SECTION 170000

REMOVAL OF ASBESTOS CONTAINING ROOFING MATERIALS

PART 1 - GENERAL

1.01 STIPULATIONS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section. The specifications sections "General Conditions", "Special Requirements" and "General Requirements" form a part of this section by reference thereto and shall have the same force and effect as if printed herewith in full.

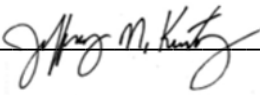
B. The procedures specified herein are guidelines for minimum performance. The Contractor is responsible for his own methods of operations and conformance to regulatory codes, rules and guidelines. The Contractor is required to obtain all permits, licenses and approvals to perform the work, including any rights to use patented systems.

C. Asbestos Project Designer:

Name: Jeffrey M. Kuntz

Company: Batta Environmental Associates, Inc.

PA L&I Certification No. 025952

Signature: 

1.02 SCOPE OF WORK

A. The scope of work for this project covers the supplying of all labor, tools, materials, equipment, services and appurtenances to accomplish the work specified and indicated on the contract drawing. The work shall be performed to the complete satisfaction of the Owner in accordance with the current EPA, OSHA, State Labor and Industry and Department of Environment Protection, City of Philadelphia and any other applicable State and Local Government regulations.

B. Contractor shall submit a Work Plan which describes specifically how abatement work is to be completed for each work area. At a minimum the Work Plan shall address work area preparation, work practices, decon location, respiratory protection, and disposal. Approval of the Work Plan must be obtained through the Owner prior to the start of work. Procedures outlined in the Work Plan must be followed throughout the abatement. Any changes in Work Plan require prior approval from Owner.

C. Work under this project includes but is not limited to the following:

- ACM Roofing Field and associated materials of the indicated 2 roof sections as shown on CAD Drawing File 995820-1, approximately 3,000 SF (1,600 SF + 1,400 SF)

- ACM Roof Edge Flashings of the indicated roof section as shown on CAD Drawing File 995820-1, approximately 130 LF

1.03 CONTROL OF WORK

A. All work which does not conform to the requirements of the contract, plans and specifications will be considered unacceptable.

B. Unacceptable work, whether the result of poor workmanship, damage through carelessness, or any other cause found to exist prior to the final acceptance of the work, shall be corrected immediately in an acceptable manner.

C. All bidders should inspect job site prior to bidding to determine job conditions.

D. If the Owner finds the work performed, or the finished product not within reasonably close conformity with the plans and specifications and have resulted in an unacceptable finished product, the affected work shall be re-accomplished or otherwise corrected by and at the expense of the Abatement Contractor.

E. The term "reasonably close conformity" shall not be construed as waiving the Contractor's responsibility to complete the work in accordance with the plans, contract and specifications. The term shall not be construed as waiving the Owner's right to insist on strict compliance with the requirements of the contract, plans and specifications during the Abatement Contractor's performance of the work, when in the Owner's opinion and judgement such compliance is essential to provide an acceptable finished product.

1.04 QUALITY ASSURANCE

A. Consultant:

1) The Owner shall contract for an Asbestos Project Monitor certified for work in the City of Philadelphia, hereafter referred to as ‘Consulting Firm’ which specializes in performing air sampling, project monitoring and inspections on asbestos abatement projects. The Consulting Firm's testing laboratory shall as a minimum be accredited by AIHA for PCM asbestos air analysis and NVLAP for asbestos bulk analysis.

2) The Consulting Firm will be responsible for certifying the project was completed in accordance with all federal, state, and local asbestos standards and regulations.

3) The Consulting Firm and Asbestos Abatement Contractor must complete the Certification of Visual Inspection form found at the end of this section for each work area completed.

4) The Consulting Firm shall review the Contractors Work Plan which describes

specifically how work is to be completed for each abatement area. Approval of the Work Plan must be obtained from the Owner prior to the start of work.

B. Contractor Experience:

1) The Asbestos Abatement Contractor shall have a minimum of three (3) years experience in the asbestos abatement business. He shall have successfully completed three (3) projects of similar or larger size and dollar value to this project and shall not have defaulted on an asbestos abatement project within the last three (3) years. The Contractor shall be certified by Pennsylvania Department of Labor and Industry.

C. Worker Certification:

1) The Contractor shall furnish proof that his employees have had instruction on the dangers of asbestos exposure, on respirator use, decontamination and current OSHA and EPA regulations.

2) Documentation of workers' medical exams, consist of x-rays and pulmonary function shall be submitted and as may be required by current OSHA and EPA regulations and any applicable State and Local Government regulations.

3) There must be on site at all times, an EPA Certified Asbestos Abatement Supervisor. The Asbestos Abatement Supervisor shall have successfully completed a 5-day EPA Certified Practices and Procedures Course as required per 40 CFR, Part 763, Subpart E, Appendix C-EPA Model Accreditation Plan (must provide a copy of certificate from EPA approved course). All asbestos workers shall have successfully completed a 4-day EPA Certified Practices and Procedures Course as per 40 CFR, Part 763, Subpart E, Appendix C, EPA Model Accreditation Plan. The Contractor must provide copies of certificates from Pennsylvania Department of Labor and Industry for all workers, and supervisors as required by regulation.

4) When required by the Pennsylvania Department of Labor and Industry (PDL&I) the Contractor, Abatement Supervisor, and Abatement Workers shall be licensed by (PDL&I). Each worker/supervisor shall have a current photo identification issued by PDL&I available on request by the Owner when required.

1.05 POSTING OF REGULATIONS

A. The Abatement Contractor will have at all times in his possession at his office one (1) copy and in view at the job site one (1) copy, of the current OSHA Regulations 29 CFR 1926.1101, Asbestos and current Environmental Protection Agency 40 CFR Part 61, Subpart M: National Emission Standard for Hazardous Air Pollutants as related to asbestos stripping, emissions, notification, work practices and disposal of asbestos waste.

1.06 REGULATORY SUBMITTALS (ABATEMENT CONTRACTOR'S RESPONSIBILITY)

The Abatement Contractor is required to notify the building occupants (via the Owner) and the following agencies in writing ten (10) days prior to starting work for notification and instructions concerning proper disposal of asbestos waste material.

1) United States Environmental Protection Agency - Region III
Asbestos - NESHAP Coordinator (3AT33)
841 Chestnut Building
Philadelphia, PA 19106

2) Pennsylvania Department of Environmental Protection
Bureau of Air Quality Control
Regional Manager

3) Pennsylvania Department of Labor and Industry
Asbestos Occupation Accreditations & Certification
Bureau of Occupational and Industrial Safety
Room 1623 Labor and Industry Building
Seventh & Forster Streets
Harrisburg, Pennsylvania 17120

4) City of Philadelphia Department of Public Health
Air Management Services, Asbestos Control Unit
321 University Avenue
Philadelphia, PA 19104-4597

5) EPA, DEP approved asbestos landfill proposed to be used by the Contractor for RACM. Submit completed WSR for RACM at projects end.

1.07 AIR TESTING AND MONITORING

A. Air sampling of the work areas and surrounding environment will be conducted during the performance of this contract by the Consulting Firm so as to ensure abatement procedures are in compliance with all codes, regulations, ordinances and this specification.

B. The Contractor shall fully cooperate with the Consulting Firm and all others responsible for testing and inspecting the work.

C. Air testing and analyses shall be in accordance with current EPA requirements and Section 29 CFR 1926.1101 of the current OSHA Regulations, as a minimum. Analysis shall be performed by Phase Contrast Microscopy per NIOSH 7400 Method.

D. Air tests taken prior to start of work (background), and during work activities, will be analyzed by PCM-Phase Contrast Microscopy.

E. The Consulting Firm shall give verbal notification to the Owner of the results of each test within twenty-four (24) hours of analysis. The Consulting Firm shall confirm the results in writing in a final closeout report.

F. Representatives of the Consulting Firm shall have access to the work area at all times. The Abatement Contractor shall facilitate such access in order that the Consulting Firm may properly perform its function.

G. Sampling equipment and personnel will be provided by the Consulting Firm.

H. Air sampling shall be performed in and around each work area prior to commencement of the work at that location and throughout the abatement process.

I. Air samples shall be taken in accordance with, but not necessarily limited to, the following schedule:

1. Before Start of Work the Consulting Firm will secure air samples to establish a base line in compliance with the City of Philadelphia regulations as needed.

a. PCM Samples:

Location Sampled	Number of Samples	Limit Value (Fibers/cc)	Approx. Volume (Liters)	Rate (Liters/ Minute)
Within 100 Feet Of Work Area	5	0.01	1,000	1-16

b. Base Line which is defined as a level expressed in fibers per cubic centimeter which is twenty-five percent greater than the largest of the following:

a. Average of the PCM samples collected outside each Work Area
b. 0.01 fibers per cubic centimeter

2. Daily:

a. From start of work of Temporary Enclosures through the work of Section 170000 Project Decontamination, the Owner may take samples.

b. Sample volume and sensitivity: inside the work area may vary depending upon conditions in the work area. If samples are overloaded at the sample volume required for a limit value equal to the Stop Action Levels or Immediate Stop Action Levels given later in this section, the level is considered to have been exceeded.

c. PCM Samples:

Location Sampled	Number of Samples	Limit Value (Fibers/cc)	Approx. Volume (Liters)	Rate (Liters/ Minute)
Within 100 Feet Of Work Area	5	0.01	1,000	1-16

3. Additional samples may be taken at Owner's or Owner's Representative discretion. If airborne fiber counts exceed allowed limits additional samples may be taken as necessary to monitor fiber levels.

J. A Work Area VISUAL clearance inspection will be performed by the Abatement Supervisor and the Consulting Firm's on-site representative before work area protective regulated area barriers and signs are removed.

K. The Abatement Contractor is responsible for performing required 8 hour TWA personal air samples in the employees breathing zone per OSHA regulations.

1.08 AIR FILTERING - (Not required for exterior open air work)

1.09 ALTERNATIVE AIR FILTERING METHODS - (Not required for exterior open air work)

1.10 PLACEMENT OF WARNING SIGNS AND LABELS

A. The Abatement Contractor shall furnish and place warning signs and barrier tape at all approaches to asbestos abatement areas. Locate warning signs at such a distance that personnel may read the warning sign and take the necessary protective action required before entering the area. Warning signs shall be in place for the duration of the work. The Abatement Contractor shall furnish and attach caution labels to all disposal containers holding asbestos materials, scrap waste, debris and other products contaminated with asbestos.

B. The Abatement Contractor will provide Warning Signs conforming to 29 CFR 1926.1101 with the following legend:

DANGER
ASBESTOS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
AUTHORIZED PERSONNEL ONLY
WEAR RESPIRATORY PROTECTION
AND PROTECTIVE CLOTHING IN THIS AREA

C. The Abatement Contractor will provide Caution Asbestos Labels and attach the labels to the outside of all disposal bags and containers which hold asbestos contaminated materials. Caution labels shall be printed in letters of sufficient size and contrast so as to be readily visible and legible and shall display the following legend:

DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST
AVOID CREATING DUST

D. The Abatement Contractor will provide Generator Identification Labels and attach the labels to the outside of all disposal bags and containers which hold asbestos contaminated materials and are to be transported off facility site. Identification labels shall display the following legend and be filled out by the abatement contractor:

Waste Generator Name: _____

Generator Location: _____

E. Transportation markings for materials departing site shall conform to 49 CFR 171 and 172 and shall be provided on all containers with more than one pound of friable asbestos. Transportation marking shall display the following legend:

R Q HAZARDOUS SUBSTANCE
SOLID, NOS
ORM-E, NA 9188
(ASBESTOS)

PART 2 - PRODUCTS

2.01 EQUIPMENT AND MATERIALS

A. The list of required materials will include, but is not necessarily limited to the following:

1) Respirators: Provide respiratory protection in accordance with OSHA Regulation 29 CFR 1926.1101 and appendices ANSI Z88.2-1980, regardless of any negative exposure assessments indicating respiratory protection is not required. There shall be NO EXCEPTION to this requirement. As minimum protection, negative pressure air purifying respirators shall be worn. The Abatement Contractor shall select the appropriate respirator based on an initial exposure assessment or exposure monitoring results. No employee or visitor shall enter any area without this respiratory protection until clearance has been issued by the Consulting Firm. Respirators shall be NIOSH approved. Wearers are to ensure proper filters are utilized, with HEPA as a minimum.

2) Protective Clothing: Disposable Clothing – such as "Tyvek" by DuPont or other comparable product. Clothing shall consist of coverall, head cover and foot cover. Gloves will be worn for hand cover as needed.

3) Wetting Agents - The asbestos material will be sprayed or misted with water containing an additive to enhance penetration. The additive, or wetting agent, will be polyoxyethylene at a concentration of one (1) ounce per five (5) gallons of water or as otherwise specified by the manufacturer, or a suitable equivalent. A fine spray of this solution must be applied to prevent fiber disturbance preceding the removal of the asbestos material. The asbestos must be sufficiently saturated to prevent emission of airborne fibers in excess of the exposure limits prescribed in the current OSHA standards referenced in these specifications. DRY REMOVAL WILL NOT BE ALLOWED.

4) Polyethylene sheeting of at least six (6) mils thickness shall be used for protection of HVAC supply and return openings, and decontamination units.

5) Polyethylene bags (with pre-printed warning labels) that are leak-proof and of at least six (6) mils thickness minimum are to be employed for disposal of all fine, loose waste debris. This fine, loose waste debris shall be double bagged and further wetted in the bag. The use of porous seed, rice, or other bags is allowed to minimize the puncturing or tearing of the waste bags, but are NOT counted as any of the required 2 leak-proof bags. Large sections of non-friable roofing with no loose dust attached may be loaded directly into a lined open-top dumpster, wetted, and covered for hauling to a dump, as long as the dump accepts unpackaged non-friable roofing waste. Open top dumpsters must be removed from site at the end of each shift, or secured with tamper resistant coverings to prevent unauthorized access to the waste material, or illegal use of the waste dumpsters.

6) Tape is to be a high-quality vinyl or fabric duct tape. Paper tape is not permitted.

7) Negative Pressure Filtration Equipment is NOT required for this project as all work areas are outdoor, open air.

8) Airless Spray Equipment should be used for saturating materials and to mist for fiber control. Low pressure equipment should be available onsite and utilized as needed.

9) Vacuums are required to be fully HEPA filtered / rated for asbestos abatement work. Any Roof Saws or power tools such as, but not limited to, saws, corers, abrasive wheels and drills must be provided with shrouded local exhaust ventilation systems with HEPA filtration.

10) Hand Tools for use during abatement, including but not limited to: brooms, plastic shovels, scrapers, brushes, etc., must be supplied by the Abatement Contractor in sufficient quantity to ensure the appropriate level of cleaning of the abatement area.

11) Water Filtration System is required to provide filtration of shower and contaminated water prior to disposal. A 5-micron filter or better is the minimum filtration level.

12) GFCI protection is to be provided for all electrical connections in the work area.

13) Encapsulants are not anticipated to be utilized for this project, but if deemed to be needed they are to be one of the following: International Cellulose Corporation SK-13 Asbestos Encapsulant, International Protective Coatings Corporation Serpiflex Shield, Fiberlock Technology ABC Asbestos Binding Compound Concentrate, American Coatings Corporation Cable Coating 2B, Decadex Laboratories Firecheck, Fiberlock Technology ABC Asbestos Binding Compound Concentrate and others listed as acceptable in the Environmental Protection Agency - Battelle Laboratory Encapsulant Study, or approved equal.

B. The Contractor will have at all times in his possession at the job site Safety Data Sheets (SDS) for wetting agents, encapsulants, solvents, strippers, and any other potentially hazardous materials.

2.02 PERSONNEL PROTECTIONS

A. Personnel protection is required for laborers, mechanics, supervisors and visitors at the work site during the set-up and abatement operations.

B. Each worker shall be supplied with a minimum of two (2) complete protective work clothes and respirator filter changes per day for the complete duration of the project. Hard hats should be available as appropriate which meet ANSI Z-89.1 standards. Safety toe footwear is to be worn underneath the disposable shoe covers and must meet the requirements and specifications in ANSI Z-41.1. Eye wear and face protection must meet the standards and specifications of ANSI Z-87.1.

C. In addition to sets of protective work clothes for workers, the Contractor shall have on hand two (2) additional sets of disposable work clothes, per day and respirators for personnel who are authorized to inspect the work site. Hard hats should be available as appropriate which meet ANSI Z-41.1. Eye wear and face protection must meet the standards and specifications of ANSI Z-87.1.

D. Respirators approved for asbestos use and protective work clothes will be worn by laborers and mechanics as a minimum during set-up.

E. Appropriate respirators will be worn by all personnel in the active work area.

F. Upon leaving the active work area, filters will be discarded, cartridges removed and respirators cleaned in disinfectant solution and clean water rinse.

G. Clean respirators will be dried and stored in plastic bags when not in use.

H. Respirators will be inspected daily for broken, missing, or deteriorated parts.

PART 3 - EXECUTION

3.01 AREA PREPARATION

A. Movable equipment or supplies will be removed from area of work by the Owner.

B. Heating and ventilating systems in the areas of work must be shut down and sealed at the roof work area prior to starting any work. Notify the Owner prior to starting any work so that they can arrange to have the heating and ventilating system shut down.

C. The Abatement Contractor shall isolate the work area for the duration of the work by installing asbestos Barrier Tape and Warning Signs, as well as completely sealing off with six (6) mil plastic sheeting, all HVAC unit openings, roof ventilator openings, wall vents, access doors, hatches, or windows in or near the work area, with the plastic sheeting taped securely in place.

D. The Abatement Contractor shall construct a remote 3 stage decontamination chamber in an area adjacent to the removal areas that does NOT require the workers to pass through an enclosed building space to access the decon from the roof removal areas.

3.02 DECONTAMINATION UNIT (USAGE AND ACTIVITIES)

A. The Clean Room of the remote decon is to be clearly marked "EXIT ONLY" and is where the workers will don street clothes or clean garments after showering when leaving the work area. Respiratory protection equipment may be stored in this area if desired. No asbestos contaminated items should enter this room.

B. The Shower Room of the remote decon connects the dirty room where workers remove soiled / contaminated tyveks or equivalent work garments to the clean room. After removing the soiled / contaminated tyveks or equivalent work garments, the workers proceed through the shower Room where they thoroughly wash themselves and their respirator with soap and water, removing their respirator once rinsed off, and then proceed to the clean room. This shower room is to be supplied with hot and cold water adjustable to the workers showering, and emptied by means of a transfer pump and filtering device removing all contamination 5 microns and larger as a minimum. All shower water filters will be disposed of as contaminated waste.

C. The Dirty Room is to be clearly marked "ENTER ONLY" and is a contaminated area where workers enter wearing soiled / contaminated tyveks or equivalent work garments, remove all of the contaminated garments, but leave their respirators in place until they have showered in the Shower Room. Contaminated work footwear or reusable safety equipment may be left here or packaged up for removal from site.

D. If outside the building structure, the decon is to be constructed out of wood or metal studs and protected by ½ inch minimum plywood walls and doors on all sides to discourage after-hours access or damage by non-authorized individuals. If outside the building structure the decon unit is also to be SECURED / ANCHORED to the ground (or roof).

E. Decontamination chambers require temporary water and electric services. Verify during the bidding period the availability for temporary hook up. Mobilization, hook-up, demobilization, and disconnection costs will be the responsibility of the Contractor. Installation of temporary services during demolition shall be per current EPA and OSHA regulations.

F. Work Area: The work area should be demarcated by Asbestos Hazard Barrier Tape and Danger - Asbestos Warning signs, erected at the start of each shift and removed at the end of each shift following passing a visual inspection performed by the Abatement Supervisor and the Consulting Firm's on-site representative. Any location where the work area is 10 feet or less from the perimeter of the building and the area below the work is accessible to pedestrians walking by, will be secured and barricaded off at least ten (10) feet out from the building at all times during abatement activity, except for the

entrances, by the use of standard "Danger – Asbestos Hazard" barrier / warning tape and warning signs. Signs shall be placed every 15 feet along the barrier tape. In areas where materials will be possibly falling off the roof onto the ground or other roof levels, a minimum of one layer of 6 mil polyethylene sheeting drop cloths are to be installed at the beginning of every shift to catch the debris, and removed and disposed of at the end of every shift. Should there be any likelihood of waste or equipment damaging or disturbing the soil or paved surface below the work area, plywood sheets of sufficient thickness to bear the load or impact anticipated are to be installed to protect the soil or surface from damage. Then a minimum of one layer of 6 mil polyethylene sheeting drop cloths will be installed over the plywood.

3.03 WORK AREA ENTRANCE/EXIT

A. Access to the roof will be by ladder, scaffold or through interior roof access doors. (NOTE: NO waste material will be transported through the building interior!) All workers involved in the removal of asbestos will utilize the following procedure for work area entrance and exit.

B. Disposable protective clothing such as Tyvek material suits, gloves, and respirators are required when working in the regulated abatement area, as well as in or around the waste dumpster. If the decon is located on the roof, single layer protective clothing / suits may be utilized. If the decon is located within the building structure or otherwise away from the roof work areas, two layers of protective clothing / suits MUST be utilized while within the regulated area, and the outer layer must be removed and disposed of upon exiting the regulated area. The inner layer will then be worn to travel to the decon unit, where it will be removed upon entry to the decon unit. Protective clothing sleeves will be taped to gloves and protective clothing legs will be taped to foot covers if suits do not have integral foot covers. The neck collar, zipper seam, wrists and ankles of protective clothing will be taped closed.

C. Worker will access any additional clothing or equipment left in Dirty Room and required by worker shall be donned. This may include work shoes or additional warm garments workers may provide themselves when the work area is too cold for coveralls only. These warm garments must be treated as contaminated clothing and left in the Dirty Room and disposed of at the conclusion of the project.

D. Worker proceeds to work area.

E. Before leaving the work area, the worker should remove all gross contamination and debris from the protective clothing, by vacuuming down the clothes with a HEPA filtered vacuum cleaner. In practice, this may be carried out by one worker assisting another. If the decon unit is a distance away and 2 suits were employed in the work area, the outer suit is to be removed when exiting the regulated area, and the inner suit will be worn while proceeding to the decon unit.

F. The worker proceeds to Dirty Room and removes all clothing except respiratory protection equipment. Extra work clothing may be stored in in the Dirty Room.

G. Disposable protective clothing is placed in a bag for disposal. The worker then proceeds into the shower room. Respiratory protection equipment should only be removed after wetting in shower to prevent inhalation of fibers. Employees must shower every time upon exiting the work area and before entering the Clean Room.

H. After showering, the worker will move to the Clean Room and dresses in either new protective clothes or street clothes. Respirator filters are sealed with tape or thrown away if spent, and respirator face-piece is thoroughly cleaned and left in the Clean Room, or placed in a clean respirator bag and taken by the worker out of the Clean Room.

I. Workers shall not eat, drink, smoke, chew gum, or chew tobacco in the work area. To eat, drink or smoke, workers shall exit the work area following the decontamination procedure outlined above.

J. All contaminated footwear shall be left inside work area until completion of the job, then cleaned or discarded as contaminated waste.

3.04 METHOD OF REMOVAL

A. Remove and dispose of all asbestos-containing materials (ACM) in accordance with the methods and procedures outlined in the United States Department of Labor, Occupational Safety and Health Administration (OSHA) Asbestos Regulations, Codes of Federal Regulations Title 29, Part 1926, Section 1926.1101, as well as any state or local requirements.

B. Dry removal will not be allowed except when wet removal will create a safety hazard. Dry removal will require written authorization by EPA and the Owner and / or the Owner' Consultant, except when work area has freezing conditions.

C. Work of this section shall be performed in the following manner:

1) Install six (6) mil polyethylene critical barriers over all doors, wall openings, windows, etc. Secure with duct tape on all sides.

2) After the general area is secured and the specific work area demarcated, the owner's consultant representative will conduct a pre-abatement visual inspection of the demarcated work area. Once a satisfactory inspection has been completed, removal work may begin. ALL ACM materials will be wetted and maintained in a wet state by the abatement contractor by the use of amended water applied as a fine mist from a sprayer or similar device. (Use of a garden hose directly onto the work area is NOT permitted.) The contractor shall follow proper removal procedures at all times. All asbestos containing materials shall be continually wetted with amended water during removal procedures. The asbestos containing roofing materials are to be removed completely to the deck or insulation layer as required and completely from any wall, curb, ventilation equipment, vent pipe, or structural component the roofing was adhered to. The area is to be HEPA vacuumed and no debris is to remain in the removal area. ALL ACM roofing materials within the delineated work areas are to be removed from the roof. Air flow into any HVAC or ventilation equipment in or near the active removal area must be prevented by installation and maintenance of six (6) mil polyethylene sheeting barriers securely fastened over all opening of the equipment. Electrical power running into or through the work area should be shut off.

3) Waste materials are to be regularly, promptly and properly packaged. Packaging is to be sufficient so as to not be punctured or damaged by handling. NESHAP labels are to be affixed PRIOR to the waste leaving the roof. If bags are used, they shall be double bagged and sealed in a goose neck fashion before being taken out of the work area. CLEAR waste bags are to be used. Packaging is to be decontaminated by wet wiping while still on the roof and lowered to the ground by a hoist or other means, NOT dropped or thrown from the roof. No waste is to be accumulated or stored on the roof. Any waste materials that have fallen from the roof onto plywood/polyethylene drop cloths below must also be promptly and properly packaged in accordance with this section.

4) Materials are to be removed ONLY as communicated by the Roofing Contractor with regard as to how much material can be put back in the following shift. Close coordination with the 'put-back' roofer, the asbestos project monitoring team, and the building owner is critical. Weather calls will be made by the roofing contractor.

5) After complete removal and final cleaning of all asbestos containing material throughout the work area, the owner's consultant representative and abatement contractor's supervisor will inspect the work area. When the complete removal work areas pass a visual inspection and contains no visible asbestos debris, the area will be deregulated and the abatement crew will remove all abatement equipment and supplies from the work area, turning the area over to the 'put-back' roofer. No unauthorized personnel will be allowed in the demarcated roof area under abatement until ALL contaminated waste has been removed and all asbestos abatement workers have left the demarcated roof work area.

6) NO Final air tests will be performed as this is not required. Clearance will be by visual inspection only. Deregulation of the regulated areas will not proceed until final visual inspections have passed and been documented by the owner's consultant firm representative.

7) The Abatement Supervisor shall coordinate with the "put-back" roofer to ensure that the open roof areas just abated are properly protected from the weather. While it is the responsibility of the "put-back" roofer to provide protection of the open area, the abatement supervisor is responsible to confirm the protection before departing the site. In an emergency situation, the abatement supervisor / crew will assist the roofer in a team effort, in working to protect the structure from water damage due to infiltration in the area of the current asbestos abatement work.

8) NOTE: The abatement Contractor will follow all current OSHA regulations when working near the roofs edge. During the performance of roofing work on flat or low-pitched roofs with a ground to eave height greater than 16 feet, workers engaged in such work shall be protected from falling from all unprotected sides and edges of the roof as follows:

ROOF EDGE MATERIALS HANDLING AREAS AND MATERIALS STORAGE.
Workers working in a roof edge materials handling or storage area located on a low-pitched roof with a ground to eave height greater than 16 feet shall be protected from

falling by the use of a Motion-stopping-safety (MSS) system along all unprotected roof sides and edges of the area.

(i) When guardrails are used at hoisting areas, a minimum of four feet of guardrail shall be erected on each side of the access point through which materials are hoisted.

(ii) A chain or gate shall be placed across the opening between the guardrail sections when hoisting operation are not taking place.

(iii) When guardrails are used at bitumen pipe outlets, a minimum of four feet of guardrail shall be erected on each side of the pipe.

(iv) When safety belt systems are used, they shall not be attached to the hoist.

(v) When safety belt systems are used they shall be rigged to allow the movement of workers only as far as the roof edge.

(vi) Materials may not be stored within six feet of the roof edge unless guardrails are erected at the roof edge.

(vii) Materials which are piled, grouped, or stacked shall be stable and self-supporting.

TRAINING

(i) The employer shall provide a training program for all employees engaged in roofing work so that they are able to recognize and deal with the hazards of falling associated with working near a roof perimeter. The employees shall also be trained in the safety procedures to be followed in order to prevent such falls.

(ii) The employer shall assure that employees engaged in roofing work have been trained and instructed in the following areas:

(a) The nature of fall hazards in the work area near a roof edge;

(b) The function, use, and operation of the MSS system, and the safety monitoring systems to be used;

(c) The correct procedures for erecting, maintaining and disassembling the systems to be used;

(d) The role of each employee in the safety monitoring system when this system is used;

(e) The limitations on the use of mechanical equipment; and

(f) The correct procedures for the handling and storage of equipment and materials.

(iii) Training shall be provided for each newly hired employee, and for all other employees maintain proficiency in the areas listed above.

FALL PROTECTION PLAN

It is the responsibility of the abatement contractor to have a written Fall Protection plan in accordance with OSHA 29 CFR 1926, in place prior to any roof work beginning. The written Fall Protection plan must be brought to and kept on site. It will be the responsibility of the abatement supervisor to have read and fully understood all parts of the Fall Protection plan, inform all workers about the plan, and ensure all part of the plan are being continually implemented while roof and/or elevated work is ongoing.

PROTECTION OF ROOF

If the abatement contractor must walk or place equipment on any portion of the old or new roof, it will be protected with 4 X 8 sheets of plywood wired together at each end, unless waived by the building owner.

3.05 HOUSEKEEPING

A. Throughout the work period, the Contractor shall maintain the building and site in a standard of cleanliness as specified throughout these specifications. Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the work is indicated. Maintain the existing building in a weather tight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period. Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.

B. Contaminated disposable clothing, respirator filters and other ACM debris will be bagged, properly labeled and sealed at the end of each work day.

C. All asbestos waste generated will be bagged, properly labeled, sealed and secured in a lockable asbestos waste dumpster or removed from site at the end of each work day.

D. Respirators will be thoroughly cleaned at the end of each workday and stored for the next day's use.

E. Retain all stored items in an orderly arrangement allowing maximum access, not impeding traffic, and providing the required protection of materials.

F. Do not allow the accumulation of scrap, debris, waste material, and other items not required for completion of this work.

G. At least weekly, and more often if necessary, completely remove all scrap, debris and waste material from the job site.

H. Unless otherwise noted or directed, materials resulting from demolition operations shall be the property of the Contractor, shall not be used in the work and shall be promptly removed from the site.

I. Daily, and more often if necessary, inspect the work areas and adjoining spaces, and pick up all scrap, debris and waste material. Remove all such items to the place designated for their storage.

J. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the environment.

K. Maintain the site in a neat and orderly condition at all times.

L. Compressed air is not to be used for cleaning purposes.

3.06 FINAL DECONTAMINATION OF WORK AREA

A. All loose removed asbestos debris material is to be double bagged by the Abatement Contractor, and the bags shall be properly labelled as required. Bags shall be wiped with clean damp cloths prior to transportation to the approved disposal site.

B. Large sections of removed roofing with no loose dust or debris may be placed within a lined open-top asbestos waste dumpster and maintained in a damp condition until removed from the site and transported to the approved disposal site.

C. Cleaning shall be performed utilizing hand tools and HEPA filtered vacuums until there is no visible debris from removed material or residue on the roof deck or surrounding areas. This cleaning shall extend to include the decontamination unit.

D. Pressure washing techniques of any kind are strictly prohibited.

E. The owner’s consultant firm representative and the abatement contractor’s supervisor will inspect each daily work area. When the complete removal work area passes a visual inspection and contains no visible asbestos debris, the area will be deregulated and the abatement crew will remove all abatement equipment and supplies from the work area, turning the area over to the ‘put-back’ roofer. No unauthorized personnel will be allowed in the demarcated roof area under abatement until ALL contaminated waste has been removed and all asbestos abatement workers have left the demarcated roof work area.

F. NO Final air tests will be performed as this is not required. Clearance will be by visual inspection only (as described above). Deregulation of the regulated areas will not proceed until final visual inspections have passed and been documented by the owner’s consultant firm representative.

G. Following successfully passing the visual inspection the regulated area may be deregulated and the Consulting Firm's representative and the Abatement Contractor's supervisor shall complete a Certification of Visual Inspection form found at the end of this section.

3.07 DISPOSAL OF ASBESTOS WASTE

A. All RACM and miscellaneous ACM debris will be transported to the predesignated disposal site in accordance with the guidelines of the U.S. Environmental Protection Agency, Title 40, Part 61, Subpart M, and all local agencies' regulations. Ensure all waste bags/leak-tight container have the facility's name, address, and contact person as required by NESHAP.

B. EPA NESHAP Category I & II non-friable ACM may be disposed of as C&D waste as allowed by regulation. If non-friable materials become friable they must then be disposed of as regulated ACM waste in an approved landfill.

C. Workers loading/unloading the asbestos materials and machinery operators within the regulated work area will wear respirators and disposable work clothing when handling asbestos containing materials at the project and disposal site. Asbestos warning signs shall be posted on vehicles as required by regulations.

D. Obtain completed Waste Shipment Record (WSR) for all RACM. WSR must also indicate the amount of waste in cubic yards / number of bags / weight. Submit signed WSR with the final report / Project Close-out.

3.08 INSPECTIONS

A. All work procedures detailed in this specification will be strictly adhered to and meet or exceed all current EPA, OSHA, DEP, ASTM, PDL&I, and City of Philadelphia regulations.

B. All work shall meet with the approval of the Owner. Work which does not meet with the approval shall be determined to be unsatisfactory.

ASBESTOS CERTIFICATION OF VISUAL INSPECTION

Project Name:_____

Project Number:_____

Building Name:_____

Work Area Location:_____

ABATEMENT CONTRACTOR CERTIFICATION

In accordance with Project Specifications and scope of work, the abatement contractor hereby certifies that the Abatement Contractor has visually inspected the work area (all surfaces including pipes, beams, ledges, walls, ceiling and floor, decontamination unit, sheet plastic, etc.) and has found no asbestos dust, debris or residue.

Abatement Contractor Name:_____

Signature:_____ Print Name:_____

Print Title:_____ Date:_____

QUALITY ASSURANCE CONSULTANT

The Quality Assurance Consultant hereby certifies that he/she has accompanied the Abatement Contractor on the visual inspection and verifies that this inspection has been thorough and to the best of his/her knowledge and belief, the Abatement Contractor's certification above is a true and honest one.

Quality Assurance Consultant Name:_____

Inspector Signature:_____ Date:_____

Print Inspector Name:_____

END OF SECTION

SECTION 028500

REMOVAL OF MOLD CONTAMINATED MATERIALS

PART 1 - GENERAL

1.01 INTRODUCTION / BACKGROUND

A. A visual assessment and air sampling was performed by Batta Environmental to document the current conditions within the Pelbano Recreational Center located at 8101 Bustleton Avenue in Philadelphia, Pennsylvania as they may relate to suspected mold contaminated materials or conditions that may promote mold growth. Only select interior areas of interest were sampled, including the Rawhurst AA Room, a Classroom, and the Multi-Purpose Room. An outdoor ambient sample was also secured for comparative purposes. While no visible mold was observed, one of the samples (Rawhurst AA Room) had an elevated count for the spores of Chaetomium (1550 spores/m^3), which was not detected in any of the other samples. Chaetomium is common to water damaged materials, and presents a musty odor. This presence may be associated with possible hidden growth within the room. Care should be taken when impacting water damaged materials associated with this project.

Based on the conditions, within the recreational center, Batta Environmental Associates, Inc. has developed this mold remediation plan when encountering mold contaminated materials. Guidance within this plan is based on the OSHA guidance document "A Brief Guide to Mold in the Workplace."

1.02 STIPULATIONS

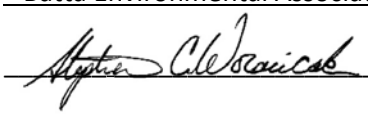
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section. The specifications sections "General Conditions", "Special Requirements" and "General Requirements" form a part of this section by reference thereto and shall have the same force and effect as if printed herewith in full.

B. The procedures specified herein are guidelines for minimum performance. The Contractor is responsible for his own methods of operations and conformance to regulatory codes, rules and guidelines. The Contractor is required to obtain all permits, licenses and approvals to perform the work, including any rights to use patented systems.

C. Guidance Document Author:

Name: Stephen C. Woronicak

Company: Batta Environmental Associates, Inc.

Signature: 

1.02 SCOPE OF WORK

A. The scope of work for this project covers the supplying of all labor, tools, materials, equipment, services and appurtenances to accomplish the work specified and indicated on the contract drawing. The work shall be performed to the complete satisfaction of the Owner in accordance with the current EPA, OSHA, State Labor and Industry and Department of Environment Protection, City of Philadelphia and any other applicable State and Local Government regulations.

B. Contractor shall submit a Work Plan which describes specifically how the work is to be completed for each work area. At a minimum the Work Plan shall address work area preparation, work practices, decon location (if required), respiratory protection, and disposal. Approval of the Work Plan must be obtained through the Owner prior to the start of work. Procedures outlined in the Work Plan must be followed throughout the abatement. Any changes in Work Plan require prior approval from Owner.

C. Work under this project includes but is not limited to the following areas noted on drawing A-107 dated March 1, 2021:

R1 – 72 SF	R5 – 30 SF	R9 – 34 SF	R11 – 106 SF
R3 – 21 SF	R7 – 33 SF	R10 – 17 SF	R14 – 25 SF

1.04 CONTROL OF WORK

A. All work which does not conform to the requirements of the contract, plans and specifications will be considered unacceptable.

B. Unacceptable work, whether the result of poor workmanship, damage through carelessness, or any other cause found to exist prior to the final acceptance of the work, shall be corrected immediately in an acceptable manner.

C. All bidders should inspect job site prior to bidding to determine job conditions.

D. If the Owner finds the work performed, or the finished product not within reasonably close conformity with the plans and specifications and have resulted in an unacceptable finished product, the affected work shall be re-accomplished or otherwise corrected by and at the expense of the Contractor.

E. The term "reasonably close conformity" shall not be construed as waiving the Contractor's responsibility to complete the work in accordance with the plans, contract and specifications. The term shall not be construed as waiving the Owner's right to insist on strict compliance with the requirements of the contract, plans and specifications during the Contractor's performance of the work, when in the Owner's opinion and judgement such compliance is essential to provide an acceptable finished product.

1.05 QUALITY ASSURANCE

A. Consultant:
1) The Owner shall contract for an Industrial Hygiene Project Monitor certified for work in the City of Philadelphia, hereafter referred to as 'Consulting Firm' which specializes in performing air sampling, project monitoring and inspections for mold remediation projects. The Consulting Firm's testing laboratory shall as a minimum be accredited by AIHA for Mold air analysis.

2) The Consulting Firm will be responsible for certifying the project was completed in accordance with all federal, state, and local asbestos standards, guidelines, and regulations.

3) The Consulting Firm and Mold Remediation Contractor must complete the Certification of Visual Inspection form found at the end of this section for each work area completed.

4) The Consulting Firm shall review the Contractors Work Plan which describes specifically how work is to be completed for each remediation area. Approval of the Work Plan must be obtained from the Owner prior to the start of work.

B. Contractor Experience:
1) The Mold Remediation Contractor shall have a minimum of three (3) years experience in the mold remediation business. They shall have successfully completed three (3) projects of similar or larger size and dollar value to this project and shall not have defaulted on a project within the last three (3) years.

C. Worker Certification:
1) The Contractor shall furnish proof that his employees have had instruction on the dangers of mold exposure, on respirator use, decontamination and current OSHA and EPA regulations.

2) There must be on site at all times, a mold remediation Supervisor who has training in the mold remediation field. All mold remediation workers shall have training in the mold remediation field.

1.06 AIR TESTING AND MONITORING

A. Air sampling of the work areas and surrounding environment will be conducted during the performance of this contract by the Consulting Firm so as to ensure remediation procedures are in compliance with all codes, regulations, ordinances and this specification.

B. The Contractor shall fully cooperate with the Consulting Firm and all others responsible for testing and inspecting the work.

C. Air testing and analyses shall be in accordance with current industry standards as a

minimum. Analysis shall be performed by Spore Trap Analysis – ASTM D7391-17 method.

D. The Consulting Firm shall give verbal notification to the Owner of the results of each test within twenty-four (24) hours of analysis. The Consulting Firm shall confirm the results in writing in a final closeout report.

E. Representatives of the Consulting Firm shall have access to the work area at all times. The Abatement Contractor shall facilitate such access in order that the Consulting Firm may properly perform its function.

F. Sampling equipment and personnel will be provided by the Consulting Firm.

G. Air sampling may be performed in and around each work area prior to commencement of the work at that location and throughout the remediation process, as dictated by the Consulting Firm. Additional samples may be taken at Owner's or Owner's Representative discretion.

H. A Work Area VISUAL clearance inspection will be performed by the Remediation Supervisor and the Consulting Firm's on-site representative before work area protective regulated area barriers and signs are removed.

1.07 AIR FILTERING

A. HEPA filtered Negative Pressure Filtration Equipment is recommended for all mold remediation work areas and required when removal quantities require it (Level IV). These units are to have new HEPA filters installed prior to arrival on this work site and not have been previously used for asbestos or lead abatement.

PART 2 - PRODUCTS

2.01 EQUIPMENT AND MATERIALS

A. The list of required materials will include, but is not necessarily limited to the following:

1) Respirators: Provide respiratory protection in accordance with OSHA Regulation 29 CFR 1926.1101 and appendices ANSI Z88.2-1980, regardless of any negative exposure assessments indicating respiratory protection is not required. There shall be NO EXCEPTION to this requirement. As minimum protection, negative pressure air purifying respirators shall be worn. The Remediation Contractor shall select the appropriate respirator based on an initial exposure assessment or exposure monitoring results. No employee or visitor shall enter any area without this respiratory protection until clearance has been issued by the Consulting Firm. Respirators shall be NIOSH approved. Wearers are to ensure proper filters are utilized, with HEPA as a minimum.

2) Protective Clothing: Disposable Clothing – such as "Tyvek" by DuPont or other comparable product. Clothing shall consist of coverall, head cover and foot cover.

Gloves will be worn for hand cover as needed.

3) Wetting Agents - The asbestos material will be sprayed or misted with water containing an additive to enhance penetration. The additive, or wetting agent, will be polyoxyethylene at a concentration of one (1) ounce per five (5) gallons of water or as otherwise specified by the manufacturer, or a suitable equivalent. A fine spray of this solution must be applied to prevent fiber disturbance preceding the removal of the asbestos material. The asbestos must be sufficiently saturated to prevent emission of airborne fibers in excess of the exposure limits prescribed in the current OSHA standards referenced in these specifications. DRY REMOVAL WILL NOT BE ALLOWED.

4) Polyethylene sheeting of at least six (6) mils thickness shall be used for protection of HVAC supply and return openings, and decontamination units.

5) Polyethylene bags that are leak-proof and of at least six (6) mils thickness minimum are to be employed for disposal of all debris, or larger materials may be wrapped and sealed with polyethylene sheeting of at least six (6) mils thickness and high-quality vinyl or fabric duct tape.

6) Tape is to be a high-quality vinyl or fabric duct tape. Paper tape is not permitted.

7) Negative Pressure Filtration Equipment is required for this project when removal quantities require it.

8) Airless Spray Equipment should be used for dampening materials and to mist for spore control. Low pressure equipment should be available onsite and utilized as needed.

9) Vacuums are required to be fully HEPA filtered / rated for mold remediation or asbestos/lead abatement work.

10) Hand Tools for use during remediation, including but not limited to: brooms, plastic shovels, scrapers, brushes, etc., must be supplied by the Abatement Contractor in sufficient quantity to ensure the appropriate level of cleaning of the remediation area.

12) GFCI protection is to be provided for all electrical connections in the work area.

B. The Contractor will have at all times in his possession at the job site Safety Data Sheets (SDS) for wetting agents, encapsulants, solvents, strippers, and any other potentially hazardous materials.

2.02 PERSONAL PROTECTIVE EQUIPMENT

A. Any remediation work that disturbs mold and causes mold spores to become airborne increases the degree of respiratory exposure. Actions that tend to disperse mold include: breaking apart moldy porous materials such as wallboard; destructive invasive procedures to examine or remediate mold growth in a wall cavity; removal of contaminated wallpaper by stripping or peeling; using fans to dry items or ventilate areas. The primary function of personal protective equipment is to prevent the inhalation and ingestion of mold and mold spores and to avoid mold contact with the skin or eyes. The following sections discuss the

various types of PPE that should be used during remediation activities.

B. Protective Clothing

Appropriate personal protective clothing (i.e., reusable or disposable) is required to minimize cross-contamination between work areas and clean areas, to prevent the transfer and spread of mold and other contaminants to street clothing, and to eliminate skin contact with mold and potential chemical exposures.

Disposable PPE should be discarded after it is used. They should be placed into impermeable bags, and can be discarded as ordinary construction waste. Appropriate precautions and protective equipment for biocide applicators should be selected based on the product manufacturer's warnings and recommendations (e.g., goggles or face shield, aprons or other protective clothing, gloves, and respiratory protection).

C. Respiratory Protection

A half mask or full face piece air-purifying respirator shall be used. A full face piece respirator provides both respiratory and eye protection. Please refer to the Mold Removal Guidelines for the proper respirator. Respirators used to provide protection from mold and mold spores must be certified by the National Institute for Occupational Safety and Health (NIOSH). More protective respirators may have to be selected and used if toxic contaminants such as asbestos or lead are encountered during remediation.

As specified by OSHA in 29 CFR 1910.134 individuals who use respirators must be properly trained, have medical clearance, and be properly fit tested before they begin using a respirator. In addition, use of respirators requires the employer to develop and implement a written respiratory protection program, with worksite-specific procedures and elements.

1) Appropriate respirators will be worn by all personnel in the active work area.

2) Upon leaving the active work area, filters will be discarded, cartridges removed and respirators cleaned in disinfectant solution and clean water rinse.

3) Clean respirators will be dried and stored in plastic bags when not in use.

4) Respirators will be inspected daily for broken, missing, or deteriorated parts.

D. **Skin and Eye Protection**

1) Gloves protect the skin from contact with mold, as well as from potentially irritating cleaning solutions. Long gloves that extend to the middle of the forearm are recommended. The glove material should be selected based on the type of substance/ chemical being handled. If using a biocide such as chlorine bleach, or a strong cleaning solution, select gloves made from natural rubber, neoprene, nitrile, polyurethane, or PVC. If using a mild detergent or plain water, ordinary household rubber gloves may be used.

2) To protect eyes, use of properly fitted goggles or a full face piece respirator is required. Goggles must be designed to prevent the entry of dust and small particles. Safety glasses or goggles with open vent holes are not approved for use.

E. Personnel protection is required for laborers, mechanics, supervisors and visitors at the work site during the set-up and abatement operations.

F. Each worker shall be supplied with a minimum of two (2) complete protective work clothes and respirator filter changes per day for the complete duration of the project. Hard hats should be available as appropriate which meet ANSI Z-89.1 standards. Safety toe footwear is to be worn underneath the disposable shoe covers and must meet the requirements and specifications in ANSI Z-41.1. Eye wear and face protection must meet the standards and specifications of ANSI Z-87.1.

G. In addition to sets of protective work clothes for workers, the Contractor shall have on hand two (2) additional sets of disposable work clothes, per day and respirators for personnel who are authorized to inspect the work site. Hard hats should be available as appropriate which meet ANSI Z-41.1. Eye wear and face protection must meet the standards and specifications of ANSI Z-87.1.

PART 3 - EXECUTION

3.01 QUANTITIES

During the initial non-intrusive investigation, no visible mold was identified. However, numerous areas of water damaged were noted throughout the facility. Furthermore, air sampling data indicated elevated mold spores within the recreation center (Rawhurst AA Room) at the time of the assessment. When impacting water damaged materials, it should be assumed that hidden mold growth may be present. Care should be taken during demolition to reduce dust and identify possible mold growth.

The following removal criteria will apply to any discovered mold contaminated materials in the areas indicated by the RCP notes in attached drawing in Appendix A of this plan.

- 10 sq. ft. or less - Level I: Small Isolated Areas

- 10 - 30 sq. ft. - Level II: Mid-Sized Isolated Areas
  - R3 – 21 SF
  - R5 – 30 SF
  - R10 – 17 SF
  - R14 – 25 SF

- 30 - 100 square feet - Level III: Large Isolated Areas
  - R1 – 72 SF
  - R7 – 33 SF
  - R9 – 34 SF

- Greater than 100 contiguous square feet in an area - Level IV: Extensive Contamination

- R11 – 106 SF

Specific details when impacted mold contaminated materials can be found in Section 3.02 Removal Methods.

3.02 REMOVAL METHODS

This section presents remediation guidelines for the removal of mold contaminated building materials. The removal methods are designed to protect the health of the mold remediation personnel and other outside contractors during remediation. These methods are based on the size of the area impacted by mold contamination. If possible, remediation activities should be scheduled during off-hours when building occupants are not present and less likely to be affected.

The following guidelines are based on OSHA guidelines for the proper handling of mold contaminated materials.

1) Level I: Small Isolated Areas (10 sq. ft. or less) - e.g., ceiling tiles, small areas on walls.

A) Remediation can be conducted by the regular building maintenance staff as long as they are trained on proper clean-up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

B) Respiratory protection (e.g., N-95 disposable respirator as a minimum) is recommended. Respirators must be used in accordance with the OSHA respiratory protection standard (29 CFR 1910.134). Gloves and eye protection should be worn.

C) The work areas should be unoccupied. Removing people from spaces adjacent to the work area is not necessary, but is recommended for infants (less than 12 months old), persons recovering from recent surgery, immune-suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).

D) Containment of the work area is not necessary. Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are required.

E) Contaminated materials that cannot be cleaned should be removed from the building in a sealed impermeable plastic bag. These materials may be disposed of as ordinary waste.

F) The work areas and areas used by remediation workers for egress should be cleaned with a damp cloth or mop and a detergent solution.

G) All areas should be left dry and visibly free from contamination and debris.

2) Level II: Mid-Sized Isolated Areas (10 - 30 sq. ft.) - e.g., individual wallboard panels.

A) Remediation can be conducted by the regular building maintenance staff. Such persons must receive training on proper clean-up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

B) Respiratory protection (e.g., N-95 disposable respirator as a minimum) is recommended. Respirators must be used in accordance with the OSHA respiratory protection standard (29 CFR 1910.134). Gloves and eye protection should be worn.

C) The work areas should be unoccupied. Removing people from spaces adjacent to the work area is not necessary, but is recommended for infants (less than 12 months old), persons recovering from recent surgery, immune-suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).

D) Surfaces in the work area that could become contaminated should be covered with a secured plastic sheet(s) before remediation to contain dust/debris and prevent further contamination.

E) Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are required.

F) Contaminated materials that cannot be cleaned should be removed from the building in a sealed impermeable plastic bag. These materials may be disposed of as ordinary waste.

G) The work area and areas used by remediation workers for egress should be HEPA vacuumed and cleaned with a damp cloth or mop and a detergent solution.

H) All areas should be left dry and visibly free from contamination and debris.

3) Level III: Large Isolated Areas (30 - 100 square feet) - e.g., several wallboard panels.

A) It is recommended that personnel be trained in the handling of hazardous materials and equipped with respiratory protection (e.g., N-95 disposable respirator as a minimum). Respirators must be used in accordance with the OSHA respiratory protection standard (29 CFR 1910.134). Gloves and eye protection should be worn.

B) Surfaces in the work areas and areas directly adjacent that could become contaminated should be covered with a secured plastic sheet(s) before remediation to contain dust/ debris and prevent further contamination.

C) Seal ventilation ducts/grills in the work area and areas directly adjacent with plastic sheeting.

D) The work areas and areas directly adjacent should be unoccupied. Removing people from spaces near the work area is recommended for infants, persons having undergone recent surgery, immunosuppressed people, or people with chronic inflammatory lung diseases. (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).

E) Dust suppression methods, such as misting (not soaking) surfaces prior to mediation, are required.

F) Contaminated materials that cannot be cleaned should be removed from the building in

sealed impermeable plastic bags. These materials may be disposed of as ordinary waste.

G) The work area and surrounding areas should be HEPA vacuumed and cleaned with a damp cloth or mop and a detergent solution.
H) All areas should be left dry and visibly free from contamination and debris.

I) Note: If remediation procedures are expected to generate a lot of dust (e.g., abrasive cleaning of contaminated surfaces, demolition of plaster walls) or the visible concentration of the mold is heavy (blanket coverage as opposed to patchy), it is recommended that the remediation procedures for Level IV be followed.

4) Level IV: Extensive Contamination (greater than 100 contiguous square feet in an area).

A) Personnel trained in the handling of hazardous materials and equipped with:
   a. Full face piece respirators with HEPA cartridges;
   b. Disposable protective clothing covering entire body including both head and shoes; and Gloves.

B) Containment of the affected area:
   a. Complete isolation of work areas from occupied spaces using plastic sheeting sealed with duct tape (including ventilation ducts/grills, fixtures, and other openings);
   b. The use of an exhaust fan with a HEPA filter to generate negative pressurization; and Airlocks and decontamination room.

C) Contaminated materials that cannot be cleaned should be removed from the building in sealed impermeable plastic bags. The outside of the bags should be cleaned with a damp cloth and a detergent solution or HEPA vacuumed in the decontamination chamber prior to their transport to uncontaminated areas of the building. These materials may be disposed of as ordinary waste.

D) The contained area and decontamination room should be HEPA vacuumed and cleaned with a damp cloth or mopped with a detergent solution and be visibly clean prior to the removal of isolation barriers..

3.03 AREA PREPARATION

A. Movable equipment or supplies will be removed from area of work by the Owner.

B. Heating and ventilating systems in the areas of work must be shut down and sealed at intakes and exhausts within and around the work area prior to starting any remediation work. Notify the Owner prior to starting any work so that they can arrange to have the heating and ventilating system shut down.

C. The Remediation Contractor shall isolate the work area for the duration of the work by installing Barrier Tape and Warning Signs, as well as completely sealing off all HVAC openings, vents, access doors, or windows in or near the work area, with six (6) mil

plastic sheeting taped securely in place.

D. The Remediation Contractor shall construct a decontamination room when required in an area adjacent to the remediation areas.

3.04 REMEDIATION WORK

A. Open Small inspection access holes to observe the back-side / hidden areas of the water damaged areas to be replaced.

B. Visually determine the extent of the hidden contamination and expand work areas as necessary, opening additional inspection access holes as needed.

C. Remove and dispose of all water-damaged / mold-contaminated materials in accordance with the methods and procedures outlined in the sections above, as well as any federal, state or local requirements.

D. Dry removal will not be allowed except when wet removal will create a safety hazard. Dry removal will require written authorization by the Owner and / or the Owner s Consultant.

E. Work of this section shall be performed in the following manner:

1) Install six (6) mil polyethylene critical barriers over all doors, wall openings, windows, etc. Secure with duct tape on all sides.

2) After the general area is secured and the specific work area demarcated, the owner's consultant representative will conduct a pre-remediation visual inspection of the demarcated work area(s). Once a satisfactory inspection has been completed, remediation work may begin. ALL water-damaged and / or mold contaminated materials will be wetted and maintained in a wet state by the remediation contractor by the use of amended water applied as a fine mist from a sprayer or similar device. (Use of a garden hose directly onto the work area is NOT permitted.) The contractor shall follow proper remediation procedures at all times. All removed materials shall be continually wetted with amended water during remediation procedures. The area is to be HEPA vacuumed and no debris is to remain in the removal area. Electrical power running into or through the work area should be shut off.

3) Waste materials are to be regularly, promptly and properly packaged. Packaging is to be sufficient so as to not be punctured or damaged by handling. Packaging is to be decontaminated by wet wiping prior to leaving the work area(s).

3.08 INSPECTIONS

A. All work procedures detailed in this specification will be strictly adhered to and meet or exceed all current OSHA, DEP, ASTM, PDL&I, and City of Philadelphia regulations.

B. All work shall meet with the approval of the Owner. Work which does not meet with the approval shall be determined to be unsatisfactory.

MOLD CERTIFICATION OF VISUAL INSPECTION

Project Name:_____

Project Number:_____

Building Name:_____

Work Area Location:_____

MOLD REMEDIATION CONTRACTOR CERTIFICATION

In accordance with Project Specifications and scope of work, the Mold remediation contractor hereby certifies that the Mold Remediation Contractor's Supervisor has visually inspected the work area (all surfaces including pipes, beams, ledges, walls, ceiling and floor, decontamination unit, sheet plastic, etc.) and has found no visible mold, dust, debris or residue.

Mold Remediation Contractor Name:_____

Signature:_____ Print Name:_____

Print Title:_____ Date:_____

QUALITY ASSURANCE CONSULTANT

The Quality Assurance Consultant hereby certifies that he/she has accompanied the Mold Remediation Contractor on the visual inspection and verifies that this inspection has been thorough and to the best of his/her knowledge and belief, the Mold Remediation Contractor's certification above is a true and honest one.

Quality Assurance Consultant Name:_____

Inspector Signature:_____ Date:_____

Print Inspector Name:_____

END OF SECTION

SECTION 053100

STEEL DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Roof deck.

B. Related Requirements:
1. Section 055000 "Metal Fabrications" for miscellaneous structural steel.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Sustainable Design Submittals:

1. Recycled material content

C. Shop Drawings:

1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction. Shop drawings shall be prepared by a professional engineer licensed in the State of Pennsylvania and include signed and sealed analysis data.

1.4 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Product Certificates: For each type of steel deck.

C. Product Test Reports: For tests performed by a qualified testing agency, indicating that each of the following complies with requirements:

1. Power-actuated mechanical fasteners.

D. Evaluation Reports: For steel deck, from ICC-ES.

E. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

C. Electrical Raceway Units: Provide UL-labeled cellular floor-deck units complying with UL 209 and listed in UL's "Electrical Construction Equipment Directory" for use with standard header ducts and outlets for electrical distribution systems.

D. FM Global Listing: Provide steel roof deck evaluated by FM Global and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

B. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
2. Decking steel 90% combined pre and post-consumer recycled content.

C. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:

1. Prime-Painted Steel Sheet: ASTM A1008/A1008M, Structural Steel (SS), Grade 80 (550) minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer.

   a. Color: Manufacturer's standard.

2. Galvanized-Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 80 (550), G90 (Z275) zinc coating.
3. Galvanized and Shop-Primed Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 80 (550), G60 (Z180) zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.

   a. Color: Manufacturer's standard.

4. Aluminum-Zinc-Alloy-Coated Steel Sheet: ASTM A792/A792M, Structural Steel (SS), Grade 33 (230) minimum, AZ50 (AZ150) aluminum-zinc-alloy coating.
5. Deck Profile: As indicated.
6. Profile Depth: As indicated.
7. Design Uncoated-Steel Thickness: As indicated.
8. Design Uncoated-Steel Thicknesses; Deck Unit/Bottom Plate: As indicated.
9. Span Condition: As indicated.
10. Side Laps: Overlapped.

2.2 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 (4.8-mm) minimum diameter.

D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), not less than 0.0359-inch (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

F. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), of same material and finish as deck, and of thickness and profile recommended by SDI Publication No. 31 for overhang and slab depth.

G. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.

H. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.

I. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0747 inch (1.90 mm) thick, with factory-punched hole of 3/8-inch (9.5-mm) minimum diameter.

J. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck. For drains, cut holes in the field.

K. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck, with 3-inch- (76-mm-) wide flanges and level recessed pans of 1-1/2-inch (38-mm) minimum depth. For drains, cut holes in the field.

L. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B, with dry film containing a minimum of 94 percent zinc dust by weight.

M. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.

B. Install temporary shoring before placing deck panels if required to meet deflection limitations.

C. Locate deck bundles to prevent overloading of supporting members.

D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.

H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.3 ROOF-DECK INSTALLATION

A. Fasten roof-deck panels to steel supporting members as indicated on construction drawings.

B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, as indicated on construction drawings.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm), with end joints as follows:

1. End Joints: Lapped 2 inches (51 mm) minimum.

D. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and mechanically fasten flanges to top of deck. Space mechanical fasteners not more than 12 inches (305 mm) apart with at least one fastener at each corner.

1. Install reinforcing channels or zees in ribs to span between supports and mechanically fasten

E. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. mechanically fasten to substrate to provide a complete deck installation.

1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.

F. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Field welds will be subject to inspection.

C. Prepare test and inspection reports.

3.5 PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.

1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.
2. Wire brushing, cleaning, and repair painting of bottom deck surfaces as recommended by the metal deck manufacturer.

END OF SECTION 053100

SECTION 055000

METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Steel framing and supports for applications where framing and supports are not specified in other Sections.

B. Related requirements:
1. Section 053100 Steel Decking.

1.3 PERFORMANCE REQUIREMNTS

A. Delegated Design: Steel framing and supports including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1.4 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication and installation details for metal fabrications.

1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

B. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified professional engineer.

B. Welding certificates.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.8 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A 500, cold-formed steel tubing.

C. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.

2.3 FASTENERS

A. Stainless Steel Fasteners, provide Type 304 Type 316 stainless-steel fasteners. Select fasteners for type, grade, and class required.

1. Provide stainless-steel fasteners for fastening aluminum.
2. Provide stainless-steel fasteners for fastening stainless steel.
3. Provide stainless-steel fasteners for fastening nickel silver.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade ; with hex nuts, ASTM A 563; and flat washers.

1. Hot-dip galvanize ASTM F2329.

C. Lag Screws: ASME B18.2.1

D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

2.4 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

2.5 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

C. Fabricate steel pipe supports from steel pipe with steel baseplates and top plates. Drill or punch baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness unless otherwise indicated.

1. Unless otherwise indicated, fabricate from Schedule 40 steel pipe.
2. Unless otherwise indicated, provide 3/8-inch baseplates with four 5/8-inch anchor bolts and 1/4-inch top plates.

D. Fabricate tube railing as shown on drawings. Drill or punch baseplates for anchor and connection bolts and weld to tube with fillet welds all around. Make welds the same size as pipe wall thickness unless otherwise indicated.
1. Unless otherwise indicated, fabricate from .065 steel tube.
2. Unless otherwise indicated, provide 3/8-inch baseplates with four 5/8-inch anchor bolts.

2.6 FINISHES, GENERAL

A. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.7 STEEL FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Shop weld to the greatest extent possible. Where field welding unavoidable comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
5. Repair finish with galvanized paint.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

3.3 ADJUSTING AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 055000

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SECTION 06 1053

MISCELLANEOUS CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including City of Philadelphia Standard Contract Requirements, amendments, and attachments; and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
1. Wood blocking and nailers.
2. Fasteners.

1.3 DEFINITIONS

A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

B. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NeLMA: Northeastern Lumber Manufacturers' Association.
2. SPIB: The Southern Pine Inspection Bureau.
3. WCLIB: West Coast Lumber Inspection Bureau.
4. WWPA: Western Wood Products Association.

1.4 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include product data for all fasteners.
3. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
4. For fire-retardant treatments specified to be High-Temperature (HT) type include physical properties of treated lumber both before and after exposure to elevated

temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.

5. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
6. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
1. Power-driven fasteners.
2. Pre-drilling for anchor devices
3. Preservative-treated wood.
4. Fire-retardant-treated wood.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
3. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

1. Application: All wood unless noted otherwise.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Comply with performance requirements in AWPA C20 (lumber).

1. Use treatment that does not promote corrosion of metal fasteners.
2. Use Exterior type for exterior locations and where indicated.

B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.

C. Application: All wood unless noted otherwise.

2.4 DIMENSION LUMBER FRAMING

A. Maximum Moisture Content: 19 percent.

B. Other Framing: Construction, Stud, or No. 2 grade of any of the following species:

1. Southern pine; SPIB.
2. Douglas fir-larch; WCLIB or WWPA.
3. Mixed southern pine; SPIB.
4. Douglas fir-south; WWPA.
5. Hem-fir; WCLIB or WWPA.
6. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

2.5 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.

B. For items of dimension lumber size, provide Construction, Stud, or No. 2 grade lumber with 19 percent maximum moisture content of any species.

C. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine, No. 2 grade; SPIB.
2. Hem-fir or hem-fir (north), Construction or No. 2 Common grade; WCLIB, or WWPA.
3. Spruce-pine-fir (south) or spruce-pine-fir, Construction or No. 2 Common grade; NeLMA, WCLIB, or WWPA.

D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

2.7 MISCELLANEOUS MATERIALS

A. Flexible Flashing: Self-adhesive, rubberized-asphalt compound, bonded to a high-density, polyethylene film to produce an overall thickness of not less than 0.025 inch.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

C. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

D. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

E. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Field Treatment: Copper naphthenate.

F. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

G. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.

3.2 WOOD GROUND, BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

3.3 PROTECTION

A. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 1053

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SECTION 070150

PREPARATION FOR RE-ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including City of Philadelphia Standard Contract Requirements, amendments, and attachments; and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

A. Roof tear off.
B. Removal of base flashings.
C. Repair and/or replacement of damaged or missing “in wall” flashing.
D. Fastener pull out testing of existing roof decking.
E. Removal of abandoned equipment

B. Related Sections:

A. Division 05 Section “Steel Decking”.

B. Division 07 Section "Modified Bituminous Membrane Roofing – Torch Applied".

1.3 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

1.4 DEFINITIONS

A. Roofing Terminology: See ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

B. Existing membrane Roofing System: Existing roofing system as noted on the drawings or herein.

C. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and reinstalled.

D. Existing to Remain: Existing items of construction that are not indicated to be removed.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Temporary roofing materials and systems.

C. Fastener pull-out test report.

D. Written report on all roof drain testing performed

E. Photographs or Video: show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces that might be misconstrued as having been damaged by reroofing operations. Submit before Work begins.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning membrane roofing removal. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.7 PROJECT CONDITIONS

A. Owner will occupy building immediately below reroofing area. Conduct demolition and preparation so Owner's operations will not be disrupted.

B. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.

C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities by providing cover, fencing and other protection as required by the owner.

D. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.

E. Limit construction loads on roof to 100 lb/sq ft rooftop equipment wheel loads and 30 lb/sqft for uniformly distributed loads.

F. Weather Limitations: Proceed with reroofing only when existing and forecasted weather conditions permit Work to proceed without water entering existing and new roofing system or building.

G. Hazardous Materials: It is not expected that hazardous materials such as asbestos-containing materials will be encountered in the Work. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

1.8 WARRANTY

A. Existing Warranties: Remove, replace, patch and repair materials and surfaces cut or damaged during reroofing, by methods and with materials so as not to void existing system warranty. Notify warrantor before proceeding.

A. Notify warrantor of existing system on completion of reroofing, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 Plate Steel:

A. Steel plate stock for repair of deck openings 12 inches x 12 inches or less: 16-gauge.

B. Steel plate stock for repair of deteriorated steel deck as noted on the drawings: 14-gauge.

2.2 Metal Deck

A. Full sections to match existing in gauge, profile, and finish, and as necessary to comply with requirements of applicable insurance agencies and local codes. See Section 053100 “Steel Decking” for additional information.

PART 3 - EXECUTION

3.1 PREPARATION

A. Access to Work Sites: As directed by owner.

B. Roof traffic may only pass over areas that are to be reroofed. Protect roofing systems if roof replacement is not imminent.

A. Loosely lay 1-inch minimum thick, molded expanded polystyrene (MEPS) insulation over the roofing membrane in areas indicated. Loosely lay 15/32 IN plywood or OSB panels over MEPS past edges of plywood or OSB panels a minimum of 1 IN. Secure plywood or OSB with sandbags to keep protection in place.
B. Limit traffic and material storage to areas of existing roofing membrane that have been protected.
C. Maintain temporary protection and leave in place until replacement roofing has been completed. Remove temporary protection on completion of reroofing.
D. Repair any damage to existing roof resulting from construction operations.

C. Roof Drainage

A. Investigate Existing Roof Drainage System.
1. Test all enclosed roof drainage systems by discharging water from a 3/4 inch diameter garden hose for 15 minutes in each drain.

1) If any drain backs up, report this to Owner and Architect.
2) Owner will arrange for drain cleaning and/or repair by others.
3) Retest any drain which required cleaning and/or repair.

2. Prepare a written report on all roof drain testing performed.

B. Maintenance of Roof Drainage

1. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.
2. If roof drains are temporarily blocked or unserviceable due to roofing system removal or partial installation of new membrane roofing system, provide alternative drainage method to remove water and eliminate ponding. Do not permit water to enter into or under existing membrane roofing system components that are to remain.

D. Rooftop Utility Lines

A. Prepare an inventory of all rooftop utility lines.
B. Determine which rooftop utility lines, if any, might be adversely affected by the reroofing work and make a list of those requiring temporary shutoff during roofing work.
C. Notify Owner of temporary shutoff requirements and coordinate necessary utilities shutoff and return to service, by Owner, during reroofing.
D. Verify that all rooftop utilities and service piping have been shut off before beginning the Work.
E. Verify that all rooftop utilities have been returned to service after completion of work.

3.2 ROOF TEAR-OFF

A. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

B. Materials may only be removed from the roof through the means of and enclosed chute the empties directly into a dumpster.

C. It is the intent of this project that everything associated with the existing roof is to be removed from the roof to a clean stable substrate. As part of this scope the following components shall be completely removed and discarded:

1. Existing debris and materials on roof surface.

2. Existing roofs, cants, tapered edge strips, insulations, waterproofings, and underlayments down to the surface of the roof deck. Contractor shall exercise caution during roof removal operations as necessary to prevent damaging the existing deck.

3. Existing sheet metal flashings, counterflashings (except where may be noted on drawings or elsewhere to reuse), counterflashing reglet receivers, scuppers, conductor heads,

downspouts, gravel stop fascias, fascias, copings, flanged sleeves and collars, and pitch pan flashings.

4. Brackets, fasteners, protrusions etc. in parapet walls that would impede or hinder proper completion of the work.

5. Existing wood blocking as noted on drawings and/or as necessary to provide conditions shown on drawings.

D. Remove only as much existing roofing and insulation as can be recovered with new roofing and made watertight the same day or before the arrival of inclement weather.

E. Perform cutting, drilling, and removals in a manner that will prevent damage to adjoining construction which is to remain.

F. Prior to any cutting, drilling or removals, investigate both sides of the surface affected.

G. Notify and coordinate with the Owner's Representative prior to interrupting or disconnecting utilities.

3.3 GENERAL SUBSTRATE PREPARATION

A. Inspect deck after tear-off of existing roofing system.

B. Verify that new roof system substrate is visibly dry and free of moisture.

C. If deck or substrate surface is not suitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Architect. Do not proceed with new roofing installation until direct by Architect.

D. At equipment to be removed for reroofing shut off all affected electrical, plumbing and gas lines and disconnect all electrical, plumbing, gas lines and ventilation ducts as required to allow for lifting mechanical units and other work required for the work. All required disconnection, reconnection and modification of the electrical and mechanical systems shall be performed by a licensed mechanical/electrical subcontractor. Lift the units off the curbs or supports in a manner that will not damage the curb or the unit. Coordinate all work in this section with the Owner's Representative.

E. Temporarily displace junction boxes, rooftop conduit and gas lines, or other items that may interfere with work. All required disconnection and reconnection shall be performed by a licensed mechanical/electrical subcontractor as applicable to the work being performed. Schedule shut-offs and disconnections with the Owner.

F. Contractor shall contain and prevent any discharge of HVAC condensate or other HVAC related moisture or liquid discharge onto daily work areas during roof removal and replacement operations.

3.4 DECK

A. Repair all damaged deck, including openings and deterioration.

1. Metal Deck – Repair to create a structurally sound clean deck.

a. Surface Corrosion: Remove rust by wire-brushing or scraping. Remove dust and debris by power vacuum and prime the brushed and scraped areas with the specified steel deck primer, applied as recommended by the manufacturer; allow primer time to dry before proceeding.

1. Severe Corrosion,12 inches x 12 inches or less: Repair the defects with 14-gauge steel plate stock. Lap the plate a minimum of 6-inches on all sides of the defect. Fasten the plate with No. 14 self-drilling screws installed at each rib. Position fasteners a minimum of two inches in from the outside edge of the repair plate. Provide a minimum of four (4) fasteners for each repair plate.

b. Severe Corrosion areas larger than 12 inches x 12 inches:

1. Refer to Section 053100 “Steel Decking”. Install new decking in accordance with the requirements of FM, Steel Deck Institute, and applicable local codes.

c. Loose deck sections: Install additional fasteners to secure deck. In no case shall the fastener spacing exceed 12 inches on center.

3.5 WALLS:

A. Completely remove materials by scraping or chipping all loose bituminous materials, mortar fins and mortar and bituminous high spots, roof system components, fasteners, brackets, etc., on masonry walls to provide a suitable substrate.

3.6 PENETRATIONS:

A. Completely remove all bituminous and sealant materials and pipe insulation from the surfaces of all pipes, equipment service lines, supports, walls, etc. that are to receive new bituminous, sealant and/or sheet metal flashing materials.

3.7 WOOD BLOCKING

A. Replace deteriorated wood blocking whether of not scheduled for removal with similar in type and size.

3.8 EXISTING EXPANSION JOINTS

A. Remove existing expansion joint assemblies, rebuild curb and provide watertight assembly at the same time. No water intrusion will be allowed at any time.

3.9 FASTENER PULL-OUT TESTING

A. Perform fastener pull-out test according to SPRI FX-1, and submit test report to roofing manufacturer before installing new roofing system.

1. Obtain roofing manufacturer's approval to proceed with specified fastening pattern. Roofing e manufacturer may furnish revised fastening pattern commensurate with pull-out test results.

3.10 DISPOSAL

A. Remove any debris resulting from these operations on a daily basis or more often if requested by Owner's Representative. Take all necessary precautions to ensure that debris does not blow around the site. Keep dumpsters covered; remove from site daily. Debris shall be removed from roofs by use of covered chutes or approved mechanical means. Chutes must be pulled up and stored when not in use.

END OF SECTION 070150

SECTION 075216

MODIFIED BITUMINOUS MEMBRANE ROOFING –TORCH APPLIED

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including City of Philadelphia Standard Contract Requirements, amendments, and attachments; and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Styrene-butadiene-styrene (SBS) modified bituminous membrane roofing.
   a. Anchor Sheet - Glass mat reinforced SBS ply mechanically attached.
   b. Base Ply – Polyester reinforced SBS ply, torch grade.
   c. Intermediate Ply – Polyester mat reinforced SBS, torch grade
   d. Cap Ply – Glass mat reinforced SBS, torch grade, fire rated with white granules.
2. Roof insulation and substrate boards.
3. Walkway pads.
4. Roofing sealants and flashings.
5. Pitch pockets.

B. Related Sections:
1. Section 06 1053 “Miscellaneous Carpentry” for wood nailers and blocking.
2. Section 07 6200 "Sheet Metal Flashing and Trim" for metal roof flashings and counter flashings.
3. Section 07 7100 “Manufactured Roof Edge System for copings, edge metal fascia, fascia extensions, and expansion joint assemblies.
4. Section 07 9200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.3 REFERENCES

A. Reference Standards: References in these specifications to standards, test methods, codes etc., are implied to mean the latest edition of each such standard adopted. The following is an abbreviated list of associations, institutions, and societies which may be used as references throughout these specifications.

ASTM American Society for Testing and Materials
Philadelphia, PA (215) 299-5585

FM Factory Mutual Engineering and Research

Norwood, MA (617) 762-4300

IBC International Code Council
Country Club Hills, IL (800) 214-4321

NRCA National Roofing Contractors Association
Rosemont, IL (708) 299-9070

OSHA Occupational Safety and Health Administrations
Washington, DC (202) 523-8036

SMACNA Sheet Metal and Air Conditioning Contractors National Association
Chantilly, VA (703) 803-2980

UEAtc The European Union of Agrément, General Secretariat: British Board of Agrément, Bucknalls Lane, Garston, Watford, Herts WD25 9BA, UK

UL Underwriters Laboratories
Northbrook, IL (708) 272-8800

1.4 PERFORMANCE REQUIREMENTS

A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall not wrinkle or split over time and shall remain watertight.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

C. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7. Roof membrane manufacturer shall provide calculations and attachment requirements to meet code requirements for the following roof areas:

1. Field of roof, Perimeter and corner uplift resistance shall be calculated to meet FM 1-90 criteria

D. FM Approvals Listing: Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system, and that are listed in FM Approvals' "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals markings.

1. Fire/Windstorm Classification: Class 1A-90
2. Hail Resistance Rating: MH

1.5 SUBMITTALS

Prior to starting work and before the preconstruction meeting, the following submittals shall have been submitted for review:

A. Product Data:
   1. Product Data each type of product indicated.
   2. Manufacturer's written instructions for installation
   3. Product Data for applicable accessories.
   4. MSDS

B. Temporary Protection: Plan diagram and narrative of procedures and schedules.

C. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.

   1. Base flashings and membrane terminations.
   2. Tapered insulation, including slopes.
   3. Crickets, saddles, and tapered edge strips, including slopes.
   4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
   5. Manufacturer's standard details for the specific roofing system assembly

D. Qualification Data: For qualified installer, manufacturer, and testing agency.

   1. Written confirmation from the roof membrane manufacturer stating:

      a. Intent to warrant the roof system as specified in the contract documents
      b. The Contractor is an Approved Applicator meeting Acceptable Roofing Applicator requirements of the contract documents and is eligible to install the specified roof system as necessary to quality for the specified Manufacturer's Warranty.

   2. List of three completed projects using the type roof membrane specified, or a specified equivalent. Include the following information for each project:

      a. Project name
      b. Project size and scope of work
      c. Owner/client contact name and phone number

E. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

   1. Submit evidence of complying with performance requirements.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.

G. Research/Evaluation Reports: For components of membrane roofing system, from the currently ratified ICC-code as well as the Philadelphia code.

H. Maintenance Data: For roofing system to include in maintenance manuals.

I. Warranties: Samples of manufacturer and installer warranties.

1.6 SUBMITTALS FOR RECORD – After Completion of Work

A. Certificate of Analysis: From the testing laboratory of the primary roofing materials manufacturer, confirming the physical and mechanical properties of the roofing membrane components. Testing shall be in accordance with the parameters published in ASTM D 5147 and UEAtc* and indicate Quality Assurance/Quality Control data as required to meet the specified properties. A separate Certificate of Analysis for each production run of material shall indicate the following information:

1. Material type
2. Lot number
3. Production date
4. Dimensions and Mass (indicate the lowest values recorded during the production run)

    a. Roll length
    b. Roll width
    c. Selvage width
    d. Total thickness
    e. Thickness at selvage
    f. Weight

5. Physical and Mechanical Properties
    a. Low temperature flexibility
    b. Breaking load
    c. Ultimate elongation
    d. Dimensional stability
    e. Compound stability
    f. Granule embedment
    g. Resistance to thermal shock (foil faced products)

B. Invoice slips for all materials.

C. Maintenance Data: Complete maintenance manuals for all components of roofing system.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed and FM approved for membrane roofing system identical to that used for this Project.

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product, is eligible to receive manufacturer's warranty, and has a minimum of three years of experience.

C. Source Limitations: Obtain components including fasteners for membrane roofing system from same manufacturer as membrane roofing or approved by membrane roofing manufacturer.

D. Exterior Fire-Test Exposure: ASTM E 108, Class A for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

E. Fire-Resistance Ratings: Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

F. Preliminary Roofing Conference: Before starting demolition, conduct conference at Pelbano Recreation Center.

1. Meet with Owner, Architect, Owner's insurer if applicable, roofing installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories, pipe insulation, protective coatings, etc.
   a. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
   b. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   c. Review deck substrate requirements for conditions and finishes, including flatness and fastening.
   d. Review structural loading limitations of roof deck during and after roofing.
   e. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
   f. Review governing regulations and requirements for insurance and certificates if applicable.
   g. Review temporary protection requirements for roofing system during and after installation.
   h. Review roof observation and repair procedures after roofing installation.
   i. Review material and personnel access limitations, storage locations (roof and on ground) and debris removal.
   j. Review procedures for removal and replacement of existing pipe insulation.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Handle and store insulation and other roofing materials out of direct exposure to the elements. Store roll goods on a clean, flat and dry surface. All material stored on the roof overnight shall be stored on pallets. Rolls of roofing must be stored on ends and placed over column points. Store materials on the roof in a manner so as to preclude overloading of deck and building structure. Store materials such as solvents, adhesives and asphalt cutback products away from open flames, sparks or excessive heat. Cover all material using a breathable cover. Polyethylene or other non-breathable plastic coverings are not acceptable.

1. Any damaged, wet, or frozen goods shall be removed from the site immediately at no charge to the Owner.

D. Place equipment in a manner to avoid deflection of the structure.

1.9 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

B. Surfaces on which the installation or roofing membrane is to be applied shall be clean, smooth, dry, free of the possibility of frost, dew or contaminants that would prevent proper installation.

C. Waste products (petroleum, grease, oil and solvents, vegetable or mineral oil and animal fat, or direct contact with steam venting) shall not be allowed to come in contact with the roof membrane system.

D. Daily Seal: Roof shall be sealed to ensure that moisture does not penetrate beneath any completed sections of the roof by temporarily sealing the loose edge of the membrane at the end of each work day and prior to the arrival of inclement weather. The manufacturer's requirements shall be followed closely. Contractor shall inspect existing components for moisture intrusion along the tie-in after opening the daily seal on the next work day. All temporary and/or wet or damaged materials shall be removed prior to starting work.

1.10 WARRANTY

A. Manufacturer’s Warranty: Manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.

1. Warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, substrate board, metal trim, and all components of membrane roofing system.
2. Warranty Period: 30 year NDL on all manufacturer’s approved materials from date of Substantial Completion.

B. Roofer’s Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of membrane roofing system such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, and walkway products, for the following warranty period:

1. Warranty Period: Two years from date of Substantial Completion on all materials installed.

PART 2 - PRODUCTS

2.1 SBS-MODIFIED ASPHALT-SHEET MATERIALS

A. SBS-Modified Bituminous Membrane Roofing using the torch down method for the base ply, cap sheet, and flashings (except for wood substrates)

1. Manufacturers: Subject to compliance with requirements, provide products of the following manufacturers and their products listed below:
   a. Soprema.
   b. Johns Manville.

2.2 VAPOR BARRIER SHEET MATERIALS

A. SBS Asphalt, woven polyethylene mat.

1. Johns Manville: Vapor Barrier SA

2. Soprema: Sopravap'r

2.3 BASE PLY MATERIALS

A. ASTM D 6164, Grade S, Type I, SBS-modified asphalt sheet (reinforced with polyester); smooth surfaced; suitable for torch application.

1. Soprema: Sopralene Flam 180

2. Johns Manville: Dynaweld 180 S

2.4 INTERMEDIATE PLY MATERIALS

A. ASTM D 6164, Grade S, Type I, SBS-modified asphalt sheet (reinforced with polyester); smooth surfaced; suitable for torch application.

1. Soprema: Sopralene Flam 180

2. Johns Manville: Dynabase PR

2.5 CAP SHEET MATERIALS

A. Granule-Surface Roofing Membrane Cap Sheet: ASTM D 6164, Grade G, Type I, SBS-modified asphalt sheet (reinforced with glass fibers); white granular surfaced; suitable for torch application.

1. Soprema: Sopralene FR GR

2. Johns Manville: Dynaweld Cap 180 FR CR G

2.6 FLASHING BASE PLY MATERIALS

A. ASTM D 6163, Grade S, Type I or II, SBS-modified asphalt sheet (reinforced with glass fibers); smooth surfaced; suitable for torch application.

1. Soprema: Sopralene Flam 180

2. Johns Manville: Dynaweld 180 S

2.7 FLASHING CAP PLY MATERIALS:

A. Granule-Surface Roofing Membrane Cap Sheet: ASTM D 6164, Grade G, Type I or II, SBS-modified asphalt sheet (reinforced with polyester); white granular surfaced; suitable for torch application or- ASTM D 6163, Grade G, Type I or II, SBS-modified asphalt sheet (reinforced with glass fibers); white granular surfaced; suitable for torch application.

1. Soprema: Soprelene FR GR

2. Johns Manville: Dynaweld Cap 180 FR CR G

2.8 REINFORCED LIQUID APPLIED FLASHING.

A. System shall include manufacturer’s standard paste resin and repair mortar; reinforcement layer; flashing resin; and surfacing granules.

1. Johns Manville: PermaFlash

2. Soprema: Alsan

2.9 AUXILIARY ROOFING MEMBRANE MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing membrane.

1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

    a. Plastic Foam Adhesives: 50 g/L.
    b. Gypsum Board and Panel Adhesives: 50 g/L.
    c. Multipurpose Construction Adhesives: 70 g/L.
    d. Fiberglass Adhesives: 80 g/L.
    e. Contact Adhesive: 80 g/L.
    f. Other Adhesives: 250 g/L.
    g. Nonmembrane Roof Sealants: 300 g/L.
    h. Sealant Primers for Nonporous Substrates: 250 g/L.
    i. Sealant Primers for Porous Substrates: 775 g/L.

B. Mastic Sealant: Polyisobutylene, plain or modified bitumen; nonhardening, nonmigrating, nonskinning, and nondrying.

C. Sealant: Single component moisture cured polyurethane sealant as part of the roofing manufacturers approved system.

D. Substrate Primer: Liquid applied substrate conditioner.

1. Soprema: Elastocol 350

2. Johns Manville: Asphalt Primer

E. Cold Applied Adhesive: Solvent free, polymeric adhesive, non-toxic and low-odor, complying with all roofing membrane adhesive VOC regulations, and meeting the requirements of ASTM D7379.

    a. Soprema - Colply EF Adhesive

    b. Johns Manville: MBR Cold Applied.

F. Fasteners: Factory-coated steel fasteners and metal plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing membrane components to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer. Fasteners shall be equal to the following
1. Trufast 15 EHD and plate at metal deck

G. Roofing Granules: Ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 (2.36-mm) sieve and 98 percent of mass retained on No. 40 (0.425-mm) sieve, color to be white.

H. Miscellaneous Accessories: Any and all pre-manufactured roof accessories such as pitch pockets and reinforced fluid applied waterproofing membrane to implement special conditions as noted in the drawings. Provide those recommended by roofing system manufacturer.

2.10 COVER BOARDS

A. Cover Board: Board manufactured to serve as a substrate for the installation of torched SBS membrane and meeting the following criteria,

1. Thickness - 1/4 inch min.
2. Compressive Strength – 900 psi
3. Flexural Strength – 80 psi
4. Water Absorption - <5.5%

B. Bead –Applied Insulation Adhesive: Adhesive shall be approved by the roofing manufacturer and match the quality, performance and odor of the adhesive listed.
1. OlyBond 500

2.11 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated and that produce FM Approvals-approved roof insulation.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, felt or glass-fiber mat facer on both major surfaces. Boards shall be no greater than 4 x 4 feet.

C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/2 inch per 12 inches unless otherwise indicated.

D. Provide saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to a minimum ¼ inch final slope.

2.12 ROOF INSULATION ACCESSORIES

A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.

B. Fasteners: Factory-coated steel fasteners and metal plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing membrane components to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer. Fasteners shall be equal to the following.
1. TruFast 15 EHD and plate at metal deck

C. Bead –Applied Insulation Adhesive: Adhesive shall be approved by the roofing manufacturer and match the quality, performance and odor of the adhesive listed.
1. OlyBond 500

D. Cant Strips: ASTM C 728, perlite insulation board, 1-1/2” x 4”.

E. Wood Nailer Strips: Comply with requirements in Division 06 Section “Miscellaneous Carpentry.”

F. Tapered Edge Strips: ASTM C 728, perlite insulation board.

2.13 WALKWAYS

A. Walkway Cap Sheet Strips: White granular surfaced; suitable for torch application method

1. Soprema: -SopraWalk
2. Johns Manville DynaTread

2.14 PITCH POCKETS

A. General: Furnish pitch pocket accessories recommended by roofing manufacturer for intended use and compatibility with membrane roofing.

B. Pourable Sealer: Manufacturer's standard low VOC, rubber, 1-part flexible, self leveling, moisture cure, pourable sealer. (1-Part)

PART 3 - EXECUTION

3.1 GENERAL

A. After completion and extinguishing all torches, contractor must provide a fire watch for a minimum of three (3) hours.

B. All fuel products shall be removed from the immediate work area and transported off site as instructed by the DPP Project Coordinator.

C. The Contractor is responsible for project safety. Where conditions are deemed unsafe to use open flames. Hot-air welding equipment may be used in lieu of roof torches to seal membrane side and end laps where heat welding the laps is necessary. Refer to NRCA CERTA, local codes and building owner's requirements for hot work operations.

3.2 EXAMINATION

A. Perform all preparatory work outlined in Section 07 0150, Preparation for Re-Roofing, and as shown on the contract drawings. Prior to installing roof, examine substrates, and other field conditions for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof penetrations are securely in place and curbs are set and braced and that roof drain bodies are securely clamped in place and not broken or inoperable.
2. Verify that existing lightweight concrete substrate is visibly dry and free of moisture.
3. Verify that deck repair material has cured per manufacturer's requirements before installing base sheet.

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

3.3 PREPARATION

A. Review substrate for voids, deteriorated materials, and cracks. Remove all deficient substrate and fill with Insulation boards. Boards must be full sized. Multiple partial boards may not be installed. Areas less than 12 sf may be filled with lightweight concrete.

B. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

C. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

D. Preparation of existing substrates for liquid flashing installation:

1. Aluminum Composite Panel substrate prep: Clean as per SSPC Surface Preparation Standard No. 15. Do not damage aluminum substrate.

2. Steel substrate prep: Clean as per SSPC Surface Preparation Standard No 11. Do not permit stains to remain on surface.

3. PVC substrate prep: Use 20 grit sandpaper to remove all EPDM glue residue and to roughen up surface. Do not use power tool.

3.4 VAPOR BARRIER INSTALLATION

A. Remove all dust and debris from the deck just prior to installing the membrane.

B. Unroll membrane and allow to relax.

C. Apply the manufacturer’s recommended primer to the deck.

D. Remove protective release film and apply the self-adhering membrane to the deck.

E. Lap side by 3” and ends by 6”.

F. Roll the entire surface with a minimum 75 pound roller.

3.5 INSULATION INSTALLATION

A. Install insulation where shown on drawings or where required by the Project Manual.

B. Comply with roofing system manufacturer's written instructions for installing roof insulation.

C. Install insulation in a minimum of two layers with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Offset joints between layers a minimum of 12 inches. Fill gaps exceeding 1/4 inch with insulation. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

D. Install sumps at the drains with a ½" : 1' slope.

E. Install tapered edge strips at perimeter edges of roof and at raised curbs that do not terminate at vertical surfaces.

F. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints a minimum of 6 IN in each direction from joints of insulation below. Loosely butt cover boards together and fasten to roof deck together with the insulation if approved by roof membrane manufacturer.

G. Insulation Cant Strips: Install and secure preformed 45-degree insulation cant strips at junctures of roofing membrane system with vertical surfaces or angle changes more than 45 degrees.

H. Adhesive Installation - Apply ½" wide beads. Allow adhesive to rise to ¾"–1". Set the insulation boards after foam rises but prior to adhesive skinning over. Immediately after positioning the insulation, weight each board. Position weights so they are centered over the corners of the insulation boards. Weight shall be left in place for about 5- 15 minutes.

3.6 WOOD BLOCKING

A. Install nailers, of minimum one-inch thickness and minimum three inches width. The maximum unsupported overhang for all applications shall not exceed two inches.

B. Nailers shall be firmly anchored to the deck using fastener devices and spacing in compliance the roofing manufacturer and SMACNA. Anchors shall be spaced to provide a design value of not less than 250 lbf/ft for perimeters and 300 lbf/ft at corners after application of the appropriate margin of safety.

C. Height of nailers shall match the height of the adjacent surface level or a tapered edge shall be installed to bridge the varying heights.

D. If the compressive strength of the concrete deck is less than 2,500 psi (17,000 kPa) or the concrete thickness is less than 2-1/2 inches (64 mm), an on-site test shall be carried out to confirm anchor performance.

E. Attachment of wood blocking to standard masonry block, the top two courses shall be filled with ASTM C 270 mortar and allowed to cure for 28 days.

3.7 ROOFING MEMBRANE INSTALLATION, GENERAL

A. Install roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing."

B. Contractor shall perform all testing and other examination of deck surface as recommended by the roofing materials manufacturer and as recommended by manufacturer of the roof deck materials. Responsibility for determination of moisture content of deck being suitable for application of roofing materials shall be the sole responsibility of the Contractor.

C. Prime all dissimilar surfaces to which asphalt or membrane shall come in contact. Apply at the rate of 100 to 150 sf per gallon. Coat with primer all metal flashings and fascia that come in contact with membrane.

D. Apply general purpose SBS mastic and roofing cement to seal drain leads, metal flanges, seal along membrane edge at terminations, and where specified.

E. Do not use general purpose SBS mastics and roofing cement where flashing cement applications are required. Do not use SBS mastics and roofing cement beneath SBS-modified bitumen membrane and flashing plies.

F. Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.

G. Cooperate with testing agencies engaged or required to perform services for installing roofing system.

H. Should conditions be uncovered or created which would be detrimental to the proper conduct of specified work, immediately notify the Owner Representative of these conditions for resolution.

I. Begin installation of the roof membrane system at the low point of the roof and proceed upslope. Install membrane plies shingle style, perpendicular to the slope.

J. Extend roofing membrane and flashings as shown to provide complete membrane over area(s) indicated to be roofed. Seal to all equipment projections through membrane and seal all membrane and flashing seams. Ensure complete bonding to vertical surfaces and, where shown or recommended by material manufacturer, to horizontal surfaces.

K. Coordinate installation of roofing system so insulation and other components of the roofing membrane system which are not to be permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

1. At end of each day's work, provide tie-offs to cover exposed roofing membrane sheets and insulation with a course of coated felt set in roofing cement or hot roofing asphalt, with joints and edges sealed.
2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
3. Remove and discard temporary seals before beginning work on adjoining roofing.

3.8 BASE SHEET INSTALLATION

A. Begin by unrolling the membrane to its complete length. Once relaxed for a minimum of twenty minutes, reroll the membrane.

B. Unroll membrane on substrate for alignment.

C. Place membrane so edge lap will be centered on drain.

D. Application shall provide a smooth surface, free of air pockets, wrinkles, fish mouths or tears.

E. Install lapped course, extending over and terminating beyond cants. Attach as follows:
1. Fully adhere by torching.

F. Ensure manufacturer required side-laps and end-laps are maintained, or as indicated below.

1. 6 in end-laps
2. 3 in side laps
3. End-laps should be staggered 3 ft apart.

G. While unrolling and heating the sheet, ensure a constant flow hot bitumen approximately ¼ to 1/2 in flows ahead of the roll as it is unrolled, and there is 1/8 to 1/4 in bleed out at all laps.

H. At the, melt the plastic burn-off film from the top surface or embed granules, where present, using a torch or hot-air welder.

I. At end-laps, cut a 45 degree dog-ear away from the selvage edge. Ensure the membrane is fully heat-welded watertight at all T-joints.

J. Each day, physically inspect all side and end-laps, and ensure the membrane is sealed watertight. Where necessary, use a torch or hot-air welder and a clean trowel to ensure all laps are sealed.

K. Inspect the installation each day to ensure the plies are fully adhered. Repair all voids, wrinkles, open laps and all other deficiencies.

3.9 CAP SHEET INSTALLATION

A. Construct and stage the project so that PHASED APPLICATION can be achieved. Phased application maintains a watertight condition with the base ply and reinforcing plies to vertical surfaces without the installation of the cap sheet. The base ply may stay exposed per the manufacturer's requirements and recommendations. When roof top equipment and trades have finished, the application of the cap sheet installation may begin only after the manufacturer has conducted an inspection of the base sheet and provided a written report verifying examination of the base sheet. The contractor must schedule this inspection and notify the Architect five (5) days in advance.

B. Apply cap sheet in accordance with roofing system manufacturer's instruction and the following requirements.

C. Prime metal flanges (all jacks, edge metal, lead drain flashings, etc.) and concrete and masonry surfaces with a uniform coating of ASTM D 41-85 asphalt primer.

1. Cutting or alterations of bitumen, primer, and sealants will not be permitted.

D. Apply all layers of roofing free of wrinkles, creases or fishmouths. Exert sufficient pressure on the roll during application to ensure prevention of air pockets. Stagger the lap seams between the base ply layer and the finish ply layer.

E. Begin by unrolling the base membrane to its complete length. Once relaxed for a minimum of twenty minutes, reroll the field membrane ply each end, one end at a time to insure proper alignment.

F. Install the cap sheet membrane starting at the low point of the roof area. The membrane shall be installed parallel to the base ply. Keep end laps away from locations where the positive flow of water to drains will be inhibited.

G. Fully bond the finish ply to the base ply. Maintain manufacturers required laps or as indicated below.

1. 6 in end-laps

2. 3 in side laps

3. End-laps should be staggered 3 ft apart.

4. Stagger Cap ply laps 3 ft from base ply laps

H. Asphalt bleedout must be present and continuous at all seams. A minimum 1/4 inch flow-out must be obtained at all seam areas. A maximum 3/4 inch flow-out must not be exceeded.

I. To ensure the proper flow of bitumen at the seam areas, a weighted roller or broom may be used. The roller operator should follow behind the torch no more than 4 ft nor less than 3 ft to be sure that the membrane will be in condition to produce proper flow.

J. Check all seams for full and uniform adhesion. All unadhered seams shall be lifted and resealed. Press or roll seam to achieve a minimum 3/8 inch compound flow-out of bitumen.

K. If end laps fall in line, a full width of membrane must be installed over the end laps.

L. Treatment of Bleed-Out: Broadcast ceramic granules of the same color as the membrane into the bleed-out of asphalt at all side and end laps to provide a continuous appearance.

M. Broadcast mineral granules over all bitumen overruns on the finish ply surface, while the bitumen is still hot, to ensure a monolithic surface color.

3.10 FLASHING AND STRIPPING INSTALLATION

A. Install base flashing over cant strips and other sloped and vertical surfaces, at roof edges, and at penetrations through roof; secure to substrates according to roofing system manufacturer's written instructions, and as follows:

1. Prime substrates as per written requirements of roofing system manufacturer.

2. Base Ply Application at insulation and plywood curbs: Nail top of base sheet to the top of curb following the manufacturer's recommendations.
3. Base Ply Application at concrete and cover board: Torch adhere flashing sheet to substrate at rate required by roofing system manufacturer.
4. Flashing Cap Sheet Application: Torch adhere flashing sheet to substrate at rate required by roofing system manufacturer.
5. At skylight curbs and other locations as directed by the architect, install the base flashing with Cold Applied Adhesive.

B. Extend base ply flashing up walls a minimum of 8 inches above roofing membrane and 4 inches onto field of roofing membrane. Extend base ply flashing at parapets over top surface and down two inches past wood blocking

C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.

1. Seal top termination of base flashing with a strip of glass-fiber fabric set in asphalt roofing cement].

D. Install roofing membrane cap-sheet stripping where metal flanges and edgings are set on membrane roofing according to roofing system manufacturer's written instructions.

E. Roof Drains: Set 36-by-36-inch minimum square metal flashing in bed of asphalt roofing cement on completed roofing membrane. Cover metal flashing with roofing membrane cap-sheet stripping and extend a minimum of 6 inches beyond edge of metal flashing onto field of roofing membrane. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring.

1. Install stripping according to roofing system manufacturer's written instructions.

3.11 LIQUID FLASHING INSTALLATION

A. Prepare substrate as per liquid flashing manufacturer's written recommendations.

B. Apply manufacturer's standard paste and repair depressions in substrate material as per manufacturer's recommendations. Apply in thicknesses as per manufacturer's written recommendations.

C. Apply manufacturer's standard reinforcement fabric.

D. Apply manufacturer's standard flashing resin. Apply summer grade flashing resin when ambient temperature is between 59 and 122 degrees F. Apply winter grade flashing resin when ambient temperature is between 25 and 68 degrees F.

E. Maintain manufacturer's written requirements for overlap and coverage.

F. Apply manufacturer's standard surfacing granules and/or color finish where indicated on the drawings.

3.12 PITCH POCKET INSTALLATION

A. Remove existing pitch pockets and clean all penetrations down to base metal. Follow SSPC Surface Preparation Standard No. 11 to provide a roughened, clean, bare metal surface free of all visible oil, grease, dirt, rust, coating, oxides, mill scale, corrosion products and other foreign matter. Do not permit stains to remain on surface.

B. Prime and install new pitch pocket as per manufacturer's written instructions and to satisfy all requirements for warranty.

3.13 ROOF SYSTEM INTERFACE WITH RELATED COMPONENTS

A. The following is a list of descriptions for correct installation of components integrated into the roof membrane assembly. In all cases, unless otherwise approved, incorporate flanged components into the system between the application of the base ply and the finish ply. The flange must be primed with a uniform coating of approved ASTM D 41-85 asphalt primer and allowed to dry thoroughly; all flanges must be set in approved mastic.

1. Concrete parapet walls: Prime and torch adhere a base ply extend a minimum of three (3) inches onto the base ply of the field. After the field cap ply has been applied to the top of the cant, prepare the surface area that is to receive flashing cap sheet coverage by application of asphalt primer; allowing primer to dry thoroughly. Torch apply flashing cap sheet into place using three foot widths (cut off the end of roll) always lapping the factory selvage edge. Extend the flashing cap sheet a minimum of four (4) inches beyond the toe of the cant onto the prepared surface of the finished roof and up the wall to the desired flashing height. Exert pressure on the flashing cap sheet during application to ensure complete contact with the wall/roof surfaces, preventing air pockets. Check and seal all loose laps and edges. Extend the roofing over the parapet and terminate.
2. Curbs: Cover insulation, wood, and metal curbs with ½ inch Gypsum sheathing mechanically fastened into place. Install flashing as described for the parapet walls.
3. Edge Metal: Completely prime metal flanges and allow to dry prior to installation. Turn the base ply down two (2) inches past the roof edge and over the nailer. After the base ply and continuous cleat (if applicable) have been installed, set the flange in mastic and stagger nail every three (3) inches on center or as recommend by the metal manufacturer. Strip-in the flange using the stripping-ply material, extending a minimum of four (4) inches beyond the edge of the flange. Terminate the cap ply at the gravel-stop rise of the edge metal.
4. Lead drain flashings. The roof drain sump shall be clean and free of all rust and dirt before installing the flashing. Completely prime the lead drain flashing and allow to dry prior to installation. After the base ply has been applied, set the lead flashing sheet in mastic and form to turn down inside of the drain bowl. Ply-in the perimeter of the lead flashing using an additional layer of the base ply material, overlapping the perimeter of the lead a minimum of four (4) inches. Terminate the cap ply to extend beneath the clamping ring seal. Install the clamping ring with all clamps, bolts etc., in place.
5. Metal pipe: Reinforced, fluid applied flashing material is to be used for all post supports and low flashing lights. Reinforced, fluid applied material may also be used as base flashing for walls behind hard to flash objects. Follow manufacturers' recommended

application guidelines. The metal is to be thoroughly cleaned of existing roofing materials by wire brushing and/or grinding before installation of the liquid flashing system.

6. Sealant. Caulk all exposed finish ply edges at gravel stops, waste stacks, pitch pans, vent stacks, etc, with a smooth continuous bead of approved sealant.

3.14 WALKWAY INSTALLATION

A. Walkway Pads: Install walkway pads using units of size indicated or, if not indicated, of manufacturer's standard size according to walkway pad manufacturer's written instructions.
   1. Cut the walktread into maximum five (5) ft lengths and allow to relax until flat.
   2. Fully adhere the sheets.
   3. Space sheets with two (2) inches between sheets to allow for proper drainage.
   4. Cut pads so as not to interfere with drainage at valleys of tapered insulation.

3.15 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform test and inspections and to prepare test reports.

B. Test Cuts: Test specimens will be removed to evaluate problems observed during quality-assurance inspections of roofing membrane as follows:

   1. Approximate quantities of components within roofing membrane will be determined according to ASTM D 3617.
   2. Test specimens will be examined for interply voids according to ASTM D 3617 and to comply with criteria established in Appendix 3 in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing."
   3. Repair areas where test cuts were made according to roofing system manufacturer's written instructions.

C. Roofing system will be considered defective if it does not pass tests and inspections.

   1. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.16 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. Remaining construction cannot pass over completed roof areas.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.17 FINAL INSPECTION

A. Contractor shall advise the Architect in writing that the work is substantially completed and include a list of outstanding items for completion. Architect shall examine the work and advise if the work is substantially complete along with any incomplete or incorrect issues to be completed or corrected.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

C. Notify Architect and Owner 48 hours in advance of date and time of inspection.

D. Drain Verification: Drains shall be inspected by a certified plumbing a warranted to be free flowing. Ensure that roof drains strainers are properly installed,

E. Air Handling Units. Reconnect all ductwork, electrical and supply connection. At final inspection, verify that all connections are restored to a complete working, watertight, and safe condition, following SMACNA standards.

ROOFING INSTALLER'S WARRANTY

F. WHEREAS <**Insert name**> of <**Insert address**>, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner: <**Insert name of Owner**>.
2. Address: <**Insert address**>.
3. Building Name/Type: <**Insert information**>.
4. Address: <**Insert address**>.
5. Area of Work: <**Insert information**>.
6. Acceptance Date: <**Insert date**>.
7. Warranty Period: <**Insert time**>.
8. Expiration Date: <**Insert date**>.

G. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

H. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

I. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:

    a. lightning;
    b. peak gust wind speed exceeding <**Insert wind speed**> mph;
    c. fire;
    d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
    e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
    f. vapor condensation on bottom of roofing; and
    g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

J. IN WITNESS THEREOF, this instrument has been duly executed this <**Insert day**> day of <**Insert month**>, <**Insert year**>.

1. Authorized Signature: <**Insert signature**>.
2. Name: <**Insert name**>.
3. Title: <**Insert title**>.

END OF SECTION 07 5216

SECTION 07 7100

MANUFACTURED ROOF EDGE SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including City of Philadelphia Standard Contract Requirements, amendments, and attachments; and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Roof Edge Fascia.
2. Copings.
3. Expansion Joints.

B. Related Sections:
1. Section 07 5216 “Modified Bituminous Membrane Roofing”
2. Section 07 6200 "Sheet Metal Flashing and Trim" for custom- and site-fabricated sheet metal flashing and trim.
3. Section 07 7200 "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.
4. Section 07 9200 "Joint Sealants" for field-applied sealants between roof specialties and adjacent materials.

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

B. FM Approvals' Listing: Manufacture and install systems that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-90. Identify materials with FM Approvals' markings.

C. SPRI Wind Design Standard: Manufacture and install systems tested according to SPRI ES-1 and capable of resisting the following design pressures:

1. Design Pressure: 110 mph.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components,

failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For roof specialties. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work. Include the following:

1. Details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.
2. Pattern of seams and layout of fasteners, cleats, clips, and other attachments.
3. Details of termination points and assemblies, including fixed points.
4. Details of special conditions.

C. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.

1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each system.

B. Warranty: Sample of warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Each system shall be certified by the manufacturer to meet performance design criteria according to the following test standards:

1. ANSI/SPRI ES-1 Test RE-3 for Coping: The coping system shall be tested simultaneously on horizontal and vertical surfaces and shall exceed horizontal and vertical design wind pressure as calculated in accord with the ANSI/SPRI ES-1 Test RE-3. Use the current edition of ANSI/SPRI ES-1 Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.

a. Wind speed 110 mph

1.8 DELIVERY, STORAGE, AND HANDLING

A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.

B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof specialties installation.

1.9 WARRANTY

A. Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 30 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 EXPOSED METALS

A. Aluminum Sheet: Alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.

1. Surface: smooth flat finish.
2. Exposed Coil-Coated Finishes: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

a. Two-Coat Fluoropolymer: AAMA 620. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
b. Concealed Surface: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.2 CONCEALED METALS

A. Aluminum Sheet: ASTM B 209, alloy and temper recommended by manufacturer for type of use and structural performance indicated.

B. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Fasteners: Formed Aluminum Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:
1. Fasteners for Aluminum or Stainless to wood: Series 300 stainless steel screws.
2. Fasteners for Galvanized to wood: ASTM A 153 hot dip galvanized nails.
3. Fasteners for Galvanized to concrete: Blue Climaseal Tapcon.
4. Fastener Sizes: Use fasteners of sizes that will penetrate wood blocking not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws and not less than 1 inch for concrete screws.

C. Elastomeric Sealant: A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT

D. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

2.4 ROOF EDGE SYSTEM

A. Manufactured system consisting of formed-metal cap in section lengths not exceeding 12 feet, concealed anchorage; corner units, end cap units, and concealed splice plates with same finish as coping caps. Custom fabricate shapes as required to conform to existing conditions and create a continuous flange. Weld corners and special angles

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Hickman Company, W. P.
   b. American Architectural Metals.
   c. Metal-Era, Inc.

2. Cap Metal: Formed aluminum.
   a. Finish: Two-coat fluoropolymer.
   b. Color: As selected by Architect from manufacturer's full range.

3. Splice Metal: Formed aluminum, .050 inch thick.
   a. Finish: Two-coat fluoropolymer.
   b. Color: Matching cap metal.

4. Corners: Factory mitered and continuously welded.
5. Ends: Close all exposed ends with welded caps.
6. Intersection: Slope to create a smooth transition and fabricate a welded “T” to joint perpendicular metal sections.
7. Special Fabrications: None

8. Cap Attachment Method: Snap-on.
9. Anchor Plates: Concealed, galvanized-steel sheet 24 ga., with integral cleats.

2.5 COPING

A. Manufactured, two-piece, roof-edge fascia consisting of .050 cap metal cover in section lengths not exceeding 12 feet, 8 inch splice plate and an 12 inch minimum galvanized-anchor plate.

2.6 ROOF-EDGE FASCIA

A. Canted Roof-Edge Fascia and Gravel Stop: Manufactured, three-piece, roof-edge fascia consisting of .063 cap metal fascia cover in section lengths not exceeding 12 feet and a continuous formed galvanized-steel sheet water dam cant, and an aluminum compression plate with extended vertical leg terminating in a drip-edge cleat.

B. Roof-Edge Fascia: Manufactured, two-piece, roof-edge fascia consisting of snap-on metal fascia cover in section lengths not exceeding 12 feet and a continuous formed anchor bar with integral drip-edge cleat to engage fascia cover.

2.7 FASCIA EXTENSION

A. Manufactured, two-piece, fascia extension consisting of .063 cap metal cover in section lengths not exceeding 12 feet, 8 inch splice plate and a continuous galvanized-anchor plate.

2.8 EXPANSION JOINT – METAL

A. Manufactured, two-piece, cap consisting of .050 cap metal cover in section lengths not exceeding 12 feet, 8-inch splice plate and an 12-inch minimum galvanized-anchor plate. Custom fabricate shapes as required to conform to existing conditions and to terminate the ends/intersections of vertical and horizontal expansion joint locations in the field. Weld corners and special angles.

B. Insulation – Fiberglass Batt.

C. Weather Barrier – 45mil EPDM.

D. Condensate Barrier – 6 mil vinyl.

2.9 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.

B. Examine walls, roof edges, and parapets for suitable conditions for roof specialties.

C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

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

3.2 INSTALLATION, GENERAL

A. General: Install roof edge system according to manufacturer's written instructions. Anchor securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete roof edge systems.

1. Install roof edge system level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
2. Provide uniform, neat seams with minimum exposure of solder and sealant.
3. Install to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
4. Torch cutting of is not permitted.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
1. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment.
2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.

C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.

1. Space movement joints at a maximum of 12 feet with no joints within 18 inches of corners or intersections unless otherwise shown on Drawings.

2. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.

D. Seal metal joints with two beads of butyl sealant to the splice plate each side of joint, unless other provisions are made by the manufacturer.

E. Seal EPDM joints with a 6-inch wide strip of EPDM

F. Seal joints as required for watertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F.

3.3 EXPANSION JOINT

A. Secure vapor barrier to top of the expansion joint to bottom of adjacent insulation or top of deck.

B. Fill void with insulation.

C. Cover length of expansion joint opening with EPDM membrane supported by batt insulation.

D. Install metal expansion joint cover in accordance with the drawings and manufacturer’s recommendations.

3.4 COPING INSTALLATION

A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor copings to meet performance requirements.

1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's required spacing that meets performance requirements

3.5 ROOF-EDGE FLASHING INSTALLATION

A. Install cleats, cants, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor roof edgings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

3.6 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder and sealants.

C. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.

D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077100

SECTION 07 7200

ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including City of Philadelphia Standard Contract Requirements, amendments, and attachments; and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Roof hatch safety railing system.
2. Roof ladder safety post system.
3. Rooftop non-penetrating support assembly.
4. Standing Seam Metal Roofing Snow/Ice Guard Assembly.

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For roof accessories. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.

C. Warranty: Sample of warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

1.6 COORDINATION

A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1.7 WARRANTY

A. Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: Manufacturer standard finish warranty.

PART 2 - PRODUCTS

2.1 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide non-removable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:

1. Fasteners for Zinc-Coated or Aluminum-Zinc Alloy-Coated Steel: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.
2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
3. Fasteners for Copper Sheet: Copper, hardware bronze, or passivated Series 300 stainless steel.
4. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.

2.2 ROOF HATCH SAFETY RAILING SYSTEM

A. Safety Railing System: Manufacturer standard safety railing system that is compatible with the existing roof-hatch including rails, clamps, fasteners, safety barrier at railing opening, and

accessories required for a complete installation; attached to roof hatch and complying with 29 CFR 1910.23 requirements and authorities having jurisdiction.

1. Height: 42 inches above finished roof deck.
2. Posts and Rails: Galvanized-steel pipe, galvanized-steel tube, 1-5/8 inches in diameter.
3. Flat Bar: Galvanized-steel, 2 inches high by 3/8 inch thick.
4. Gate: Manufacturer standard self-closing and latching gate.
5. Post and Rail Tops and Ends: Weather resistant, closed or plugged with prefabricated end fittings.
6. Provide weep holes or another means to drain entrapped water in hollow sections of handrail and railing members.
7. Fabricate joints exposed to weather to be watertight.
8. Fasteners: Manufacturer's standard, finished to match railing system.
9. Finish: Manufacturer's Safety Yellow.
10. Existing roof hatch manufacturer: Bilco, Type 'S'.

2.3 ROOF LADDER SAFETY POST SYSTEM

A. Safety Post System: Manufacturer standard extendable ladder mounted safety pole system that is compatible with the existing roof-hatch manufacturer's standard including clamps, fasteners, and accessories required for a complete installation; attached to existing roof ladder and complying with 29 CFR 1910.23 requirements and authorities having jurisdiction.

1. Height: 42 inches above finished roof deck.
2. Material: Steel.
3. Finish: Powder Coat.
4. Color: Safety Yellow.
5. Existing roof hatch manufacturer: Bilco, Type 'S'.

2.4 ROOFTOP NON-PENETRATING SUPPORT ASSEMBLY

A. Rooftop Non-penetrating Supports: Rubber block supports with galvanized continuous block channel support assemblies for the support of mechanical piping and electrical conduit.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Dura-blok; DB Series.
    b. G-Strut; #100 Series.

B. Fasteners: Manufacturer's standard for attachment of mechanical piping and electrical conduit.

C. Accessories: Provide manufacturer accessories and components required to anchor and secure mechanical piping and electrical conduit to comply with federal, state, and local code jurisdictions.

D. Isolation Pad: Provide roofing manufacturer standard isolation pad beneath each non-penetrating roof support that is compatible with the specified roof assembly.

2.5 STANDING SEAM METAL ROOFING SNOW/ICE GUARD ASSEMBLY

A. Snow/Ice Guards: Pipe-Style system for use with factory finished mechanically curved standing seam metal roof panels.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Merchant & Evans, Inc., Zip-Rib; Alpine Pipe-Style Snow Guard System.

2. Fasteners: Manufacturer standard clamp style mounting with set screws for attachment to standing seam metal ribs.

3. Accessories: Provide manufacturer standard accessories and components required to anchor and secure snow/ice guard assembly to factory finished mechanically curved standing seam metal roof panels including, but not limited to the following components:

a. 1” O.D. Tubing.
b. Internal Coupling.
c. End Caps.
d. End Collars.
e. Clamp & Bracket.
f. Clamp Key.
g. Set Screws.
h. Ice Flags.

4. Finish: Kynar 500 coating in color/finish to match existing standing seam metal roof panels on the gymnasium roof.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.

B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

C. Verify dimensions of roof openings for roof accessories.

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

3.2 INSTALLATION

A. General: Install roof accessories according to manufacturer's written instructions.

1. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.
2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.

END OF SECTION 07 7200

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SECTION 07 9200

JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including City of Philadelphia Standard Contract Requirements, amendments, and attachments; and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Silicone joint sealants.

2. Butyl sealants

3. Preformed Silicone sealants

B. Related Sections:

1. Section 07 5216 “Modified Bituminous Membrane Roofing” for roofing sealants.
2. Section 07 7100 “Manufactured Roof Edge System.”

1.3 PRECONSTRUCTION TESTING

A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

1.4 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch wide joints formed between two 6-inch long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

D. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

E. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

C. Product Testing: Owner shall arrange to Test joint sealants using a qualified testing agency.

D. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.7 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.

3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

A. Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

C. Warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

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

B. Stain-Test-Response Characteristics: Sealants shall be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, shall be one of the following or an approved equal:

a. Dow Corning Corporation; 795.
b. Pecora Corporation; 895.
c. Sika Corporation, Construction Products Division; SikaSil-C995.

2.3 BUTYL-RUBBER-BASED JOINT SEALANT:

A. Single component, Butyl Rubber based Sealant, ASTM C 1311.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, shall be one of the following or an approved equal:

a. Pecora Corporation; BC-158.
b. Tremco Incorporated; Tremco Butyl Sealant.
c. Bostik, Inc.; Chem-Calk 300.

2.4 PREFORMED JOINT SEALANTS

A. Preformed Silicone Joint Sealants: Manufacturer's standard sealant consisting of precured low-modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral-curing silicone sealant for bonding extrusions to substrates.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, shall be one of the following or an approved equal:

a. Dow Corning Corporation; 123 Silicone Seal.
b. Pecora Corporation; Sil-Span.

B. Preformed Foam Joint Sealant: Manufacturer's standard preformed, precompressed, open-cell foam sealant manufactured from urethane foam with minimum density of 10 lb/cu. ft. and impregnated with a nondrying, water-repellent agent. Factory produce in precompressed sizes in roll or stick form to fit joint widths indicated; coated on one side with a pressure-sensitive adhesive and covered with protective wrapping.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, shall be one of the following or an approved equal:

a. EMSEAL Joint Systems, Ltd.; Emseal 25V.
b. Sandell Manufacturing Co., Inc.; Polyseal.
c. Willseal USA, LLC; Willseal 150.

2.5 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type B (bicellular material with a surface skin, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

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

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and

approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.

3. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime all joint substrates where existing sealant has been removed and to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.

G. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:

1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 3/8 inch. Hold edge of sealant bead 1/4 inch inside masking tape.
3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
4. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:

   a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
   b. Perform 1 test for each 1000 feet of joint length thereafter or 1 test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

   a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:

   a. Whether sealants filled joint cavities and are free of voids.
   b. Whether sealant dimensions and configurations comply with specified requirements.

c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

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

3.7 JOINT-SEALANT SCHEDULE

A. Silicone Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Locations:

a. Construction joints in cast-in-place concrete.
b. Joints between plant-precast architectural concrete units.
c. Control and expansion joints in unit masonry.
d. Joints between metal panels.
e. Joints between different materials listed above.

2. Silicone Joint Sealant: Single component, nonsag, neutral curing, Class 50

3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Butyl Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces

1. Locations:
   a. Concealed metal to metal joints, in compression.
2. Single component, Butyl Rubber based Sealant, ASTM C 1311

C. Preformed Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Locations:
   a. Not applicable.
2. Preformed Joint Sealant: Preformed silicone.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 07 9200

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SECTION 092900

GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Interior gypsum board.

B. Related Requirements:

1. Section 099123 "Interior Painting" for painting of interior GWB and plaster.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.

C. Samples for Initial Selection: For each type of trim accessory indicated.

D. Samples for Verification: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.

2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 INTERIOR GYPSUM BOARD

A. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. USG Corporation.

b. CertainTeed Corporation.

c. Georgia-Pacific Gypsum LLC.

2. Thickness: 5/8 inch (15.9 mm).

3. Long Edges: Tapered.
4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

B. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. USG Corporation.
b. CertainTeed Corporation.
c. Georgia-Pacific Gypsum LLC.

2. Core: 5/8 inch (15.9 mm), Type X.

3. Long Edges: Tapered.
4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.3 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.

2. Shapes:

a. Cornerbead.
b. Bullnose bead.
c. LC-Bead: J-shaped; exposed long flange receives joint compound.
d. Expansion (control) joint.

2.4 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.

a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.
6. Cementitious Backer Units: As recommended by backer unit manufacturer.
7. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.5 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

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

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Type X: Rhawnhurst Room 01, Classroom 03, Meeting Room 06, Atrium 07.
2. Mold-Resistant Type: Men 04, Women 05..

B. Single-Layer Application:

1. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.

2. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

3.4 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.
2. Bullnose Bead: Use at outside corners.
3. LC-Bead: Use at exposed panel edges.

3.5 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 5: All locations of gypsum wall board.

a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

3.6 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 099113

EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following exterior substrates:
   1. Existing roof level galvanized / steel mechanical equipment
   2. Existing miscellaneous pre-finished aluminum substrates
   3. Existing metal soffit / fascia panel assemblies over factory finished metal and miscellaneous ferrous metal surfaces.

B. Related Requirements:

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.
   1. Indicate VOC content.

B. Samples for Initial Selection: For each type of topcoat product.

C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

   1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
b. Other Items: Architect will designate items or areas required.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

A. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

B. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction.

C. Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

C. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 2.
2. SSPC-SP 3.
3. SSPC-SP 7/NACE No. 4.
4. SSPC-SP 11.

E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

G. Aluminum Substrates: Remove loose surface oxidation.

H. Existing factory finished metal panels: follow paint manufacturer's instructions for surface preparation

I. Existing ferrous metals: follow paint manufacturer's instructions for surface preparation.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
4. Paint entire exposed surface of window frames and sashes.
5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Galvanized-Steel Substrates:
   1. Protective Steel Coating: Andek (800-800-2844)
      a. Primer / Sealer: Andek Polaprime 21 solvent-based, single component polyurethane primer.
      b. Base Coating: Andek Polaroof RAC single-component urethane.
      c. Protective Coat 1: Andek Wearcoat 44 solvent-based cyclo-aliphatic urethane

   2. Alternate Protective Steel Coating: Sherwin Williams
      a. Primer: MacroPoxy 646 @ 5.0-10 .0 mils dft
      b. Intermediate Coat: Acrolon 218 Polyurethane @ 3.0-5.0 mils dft
      c. Finish Coat: Acrolon 218 Polyurethane @ 3.0-5.0 mils dft

B. Prefinished Aluminum Substrates:
   1. Sherwin Williams:
      a. Prime Coat: ProIndustrial Pro-Cryl Universal Primer.
      b. Intermediate Coat: DTM Acrylic, Semi-gloss
      c. Topcoat: DTM Acrylic, Semi-gloss.

C. Existing Factory Finished Metal panels:
   1. Protective Steel Coating: Sherwin Williams
      a. Primer: S-W DTM Bonding Primer
      b. Intermediate Coat: S-W Bond Plex Waterbased Acrylic Coating, low gloss
      c. Finish Coat: S-W Bond Plex Waterbased Acrylic Coating, low gloss

   2. Alternate Anti-Graffiti system: Sherwin Williams
      a. Primer: S-W DTM Bonding Primer
      b. Intermediate Coat: S-W 2K Waterbased Anti-Graffiti Coating, satin finish
      c. Finish Coat: S-W 2K Waterbased Anti-Graffiti coating, satin finish.

D. Ferrous Metal – miscellaneous
      a. Primer: S-W Kem Bond Alkyd Primer

OR S-W ProIndustrial Pro-Cryl Universal Primer

b. Intermediate Coat: S-W Bond Plex Waterbased Acrylic Coating, low gloss
c. Finish Coat: S-W Bond Plex Waterbased Acrylic Coating, low gloss

Alternate Anti-graffiti finish coats.

d. Intermediate Coat: S-W 2K Waterbased Anti-Graffiti Coating, satin finish
e. Finish Coat: S-W 2K Waterbased Anti-Graffiti coating, satin finish.

END OF SECTION 099113

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SECTION 099123

INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Gypsum board.
2. Plaster.

B. Related Requirements:

1. Section 092900 "Gypsum Board" for surface preparation and application of paint on interior gypsum board surfaces.

1.3 DEFINITIONS

A. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
2. Indicate VOC content.

B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches (200 mm) square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.6 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system.

a. Vertical and Horizontal Surfaces:

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Benjamin Moore & Co.
2. Duron, Inc.
3. Sherwin Williams.

B. Products: Subject to compliance with requirements, provide one of the products listed in the Interior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

C. Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Gypsum Board: 12 percent.
2. Plaster: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Plaster Substrates: Verify that plaster is fully cured.

E. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

F. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 INTERIOR PAINTING SCHEDULE

A. Gypsum Board and Plaster Substrates:

1. Latex over Latex Sealer System MPI INT 9.2A:

a. Prime Coat: Primer sealer, latex, interior, MPI #50].

b. Prime Coat: Latex, interior, matching topcoat.
c. Intermediate Coat: Latex, interior, matching topcoat.

d. Topcoat: Latex, interior (MPI Gloss Level 3), MPI #52.

END OF SECTION 099123

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SECTION 09 9653

ELASTOMERIC COATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including City of Philadelphia Standard Contract Requirements, amendments, and attachments; and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and application of elastomeric coatings to the following substrates:

1. Existing smooth faced CMU masonry wall assemblies.

1.3 REFERENCES

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

1. E 96 – Test Method for Water Vapor Transmission of Materials.

B. Volatile Organic Compound (VOC):

1. National Volatile Organic Compound Emission Standards for Architectural Coatings, Title 40 CFR Part 59.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Applicator Qualifications: Written documentation of applicators qualifications, including previous projects and qualified applicator certification from coating manufacturer.

C. Samples for Verification: For each type of elastomeric coating indicated.

1. Submit manufacturers color standard color samples.

D. Product List: For each product indicated, including the following:

1. Manufacturer’s recommended spreading rate for each separate coat for each type of substrate as applicable.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that are from same production run (batch mix) as materials applied and that are packaged for storage in unopened, factory-sealed containers and identified with labels describing contents.

1. Quantity: Furnish an additional 5 gallons of each material applied.

1.6 QUALITY ASSURANCE

A. Mockups: Prepare one mockup of coating system to verify preliminary selections made to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select a surface of approximately 10 SF to represent surface and conditions for application.
2. Final approval of color selections will be based on mockup.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

B. Deliver materials in sealed containers with manufacturer's original labels attached. Tightly close containers during storage. Store in horizontal position or cover to prevent moisture accumulation on pails.

1.8 PROJECT CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are within range permitted by manufacturer's written instructions.

B. Do not apply coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

C. Allow wet surfaces to dry thoroughly and attain temperature and conditions specified before starting or continuing coating operation.

D. Do not apply coating until joint sealants have been completed in joints adjoining surfaces to receive coating. Sealants and patches must be thoroughly cured.

1.9 WARRANTY

A. Manufacturer's Warranty standard form in which manufacturer agrees to repair or replace elastomeric coatings that fail within a five (5) year warranty period.

1. Failures include, but are not limited to, the following:
   a. Water penetration through the coating.
   b. Deterioration of coating beyond normal weathering.

PART 2 - PRODUCTS

2.1 ELASTOMERIC COATING & PRIMER COAT

A. Basis-of-Design Product: Subject to compliance with requirements, provide Wasco or comparable product.

1. Type: Single component, 100% Acrylic Coating.
2. Solids: Minimum 60% by weight.
3. Performance Characteristics:
   a. Maximum VOC content: <100 g/l.
   b. Elongation: 800 %.
   c. Tensile Strength: 325 psi.
   d. ASTM E-96: 25 Perms.

2.2 MISCELLANEOUS PRODUCTS

A. Sealant – Two part urethane, in compliance with coating manufacturer's requirements.

B. Primer – Acrylic masonry primer in compliance with the coating manufacturer's requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with manufacturer's requirements for maximum moisture content, alkalinity, and other conditions affecting performance of work.

B. Verify that substrate is within the range of alkalinity recommended by manufacturer.

C. Verify suitability of substrates including surface conditions and compatibility with existing finishes.

D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

A. Comply with manufacturer's written instructions applicable to substrates and coating systems indicated.

B. Remove hardware and hardware accessories, plates, machined surfaces, and similar items that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.

1. After completing coating operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

1. Perform cleaning and coating application so dust and other contaminants from cleaning process will not fall on wet, newly coated surfaces.

D. Crack Repair: Fill cracks according to manufacturer's written instructions before coating surfaces.

3.3 APPLICATION

A. Apply elastomeric coatings according to manufacturer's written instructions.

B. Work coating into all cracks and voids to obtain a continuous seal. Always keep a 'wet edge' to avoid ridging and overspreading. Never stop in themiddle of the wall and always complete one wall at a time.

C. Apply two coats at a rate of 50 to 100 square feet per gallon per coat.

D. Allow 4-6 hours between recoats. Avoid thick coats.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from coating application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities, touch up and restore damaged or defaced coated surfaces.

END OF SECTION 09 9653