIT PRICE WORK

A. The Unit Prices are above and beyond those shown on the Contract Drawings, and shall be carried by the Contractor within the Base Bid Scope of Work. Unit prices for certain work of this Section are listed in the General Requirements.
Section 01 22 00, UNIT PRICES that precedes the technical specifications. The General Contractor and Engineer shall verify the actual quantities used.

B. All dimensions and quantities shall be determined or verified by the Contractor. The Contract Drawings have been compiled from various sources and may not reflect the actual condition at the time of construction. The Contractor is advised to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

C. Unit Price No. 1.1.5: The Base Bid shall include all labor, access, materials, and accessories required for the proper installation of the removal, replacement, and reinstallation of two (2) lightning protection terminals. The current quantity of damaged lightning protection terminals is unknown.

D. Unit Price No. 1.1.6: The Base Bid shall include all labor, access, materials, and accessories required for the proper replacement or extension of lightning protection cables and splices. Sections of replacement or extensions shall be five (5) linear feet and include required splices. Carry two (2) lengths with splices as indicated. The current quantity of damaged lighting protection cables and splices is unknown.

E. Unit Price No. 1.1.7: The Base Bid shall include all labor, access, materials, and accessories required for the proper replacement of lightning protection through-roof connectors. Carry two (2) new through-roof connectors. The current quantity of through-roof connectors that require replacement is unknown.

1.08 WARRANTY

A. Upon completion of the work, and prior to final payment, the Contractor shall submit a Warranty of his work to be free from defect in materials and workmanship. This Warranty shall be for a period of three (3) years, and shall be signed by a Principal of the Contractor’s firm, and sealed if a corporation.

PART 2 - MATERIALS

2.01 GENERAL REQUIREMENTS

A. Lightning protection components shall conform to NFPA 780 and UL 96, for use on Class 1 structures. Aluminum materials are not allowed.

1. Class 1 conductors: Copper.
2. Class 1 air terminals: Solid copper, 460 mm (18") long, not less than 12.7 mm (1/2") diameter, with sharp bare copper points.
3. Bonding plates: Bronze, 50 square cm (8 square inches).
4. Through roof connectors: Solid copper riser bar housed in UV stable PVC, length and type as required to accommodate roof structure and flashing requirements, with parallel cable connections or straight inline cable to rod couplers.
5. Anchors and fasteners: Bronze bolt and clamp type shall be used for all applications.
6. Connectors: Bronze clamp-type connectors shall be used for roof conductor splices, and the connection of the roof conductor to air terminals and bonding plates. Crimp-type connectors are not allowed.
7. Provide bi-metallic connectors where required for bonding to metal objects.
8. Copper lightning protection materials shall not be installed on aluminum surfaces.

B. Acceptable Manufacturers:
1. Advanced Lightning Technology, Ltd.
2. East Coast Lightning Equipment, Inc.
3. ERICO, Inc.
4. Harger, Inc.
5. Heary Brothers Lightning Protection Co., Inc.
7. Preferred Lightning Protection
8. Robbins Lightning, Inc.

PART 3 - EXECUTION

3.01 INSTALLATION
A. Installation shall be coordinated with the manufacturer and coordinated with the roofing system manufacturer.
B. Install the conductors as inconspicuously as practical.
C. Make connections of dissimilar metal with bimetallic type fittings to prevent electrolytic action.
D. Connect roof conductors to all metallic projections and equipment above the roof where existing connections occur.
E. Conductors shall be rigidly fastened every 900 mm (3') along the roof and down to the building to ground.
F. Air terminals shall be secured against overturning either by attachment to the object to be protected or by means of a substantial tripod or other braces permanently and rigidly attached to the building or structure.
G. Install air terminal bases, cable holders and other roof-system supporting means without piercing metal roofs where practical.
H. Use through-roof connectors for penetration of the roof system. Flashing shall be provided by roofing contractor in accordance with Section 07 62 00 Sheet Metal Flashing and Roofing and 07 50 00 Elastomeric Membrane Roofing.
I. Roof penetrations required for down conductors or for connections to structural steel framework shall be made using through-roof assemblies with solid bars and appropriate roof flashings. The roofing contractor shall furnish the methods and materials required at roofing penetrations of the lightning protection components and any additional roofing materials or preparations required by the roofing manufacturer for lightning conductor runs to assure compatibility with the warranty for the roof.

3.02 ACCEPTANCE CHECKS AND TESTS

A. Test the ground resistance to earth by standard methods.

END OF SECTION