

2019 Roof Rehabilitation Project

Date: April 2019



Midland Public Schools

Inspiring Excellence

Mr. Mike Moeggenberg, Director of Facilities and Operations

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TREMCO

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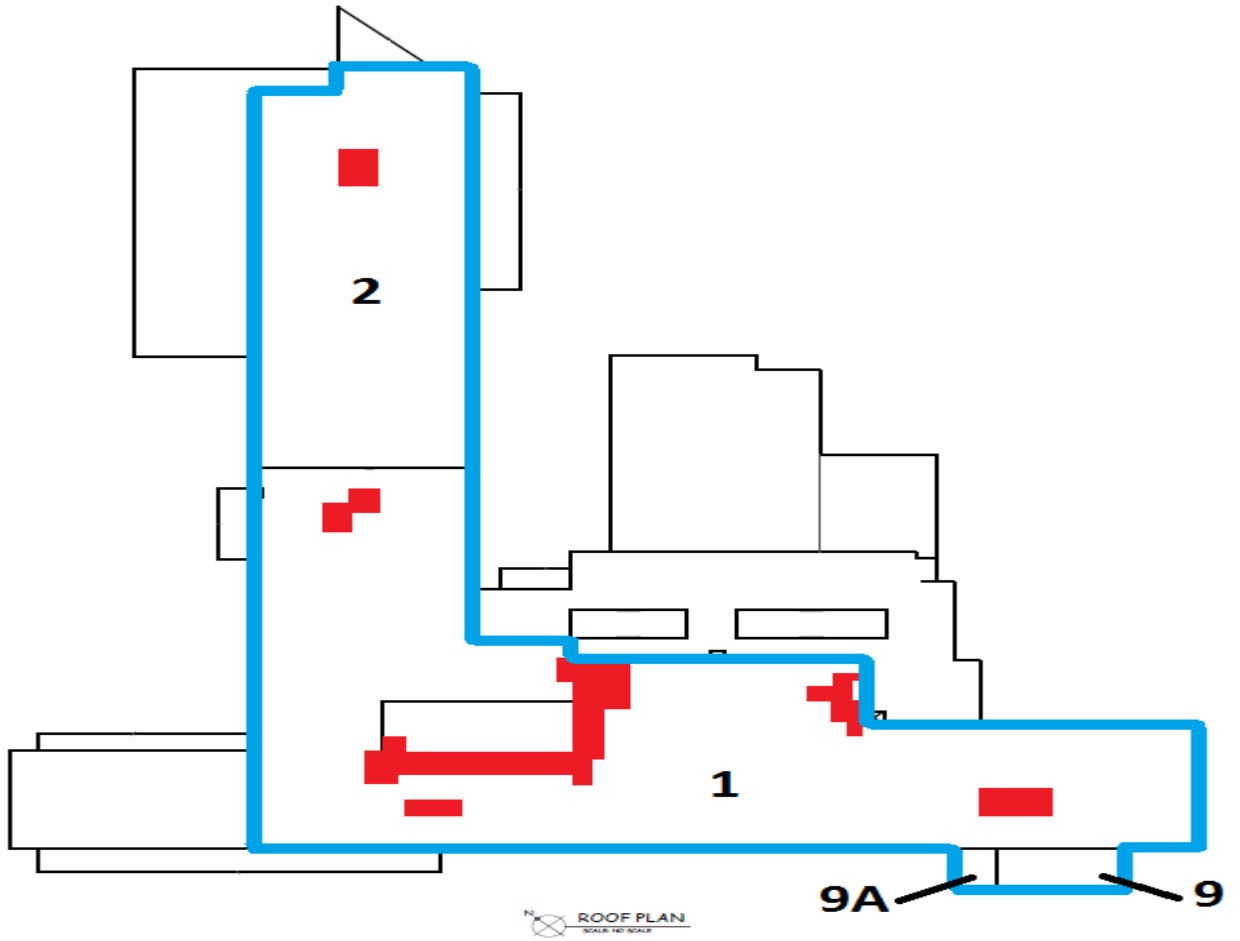
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BIDDING INSTRUCTIONS - 0411

BIDDER NAME/ADDRESS:

PRE-BID MEETING: Friday, April 19th, 2019

TIME: 10:00 a.m.

BID DUE DATE: Friday, April 26th, 2019

TIME: 9:00 a.m.

DIRECT BIDS TO: Mike Moeggenberg, Director of Facilities and Operations

COMPANY: Midland Public Schools

ADDRESS: 600 E. Carpenter St.

CITY, STATE, ZIP: Midland, MI 48640

BID 1 – MB & EPDM Rehabilitation – Urethane System \$ _____

BID 2 – MB Rehabilitation – Reflective Coating System
EPDM Rehabilitation – Urethane System \$ _____

Deduct – Power washing membranes \$ _____

QUOTE UNIT PRICES FOR THE FOLLOWING: (Not included in Base Bid)

| | Per sq. ft. |
|------------------------|-------------|
| Metal deck replacement | \$ _____ |
| Metal deck repair | \$ _____ |

| | | Per linear ft. |
|--|----------|----------------|
| Wood blocking replacement (treated lumber) | 2" x 4" | \$ _____ |
| | 2" x 6" | \$ _____ |
| | 2" x 10" | \$ _____ |
| Drain repair | | \$ _____ |
| New drain installation | | \$ _____ |
| New drain installation with service connection | | \$ _____ |

Should additional repairs, not covered in the specifications be required. The work will be performed on a time and material basis as directed by Midland Public Schools:

Labor/hour \$ _____

Materials cost plus% _____

Estimated number of days to complete projects:

BID 1 _____

BID 2 _____

Signature _____ Date _____

Acknowledge Addendum(s) _____

Comments: _____

INSTRUCTIONS TO BIDDERS - 0411

1.1 Bids

To qualify for bidding, contractors must adhere to the following specifications.

1.2 Pre-Bid Conference

Following the distribution of specifications, all contractors should attend a walkthrough of the roof areas to inspect the job-site and ensure comprehension of the specifications.

Bids are due Friday, April 26th, 2019 at 9:00 am EST.

1.3 Insurance/Bonds

The successful contractor shall be required to furnish the owner and the material supplier, with Public Liability, Property Damage, Worker's Compensation and Owner's Contingent (protective) Public Liability and Property Damage and all other insurance as required by laws of the State of Michigan.

The following types of insurance, limits of liability and policy extensions are required of the Contractor and (except for limits) all sub-contractors:

- A. Workers' Compensation and Employer's Liability Insurance:
Statutory

- B. Broad Form Comprehensive General Liability Insurance, including:
 - 1) Premises-Operations
 - 2) Product & Completed Operations
 - 3) Broad Form Contractual
 - 4) Independent Contractor & Subcontractor

- C. Comprehensive Automobile Liability Insurance (Owned, Hired and Non-Owned Automobiles):
 - Bodily Injury - \$1,000,000 Each Person
 - \$1,000,000 Each Occurrence
 - \$1,000 Maximum Deductible

 - Property Damage - \$1,000,000 Each Occurrence

- D. Excess Liability Umbrella Form - \$1,000,000 CSL (B.I. & P.D.)

- E. The material supplier who will ultimately warrant the completed system shall be given at least twenty (20) days written notice of cancellation or other material change in any overages listed on the certificate.

- F. The certificate shall include a statement to the effect that no exclusions apply to the general liability coverages listed in the certificates for damages to the property in the care, custody and control of the insured except the basic exclusion contained in the standard I.S.O. comprehensive general liability policy.
- G. The material supplier who will ultimately warrant the completed system shall be added as an additional insured on the general liability coverage, but only with respect to liability arising out of operations which are both performed by the primary insured and are within the scope of the agreement signed between the material supplier and the primary insured.
- H. The contractor shall not commence work under the contract until he has obtained all insurance required under 1.3 of these specifications and all insurance has been reviewed by the Owner.
- I.

1.4 Start / Completion Dates

Failure to begin this project in an expeditious manner may result in cancellation of the contract. **Project to start late spring / early summer 2019.**

1.5 Completion Date

All specified work shall be completed in the time frames listed in 1.4. Rain days will constitute the cancellation of that day and will be moved to the next workday.

1.6 Guarantee

The M.R.C.A. guarantee form shall be completed, for a period of two (2) years from the date of acceptance by the Owner and shall be submitted at the time of requesting final payment.

1.7 Envelopes

Envelopes containing bids should be clearly marked "ROOFING BID", Attention:

Michael Moeggenberg, Director of Facilities and Operations
Midland Public Schools
600 E. Carpenter St
Midland Mi. 48640

1.8 Bid Opening

The owner reserves the right to reject any and/or all bids and to accept that bid which, in its opinion, is in the best interest of the owner. No bid shall be withdrawn for a period of 120 days after the time set for the opening thereof. Prices quoted shall be based on F.O.B. the job site.

1.9 Questions

Questions regarding this bid can be directed to Dustin Fremion, Tremco/WTI, 260-494-2665.

If the contractor feels a conflict exists between what is considered good roofing practice and these specifications, he shall state in writing all objections prior to submitting quotations. It is the contractor's responsibility to examine the roof for defective membrane and insulation not previously identified. These areas shall be brought to the attention of the owner's representative.

1.10 Responsibility for Measurements and Quantities

The bidding contractors shall be solely responsible for the accuracy of all measurements and for estimating the material quantities required to satisfy these specifications.

1.11 Pre-Job Meeting

A pre-job meeting shall be held prior to the start of each project. This meeting shall include the contractor and the owner's representative.

The condition of the buildings and related grounds shall be recorded and contractor shall be responsible for the correction and/or repair of any additional damage to the facilities resulting from the related work and in addition to the conditions noted at the pre-job meeting.

The contractor shall not begin this project unless he notifies the owner of this estimated starting date in advance.

1.12 Discrepancies and Addenda

Should a bidder find any discrepancies in the drawings and specifications, or should he be in doubt as to their meaning, he shall notify owner at once, who will send a written Addendum to all bidders concerned. Oral instructions or decisions, unless confirmed by addenda, will not be considered valid, legal or binding.

No extras will be authorized because of failure of the contractor to include Work called for in the addenda in his bid.

1.13 Disqualifications of Bidders

Any one or more of the following causes may be considered sufficient for the disqualification of a bidder and the rejection of a bid or bids:

1. Evidence of collusion among bidders.
2. Lack of responsibility as revealed by either financial, experience or equipment statements, as submitted.
3. Lack of expertise as shown by past work and judged from the standpoint of workmanship and performance history.
4. Uncompleted work under other contracts which, in the judgment of the owner, might hinder or prevent the prompt completion of additional work if awarded.
5. Being in arrears on existing contracts, in litigation with an owner, or having defaulted on a previous contract.

1.14 Payment

- A. When the job in progress is interrupted for three (3) weeks or longer by causes beyond the contractors control such as strikes, weather, acts of God etc..., the owner agrees to pay, upon request of the contractor, a portion of the total contract price equivalent to the percentage of work completed conforms to specifications.
- B. The contractor shall submit invoices to the owner for his approval and processing of progress payments in accordance with the following schedule: To Be Determined each invoice shall be accompanied by a detailed estimate of the amounts and value of labor expended and materials purchased up to the last day of the preceding month. The amount of the invoice shall not exceed ninety (90%) of the labor and material values estimated for the preceding month. The owner reserves the right to determine the amount of retainage.
- C. Such payments shall be viewed by both parties as progress payments and shall not, in any way, relieve the contractor of performance obligations under the contract, nor shall such payments be viewed as approval or acceptance of work performed under this contract.
- D. Final payment shall be withheld until all provisions of the specifications are met and the owner receives the following, with the final payment request:
 1. Final completion report certifying compliance with all provisions of the specifications, including necessary clean up and punch list items.

2. Waiver of Lien executed by each supplier and subcontractor.
 3. Affidavit signed by the contractor and notarized, that all bills for materials and labor incorporated into the billing have been paid.
 4. One year guarantee effective from the date of acceptance by the owner.
- E. Final Payment Request Form, under section 6 of these specifications, shall be submitted with the final payment request.

1.15 Waiver of Lien

Partial Waiver of Lien from each major material supplier shall accompany each payment request after the first payment request, to conform and acknowledge disbursement of the payments. Partial Waiver of Lien shall be properly completed and shall list the cumulative amounts of payments received by the date of the Waiver. This requirement shall not be waived unless agreed upon in writing by the Surety and/or Owner. Final payments shall not be approved until the owner receives a full Waive from each major material supplier.

1.16 Hold-Harmless Agreement

The successful contractor shall also be required to furnish to the owner, A Hold Harmless Agreement whereby the contractor shall be responsible for all damage due to neglect and/or vandalism from materials, equipment, vehicles or any related items stored on the owner's property. Once the material has been installed, the damage due to vandalism occurs, the contractor shall not be held responsible.

Damage due to contractor's negligence, improper applications procedures or disregard of these specifications shall not relieve him of his responsibility under the sections.

1.17 Supplemental Manufacture Procedures

Wherever reference to materials and/or systems is made, the installation procedures and requirements of these manufacturers shall become part of these specifications. The most current manufacture's literature shall be applicable.

1.18 Quality Assurance

The company issuing the warranty shall provide a qualified manufacturer's technical representative to do extended job-site inspection to monitor the project and to ensure the specifications relating to the roof are being satisfied. The word qualified shall mean "knowledgeable in all phases of roofing including proper installation of products not manufactured by the company issuing the warranty by critical to the performance such as base sheets, insulation, fasteners, metal work, flashings, etc..." "Said representative shall

be employed by the manufacturer issuing the warranty only as an inspector with no sales responsibilities up to and including this project.

1.19 Salvaged Materials

Salvaged materials, which are not to be reused, will, unless otherwise specified, or verbally requested by the owner, become the property of the contractor and will be removed from the premises by him and legally disposed of off site by him.

1.20 MSDS Sheets

Contractor will provide owner with MSDS sheets for all roofing materials prior to the job start.

1.21 Substitutions

Contractor will submit bid substitution form (MasterSpec Document 00211 – Request for Substitution Form) with complete explanation, plans and test data a minimum of four (4) days prior to bid due date to be reviewed by owner and specifier. The owner reserves the right to accept or reject all substitutions.

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

070150.16 Maintenance Cleaning of Membrane Roofing (RoofTec)

070150.74 Rehabilitation of Modified Bitumen and Single Ply Roofing

SECTION 070150.16 - MAINTENANCE CLEANING OF MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pressure washing of roof membrane including membrane flashings, with full water reclamation.

B. Related Requirements:

1. Division 07 roofing rehabilitation section for repair and restoration coating of roofing membranes.

1.2 ACTION SUBMITTALS

- ##### A. Product Data: For cleaning compounds.

1.3 INFORMATIONAL SUBMITTALS

- ##### A. Work Plan: For maintenance cleaning, including description of means and methods for water reclamation.

1.4 QUALITY ASSURANCE

- ##### A. Operator Qualifications: Trained and approved by manufacturer of cleaning equipment, with a record of successful roofing membrane cleaning.
- ##### B. Regulatory Requirements: Comply with governing EPA regulations. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.5 FIELD CONDITIONS

- ##### A. Owner will occupy portions of building immediately below roof area to be maintained. Conduct operations so Owner's operations are not disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.
- ##### B. Protect building to be cleaned, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from maintenance operations.
- ##### C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

PART 2 - PRODUCTS

2.1 CLEANING SYSTEM OPERATORS

- A. Source Limitations: Engage a qualified roofing maintenance cleaning firm to perform cleaning of membrane roofing.
- B. Approved Operators: Beachwood OH, (800) 562-2728, Tremco, Inc., RoofTec Cleaning Systems.

2.2 PERFORMANCE REQUIREMENTS

- A. Water Reclamation: Provide maintenance cleaning of membrane roofing that provides 100 percent reclamation of cleaning water and complies with applicable provisions of the US EPA National Pollutant Discharge Elimination System (NPDES) program and requirements of local authorities having jurisdiction.

2.3 MATERIALS

- A. Pre-cleaning Treatment: Detergent-free.
 - 1. Product: Tremco, Inc., RoofTec PREKLEEN.
- B. Pressure Wash Cleaning Solution: VOC, detergent, phosphate, and surfactant free.
 - 1. Product: Tremco, Inc., RoofTec RENEW Cleaner.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Comply with warranty requirements of existing roof membrane manufacturer.
- B. Shut off rooftop utilities and service piping before beginning the Work.
- C. Test existing roof drains to verify that they are not blocked or restricted. Immediately notify Owner of any blockages or restrictions.
- D. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work. Cover air-intake louvers before proceeding with maintenance cleaning work that could affect indoor air quality or activate smoke detectors in the ductwork.
- E. 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.

3.2 MAINTENANCE CLEANING OF ROOF MEMBRANE

- A. Pretreat membrane and flashings when recommended by cleaning equipment manufacturer based upon site assessment of membrane condition.

- B. Apply pressure wash cleaning solution onto membrane and flashing surfaces.
- C. Pressure wash membrane and flashings using equipment and methods recommended in writing by cleaning equipment manufacturer for specific application. Utilize rotating wash head equipment operated at not less than 2,000 psi. Use equipment utilizing vacuum removal of wash water and residues.

3.3 DISPOSAL

- A. Collect cleaning water and associated cleaning compounds and residual material and process to meet US EPA and local environmental requirements for legal discharge.

END OF SECTION 070150.16

SECTION 070150.74 - REHABILITATION OF MB and SINGLE PLY ROOFING

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. This Section includes the following:

1. Roof re-coating preparation.
2. Application of coating on fully adhered EPDM membrane roofing.
3. Application of coating on modified bitumen membrane roofing.

- B. Related Requirements:

1. Division 00 Document "Available Information," including the following pre-construction test report attachments.
 - a. Infrared roof moisture survey report.
2. Division 07 Section "Maintenance Cleaning of Membrane Roofing" for reclaimed water cleaning system for preparation of existing roof substrate.

1.3 MATERIALS OWNERSHIP

- A. Demolished materials shall become Contractor's property; remove demolished materials from Project site and dispose of legally.

1.4 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
- B. Roofing Coating Preparation: Existing roofing that is to remain and be prepared to accept restorative coating application.
- C. Patching: Removal of a portion of existing membrane roofing system from deck or removal of selected components and accessories from existing membrane roofing system and replacement with similar materials.
- D. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and reinstalled.

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

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product specified.

1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Product Certificate: Submit notarized certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing rehabilitation system.
- C. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, and for dust control. Indicate proposed locations and construction of barriers.
- D. Warranties: Unexecuted sample copies of special warranties.
- E. Qualification Data: For Installer and Manufacturer.
 - 1. Letter written for this Project indicating manufacturer approval of Installer to apply specified products and provide specified warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: To include in maintenance manuals.
- B. Warranties: Executed copies of approved warranty forms.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of five years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Architect, and employees, and the following:
 - 1. Qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.
- B. Manufacturer Qualifications: Approved manufacturer listed in this Section, with minimum five years' experience in manufacture of specified products in successful use in similar applications.
 - 1. Approval of Other Manufacturers and Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:

- a. Product data, including certified independent test data indicating compliance with requirements.
 - b. Samples of each component.
 - c. Sample submittal from similar project.
 - d. Project references: Minimum of five installations of specified products not less than five years old, with Owner and Architect contact information.
 - e. Sample warranty.
- C. Roofing Rehabilitation Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to roofing system.
1. Meet with Owner; roofing coating materials manufacturer's representative; roofing rehabilitation Installer including project manager and foreman; and installers whose work interfaces with or affects rehabilitation including installers of roof accessories and roof-mounted equipment requiring removal and replacement as part of the Work.
 2. Review pre-construction test reports and other available information.
 3. Review methods and procedures related to coating preparation, including manufacturer's written instructions.
 4. Review temporary protection requirements for existing roofing system that is to remain uncoated, during and after installation.
 5. Review roof drainage during each stage of coating and review roof drain plugging and plug removal procedures.
 6. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 7. Review base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that will affect coating.
 8. Review HVAC shutdown and sealing of air intakes.
 9. Review shutdown of fire-suppression, -protection, and -alarm and -detection systems.
 10. Review procedures for asbestos removal or unexpected discovery of asbestos-containing materials.
 11. Review governing regulations and requirements for insurance and certificates if applicable.
 12. Review existing conditions that may require notification of Owner before proceeding.

1.9 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with rehabilitation work only when existing and forecasted weather conditions permit Work to proceed without water entering into existing roofing system or building.
 - 1. Store all materials prior to application at temperatures between 60 and 90 deg. F.
 - 2. Apply coatings within range of ambient and substrate temperatures recommended by manufacturer. Do not apply materials when air temperature is below 50 or above 110 deg. F.
 - 3. Do not apply roofing in snow, rain, fog, or mist.
- B. Protect building to be rehabilitated, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from rehabilitation operations.
- C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
- D. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
- E. Owner will occupy portions of building immediately below re-coating area. Conduct re-coating so Owner's operations will not be disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.

1.10 WARRANTY

- A. Manufacturer's Warranty for Roof Rehabilitation: Written warranty in which Manufacturer agrees to repair roof rehabilitation installations that fail due to defects in rehabilitation materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Rehabilitated membrane failures including rupturing or cracking due to a manufacturing or installation defect.
 - b. Deterioration of applied rehabilitation materials beyond normal weathering.
 - 2. Limit of Warranty Coverage for Repair of Roof Rehabilitation: Not to exceed original purchase price of manufacturer's recoating materials, except that manufacturer may elect to apply the limit amount toward the following:
 - a. Purchase of a new replacement roof within the first five years following completion of rehabilitation work.
 - 3. Qualified Installer Warranty Requirement: Installer must meet requirements of Quality Assurance Article.

4. Installation Inspection Warranty Requirement: By Roofing Inspector in accordance with requirements of Part 3 Field Quality Control Article.
 5. Warranty Period: 15 years from date of Substantial Completion.
- B. Manufacturer Inspection Requirement: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's inspections is included in the Contract Sum. Inspections to occur in Years 2, 5 and 10 following date of Substantial Completion.
- C. Installer's Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, for the following warranty period:
1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturer/Product: The roof system specified in this Section is based upon products of Tremco, Inc., Beachwood, OH, (800) 562-2728, www.tremcoroofing.com, that are named in other Part 2 articles. Provide named products.
1. Subject to compliance with requirements, approved alternate manufacturers to submit alternate systems submittal per AIA substitution request form.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Rehabilitated roofing shall withstand exposure to weather without failure or leaks due to defective manufacture or installation.
1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
- C. 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.

2.3 MATERIALS, GENERAL

- A. General: Rehabilitation materials recommended by roofing system manufacturer for intended use and compatible with components of existing membrane roofing system.
- B. Infill Materials: Where required to replace test cores and to patch existing roofing, use infill materials matching existing membrane roofing system materials, unless otherwise indicated.

- C. Temporary Roof Drainage: Design and selection of materials for temporary roof drainage are responsibilities of the Contractor.

2.4 POLYURETHANE COATINGS

- A. Polyurethane roof coating system base coat, low odor low VOC single-part moisture-curing, for use with a compatible top coat.

1. Basis of design product: Tremco, Geogard LO Base Coat.
2. Combustion Characteristics, UL 790: Class A, for two-coat system.
3. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: Less than 50 g/L.
4. Accelerated Weathering, 5000 hours, ASTM G 154: Pass.
5. Hardness, Shore A, minimum, ASTM D 2240: 37.
6. Solids, by volume, ASTM D 2697: 94 percent.
7. Minimum Thickness, Base Coat on Weathered Single Ply: 16 wet mils.
8. Minimum Thickness, Base Coat on Weathered Modified Bitumen: 48 wet mils.

- B. Polyurethane roof coating system top coat, single-part, for application over compatible base coat.

1. Basis of design product: Tremco, Geogard Finish Coat.
2. Combustion Characteristics, UL 790: Class A, for two-coat system.
3. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: Less than 250 g/L.
4. Solar Reflectance Index (SRI), ASTM E 1980: 105.
5. Accelerated Weathering, 5000 hours, ASTM G 154: Pass.
6. Hardness, Shore A, minimum, ASTM D 2240: 80.
7. Solids by volume, ASTM D 2697: 50 percent.
8. Minimum Thickness: 16 wet mils over cured base coat.

2.5 AUXILIARY ROOFING REHABILITATION MATERIALS

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

- B. Seam Reinforcing Fabric:
 - 1. Polyester Reinforcing Fabric: 100 percent stitch-bonded mildew-resistant polyester fabric intended for reinforcement of compatible fluid-applied membranes and flashings.
 - a. Basis of design product: Tremco, Permafab.
 - b. Tensile Strength, ASTM D 1682: Not less than 50 lbf. (222 N).
 - c. Elongation, ASTM D 1682: Not less than 60 percent.
 - d. Tear Strength, ASTM D 1117: Not less than 16 lbf. (70 N).
 - e. Weight: 3 oz./sq. yd (102 g/sq. m).
- C. Joint Sealant: Elastomeric joint sealant compatible with applied coating, with movement capability appropriate for application.
 - 1. Joint Sealant, Polyurethane: ASTM C 920, Type S, Grade NS, Class 50 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints; paintable.
 - a. Basis of design product: Tremco, TremSEAL Pro.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 40 g/L.
 - c. Hardness, Shore A, ASTM C 661: 40.
 - d. Adhesion to Concrete, ASTM C 794: 35 pli.
 - e. Tensile Strength, ASTM D 412: 350 psi.
 - f. Color: Closest match to substrate.
- D. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application.
- E. Metal Flashing Sheet: Provide metal flashing sheet matching type, thickness, finish, and profile of existing metal flashing and trim.
- F. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine existing roofing substrates, with Installer present, for compliance with requirements and for other conditions affecting application and performance of roof coatings
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.
 - 2. Verify compatibility with and suitability of substrates.
 - 3. Verify that substrates are visibly dry and free of moisture.
 - 4. Verify that roofing membrane surfaces have adequately aged to enable proper bond with base coat.
 - 5. Verify that roofing membrane is free of blisters, splits, open laps, indications of shrinkage, and puncture damage or other indications of impending roof system failure.
 - 6. Application of coatings indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Protect existing roofing system that is indicated not to be coated, and adjacent portions of building and building equipment.
 - 1. Comply with warranty requirements of existing roof membrane manufacturer.
 - 2. Limit traffic and material storage to areas of existing roofing membrane that have been protected.
 - 3. Maintain temporary protection and leave in place until replacement roofing has been completed.
- B. Shut down air intake equipment in the vicinity of the Work in coordination with the Owner. Cover air intake louvers before proceeding with coating work that could affect indoor air quality or activate smoke detectors in the ductwork.
 - 1. Verify that rooftop utilities and service piping affected by the Work have been shut off before commencing Work.
- C. 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.
 - 1. Do not permit water to enter into or under existing membrane roofing system components that are to remain.

3.3 ROOFING COATING PREPARATION

A. Membrane Surface Preparation:

1. Remove specified wet insulation and match existing insulation thickness and membrane type. Repair blisters, ridges, buckles, roofing membrane fastener buttons projecting above the membrane, and other substrate irregularities from existing roofing membrane that would inhibit application of uniform, waterproof coating.
2. Broom clean existing substrate.
3. Substrate Cleaning: Clean substrate in accordance with requirements of Section 070150.16 "Maintenance Cleaning of Membrane Roofing."
4. Verify that existing substrate is dry before proceeding with application of coating. Spot check substrates with an electrical capacitance moisture-detection meter.
5. Verify adhesion of coatings to prepared substrate.

B. Existing Sheet Metal Flashing and Trim Preparation: Repair flashings, gravel stops, copings, and other roof-related sheet metal and trim elements. Reseal joints, replace loose or missing fasteners, and replace components where required to leave in a watertight condition.

1. Do not damage metal counterflashings that are to remain. Replace metal counterflashings damaged during removal with counterflashings of same metal, weight or thickness, and finish.

3.4 POLYURETHANE ROOF COATING APPLICATION

A. Detail Course Application: Coat horizontal and vertical seams with detail course of base coat according to manufacturer's written instructions at a minimum 6 inches (150 mm) wide applied at 3.0 gal/100 sq. ft. (1.2 L/sq. m) minimum. Embed seam reinforcement fabric over adhered seams.

B. Base Coat: Once detail coat has adequately cured, apply base coat according to manufacturer's written instructions by direct pour and roller, as follows:

1. Base Coat Application Minimum Thickness: Apply in one coat application of 16 wet mills on single ply EPDM areas.
2. Base Coat Application Minimum Thickness: Apply in one coat application of 48 wet mills on modified bitumen areas.

C. Finish Coat: Once base coat has adequately cured, apply finish coat according to manufacturer's written instructions, by direct pour and roller, as follows:

1. Application Thickness, Finish Coat: Apply in one coat application of 16 wet mills.

3.5 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period.
- B. Correct deficiencies in or remove coating that does not comply with requirements, repair substrates, and reapply coating.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.6 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
 - 1. Owner:
 - 2. Address:
 - 3. Building Name/Type:
 - 4. Address:
 - 5. Area of Work:
 - 6. Acceptance Date:
 - 7. Warranty Period:
 - 8. Expiration Date:
- B. 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,
- C. 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.
- D. 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 74 mph (120 k/hr);

- c. fire;
 - d. failure of rehabilitation 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.

E. IN WITNESS THEREOF, this instrument has been duly executed by:

1. Authorized Signature:
2. Name:
3. Date:

END OF SECTION 070150.74

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

070150.16 Maintenance Cleaning of Membrane Roofing (RoofTec)

070150.73 Rehabilitation of Modified Bituminous Roofing

SECTION 070150.16 - MAINTENANCE CLEANING OF MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pressure washing of roof membrane including membrane flashings, with full water reclamation.

B. Related Requirements:

1. Division 07 roofing rehabilitation section for repair and restoration coating of roofing membranes.

1.2 ACTION SUBMITTALS

- A. Product Data: For cleaning compounds.

1.3 INFORMATIONAL SUBMITTALS

- A. Work Plan: For maintenance cleaning, including description of means and methods for water reclamation.

1.4 QUALITY ASSURANCE

- A. Operator Qualifications: Trained and approved by manufacturer of cleaning equipment, with a record of successful roofing membrane cleaning.
- B. Regulatory Requirements: Comply with governing EPA regulations. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.5 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately below roof area to be maintained. Conduct operations so Owner's operations are not disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.
- B. Protect building to be cleaned, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from maintenance operations.
- C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

PART 2 - PRODUCTS

2.1 CLEANING SYSTEM OPERATORS

- A. Source Limitations: Engage a qualified roofing maintenance cleaning firm to perform cleaning of membrane roofing.
- B. Approved Operators: Beachwood OH, (800) 562-2728, Tremco, Inc., RoofTec Cleaning Systems.

2.2 PERFORMANCE REQUIREMENTS

- A. Water Reclamation: Provide maintenance cleaning of membrane roofing that provides 100 percent reclamation of cleaning water and complies with applicable provisions of the US EPA National Pollutant Discharge Elimination System (NPDES) program and requirements of local authorities having jurisdiction.

2.3 MATERIALS

- A. Pre-cleaning Treatment: Detergent-free.
 - 1. Product: Tremco, Inc., RoofTec PREKLEEN.
- B. Pressure Wash Cleaning Solution: VOC, detergent, phosphate, and surfactant free.
 - 1. Product: Tremco, Inc., RoofTec RENEW Cleaner.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Comply with warranty requirements of existing roof membrane manufacturer.
- B. Shut off rooftop utilities and service piping before beginning the Work.
- C. Test existing roof drains to verify that they are not blocked or restricted. Immediately notify Owner of any blockages or restrictions.
- D. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work. Cover air-intake louvers before proceeding with maintenance cleaning work that could affect indoor air quality or activate smoke detectors in the ductwork.
- E. 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.

3.2 MAINTENANCE CLEANING OF ROOF MEMBRANE

- A. Pretreat membrane and flashings when recommended by cleaning equipment manufacturer based upon site assessment of membrane condition.

- B. Apply pressure wash cleaning solution onto membrane and flashing surfaces.
- C. Pressure wash membrane and flashings using equipment and methods recommended in writing by cleaning equipment manufacturer for specific application. Utilize rotating wash head equipment operated at not less than 2,000 psi. Use equipment utilizing vacuum removal of wash water and residues.

3.3 DISPOSAL

- A. Collect cleaning water and associated cleaning compounds and residual material and process to meet US EPA and local environmental requirements for legal discharge.

END OF SECTION 070150.16

SECTION 070150.73 - REHABILITATION OF MODIFIED BITUMEN ROOFING

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. This Section includes the following:

- 1. Roof rehabilitation and coating preparation.
- 2. Application of coating on modified bituminous membrane roofing.

- B. Related Requirements:

- 1. Division 00 Document "Available Information," including the following pre-construction test report attachments.
 - a. Roof moisture survey report.
- 2. Division 07 Section "Preparation for Re-Roofing" for existing roofing tearoff, patching, and substrate preparation for rehabilitation of roofing membrane.
- 3. Division 07 Section "Maintenance Cleaning of Membrane Roofing" for reclaimed water cleaning system for preparation of existing roof substrate.

1.3 MATERIALS OWNERSHIP

- A. Demolished materials shall become Contractor's property and shall be removed from Project site.

1.4 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary in NRCA's "The NRCA Roofing Manual" for definition of terms related to roofing work in this Section.
- B. Existing Roofing System: Modified bituminous roofing, and components and accessories between deck and roofing membrane.
- C. Roofing Re-Coating Preparation: Existing roofing that is to remain and be prepared to accept restorative coating application.

- D. Patching: Removal of a portion of existing membrane roofing system from deck or removal of selected components and accessories from existing membrane roofing system and replacement with similar materials.
- E. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and reinstalled.
- F. Existing to Remain: Existing items of construction that are not indicated to be removed.
- G. Manufacturer: Manufacturer of roofing rehabilitation products, unless otherwise indicated.
- H. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- I. Demolition Waste: Building and site improvement materials resulting from re-roofing preparation, demolition or selective demolition operations.
- J. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

1.5 ROOFING CONFERENCES

- A. Roofing Rehabilitation Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to roofing system.
 - 1. Review methods and procedures related to re-coating preparation, including membrane roofing system manufacturer's written instructions.
 - 2. Review temporary protection requirements for existing roofing system that is to remain, during and after installation.
 - 3. Review temporary protection requirements for existing roofing system that is to remain, during and after installation.
 - 4. Review roof drainage during each stage of re-coating and review roof drain plugging and plug removal procedures.
 - 5. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 6. Review base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that will affect re-coating.
 - 7. Review HVAC shutdown and sealing of air intakes.
 - 8. Review shutdown of fire-suppression, -protection, and -alarm and -detection systems.

9. Review procedures for asbestos removal or unexpected discovery of asbestos-containing materials.
10. Review governing regulations and requirements for insurance and certificates if applicable.
11. Review existing conditions that may require notification of Owner before proceeding.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product specified.

1.7 INFORMATIONAL SUBMITTALS

- A. Contractor's Product Certificate: Submit notarized certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.
- B. Qualification Data: For Installer, Manufacturer, and Roofing Inspector.
 1. Letter written for this Project indicating manufacturer approval of Installer to apply specified products and provide specified warranty.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing rehabilitation system.
- D. Warranties: Unexecuted sample copies of special warranties.
- E. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, which might be misconstrued as having been damaged by re-coating operations. Submit before Work begins.
- F. Inspection Reports: Daily reports of Roofing Inspector. Include weather conditions, description of work performed, tests performed, defective work observed, and corrective actions required and carried out.

1.8 CLOSEOUT SUBMITTALS

- A. Maintenance Data: To include in maintenance manuals.
- B. Warranties: Executed copies of approved warranty forms.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of five years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Architect, and employees, and the following:

1. Qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.
 2. Licensed to perform asbestos abatement work in Project jurisdiction.
- B. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum five years' experience in manufacture of comparable products in successful use in similar applications.
1. Approval of Other Manufacturers and Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
 - a. Product data, including certified independent test data indicating compliance with requirements.
 - b. Samples of each component.
 - c. Sample submittal from similar project.
 - d. Project references: Minimum of five installations of specified products not less than five years old, with Owner and Architect contact information.
 - e. Sample warranty.
- C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:
1. An authorized full-time technical employee of the manufacturer.
 2. An independent party certified as a Registered Roof Observer by the Roof Consultants Institute, retained by the Contractor or the Manufacturer and approved by the Manufacturer.
- 1.10 PROJECT CONDITIONS
- A. Weather Limitations: Proceed with rehabilitation work only when existing and forecasted weather conditions permit Work to proceed without water entering into existing roofing system or building.
1. Store all materials prior to application at temperatures between 60 and 90 deg. F.
 2. Apply coatings within range of ambient and substrate temperatures recommended by manufacturer. Do not apply materials when air temperature is below 50 or above 110 deg. F.

3. Do not apply roofing in snow, rain, fog, or mist.
- B. Protect building to be rehabilitated, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from rehabilitation operations.
- C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
- D. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
- E. Owner will occupy portions of building immediately below re-coating area. Conduct re-coating so Owner's operations will not be disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.

1.11 WARRANTY

- A. Manufacturer's Warranty for Roof Rehabilitation: Written warranty in which Manufacturer agrees to repair roof rehabilitation installations that fail due to defects in rehabilitation materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Rehabilitated membrane failures including rupturing or cracking due to a manufacturing or installation defect.
 - b. Deterioration of applied rehabilitation materials beyond normal weathering.
 2. Limit of Warranty Coverage for Repair of Roof Rehabilitation: Not to exceed original purchase price of manufacturer's recoating materials, except that manufacturer may elect to apply the limit amount toward the following:
 - a. Purchase of a new replacement roof within the first five years following completion of rehabilitation work.
 3. Qualified Installer Warranty Requirement: Installer must meet requirements of Quality Assurance Article.
 4. Installation Inspection Warranty Requirement: By Roofing Inspector in accordance with requirements of Part 3 Field Quality Control Article.
 5. Warranty Period: 12 from date of Substantial Completion.
- B. Manufacturer Inspection and Preventive Maintenance Requirement: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's inspections and preventive maintenance is included in the Contract Sum. Inspections to occur in Years 2, 5 and 10 following date of Substantial Completion.

- C. Installer's Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, for the following warranty period:

- 1. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturer/Product: The roof system specified in this Section is based upon products of Tremco, Inc., Beachwood, OH, (800) 562-2728, www.tremcoroofing.com that are named in other Part 2 articles. Provide named products.

- 1. Subject to compliance with requirements, approved alternate manufacturers to submit alternate systems submittal per AIA substitution request form.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Rehabilitated roofing shall withstand exposure to weather without failure or leaks due to defective manufacture or installation.

- 1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.

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

- C. 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.

2.3 MATERIALS, GENERAL

- A. General: Re-coating materials recommended by roofing system manufacturer for intended use and compatible with components of existing membrane roofing system.

- B. Temporary Roofing Materials: Selection of materials and design of temporary roofing is responsibility of Contractor.

- C. Temporary Roof Drainage: Design and selection of materials for temporary roof drainage are responsibilities of the Contractor.

- D. Infill Materials: Where required to replace test cores and to patch existing roofing, use infill materials matching existing membrane roofing system materials, unless otherwise indicated.

2.4 RESTORATIVE COATINGS

- A. Cold-Applied Reflective Aluminum Roof Coating: ASTM D 2824 Type III metallic-pigmented, fibrated asphalt-based roof coating.
1. Basis of design product: Tremco, Alumanation 301.
 2. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 400 g/L.
 3. Reflectance, minimum, ASTM D 1549: 65 percent.
 4. Solids, percent by volume: 46.

2.5 FLASHING MATERIALS

- A. ASTM D 6163 Type I Grade G SBS-modified asphalt-coated glass-fiber-reinforced sheet, granular surfaced.
1. Basis of design product: Tremco, POWERply Standard FR.
 2. Exterior Fire-Test Exposure, ASTM E 108: Class A.
 3. Tensile Strength at 73 deg. F (23 deg. C), minimum, ASTM D 5147: Machine direction 80.0 lbf/in (14.0 kN/m); Cross machine direction 70.0 lbf/in (12.0 kN/m).
 4. Tear Strength at 73 deg. F (23 deg. C), minimum, ASTM D 5147: Machine direction, 100 lbf (440 N); Cross machine direction 100 lbf (440 N).
 5. Elongation at 73 deg. F (23 deg. C), minimum, ASTM D 5147: Machine direction 7.5 percent; Cross machine direction 7.5 percent.
 6. Low Temperature Flex, maximum, ASTM D 5147: -15 deg. F (-26 deg. C).
 7. Thickness, minimum, ASTM D 5147: 0.120 inch (3 mm).
- B. Roofing Mastic, Asphalt: ASTM D 4586, Type II, Class 1, one-part, cold-applied mastic specially formulated for compatibility and use with specified roofing membranes and flashings.
1. Basis of design product: Tremco, ELS.
 2. Volatile Organic Compounds (VOC), maximum, ASTM D 6511: 234 g/L.
 3. Resistance to Sag, maximum, ASTM D 4586: 1/8 inch (3.1 mm).
 4. Moisture Vapor Transmission, ASTM E 398: 0.25 g/100 sq. in./24 hr at 0.020 in. thickness, average.

2.6 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with existing roofing system.
- B. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application.
- C. Seam Sealer Mastic: Waterproof seam and patching material compatible with applied coating.
 - 1. Elastomeric Seam Sealer: White, single-component high solids moisture curing aliphatic polyurethane sealant formulated for compatibility and use with specified roofing substrates.
 - a. Basis of design product: Tremco, GEOGARD Seam Sealer.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 189 g/L.
 - c. Tensile Strength, ASTM D 412: 270 psi.
 - d. Tear Strength, ASTM D 412: 35 pli.
 - e. Elongation, ASTM D 412: 220 percent.
- D. Reinforcing Fabric:
 - 1. Polyester Reinforcing Fabric: 100 percent stitch-bonded mildew-resistant polyester fabric intended for reinforcement of compatible fluid-applied membranes and flashings.
 - a. Basis of design product: Tremco, Permafab.
 - b. Tensile Strength, ASTM D 1682: Not less than 50 lbf. (222 N).
 - c. Elongation, ASTM D 1682: Not less than 60 percent.
 - d. Tear Strength, ASTM D 1117: Not less than 16 lbf. (70 N).
 - e. Weight: 3 oz./sq. yd (102 g/sq. m).
- E. Joint Sealant: Elastomeric joint sealant compatible with applied coating, with movement capability appropriate for application.
 - 1. Joint Sealant, Polyurethane: ASTM C 920, Type S, Grade NS, Class 50 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints; paintable.
 - a. Basis of design product: Tremco, TremSEAL Pro.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 40 g/L.

- c. Hardness, Shore A, ASTM C 661: 40.
 - d. Adhesion to Concrete, ASTM C 794: 35 pli.
 - e. Tensile Strength, ASTM D 412: 350 psi.
 - f. Color: Closest match to substrate.
- F. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FM 4470; designed for fastening roofing membrane components to substrate; tested by manufacturer for required pullout strength; and acceptable to roofing system manufacturer.
- G. Metal Flashing Sheet: Provide metal flashing sheet matching type, thickness, finish, and profile of existing metal flashing and trim.
- H. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

2.7 WALKWAYS

- A. Walkway Product:
- 1. Walkway pads, ceramic-granule-surfaced reinforced asphaltic composition slip-resisting pads, manufactured as a traffic pad for foot traffic, 1/2 inch (13 mm) thick minimum.
 - a. Basis of design product: Tremco, Trem-Tred.
 - b. Flexural Strength at max. load, minimum, ASTM C 203: 210 psi (1.5 kPa).
 - c. Granule adhesion (weight loss), maximum, ASTM D 4977: 1.1 gram.
 - d. Impact Resistance at 77 deg. F (25 deg. C), ASTM D 3746: No Damage to Roof.
 - e. Pad Size: 36 by 48 inch (914 by 1220 mm).

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect existing roofing system that is indicated not to be rehabilitated, and adjacent portions of building and building equipment.
 - 1. Comply with warranty requirements of existing roof membrane manufacturer.
 - 2. Limit traffic and material storage to areas of existing roofing membrane that have been protected.
 - 3. Maintain temporary protection and leave in place until replacement roofing has been completed.
- B. Pollution Control: Comply with environmental regulations of authorities having jurisdiction. Limit spread of dust and debris.
 - 1. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 2. Remove debris from building roof by chute, hoist, or other device that will convey debris to grade
- C. Shut down air intake equipment in the vicinity of the Work in coordination with the Owner. Cover air intake louvers before proceeding with re-coating work that could affect indoor air quality or activate smoke detectors in the ductwork.
 - 1. Verify that rooftop utilities and service piping affected by the Work have been shut off before commencing Work.
- D. 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.
 - 1. Do not permit water to enter into or under existing membrane roofing system components that are to remain.

3.2 ROOFING COATING PREPARATION

- A. Removal of Wet Insulation: Remove portions of roofing membrane with underlying wet insulation. Remove wet insulation, fill in tear-off areas to match existing insulation and membrane, and prepare patched membrane for application of roof coating as specified below.
- B. Existing Flashing and Detail Preparation: Repair flashings, gravel stops, copings, and other roof-related sheet metal and trim elements. Reseal joints, replace loose or missing fasteners, and replace components where required to leave in a watertight condition.

1. Do not damage metal counterflashings that are to remain. Replace metal counterflashings damaged during removal with counterflashings of same metal, weight or thickness, and finish.
2. Roof Drains: Remove drain strainer and clamping ring. Grind metal surfaces down to clean, bare, metal.

C. Membrane Surface Preparation:

1. Remove loose granular aggregate from granular aggregate-surfaced built-up bituminous roofing using a power broom.
2. Remove pavers and accessories from roofing membrane. Discard damaged pavers.
3. Remove blisters, rides, buckles, protruding fastener buttons, and other substrate irregularities from existing membrane that would inhibit application of uniform waterproof coating.
4. Broom clean existing substrate.
5. Substrate Cleaning: Clean substrate in accordance with requirements of Section 070150.16 "Maintenance Cleaning of Membrane Roofing."
6. Verify that existing substrate is dry before proceeding with application of coating. Spot check substrates with an electrical capacitance moisture-detection meter.

D. Verify adhesion of products before proceeding with application.

E. Membrane Repair: Repair membrane at locations with irregularities using seam sealer mastic and reinforcing fabric.

F. Membrane Seam Reinforcement: Reinforce membrane seams using seam sealer mastic and reinforcing fabric. Extend reinforcement minimum 6 inches each side of seams.

3.3 REPLACEMENT FLASHING AND STRIPPING INSTALLATION

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

1. Prime substrates with asphalt primer if required by roofing system manufacturer.
2. Flashing Sheet Application: Adhere flashing sheet to substrate in cold adhesive applied at rate recommended by roofing system manufacturer.
3. Extend base flashing up walls or parapets a minimum of (200 mm) 8 inches above roofing membrane and (150 mm) 6 inches onto field of roofing membrane.
4. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.

5. Seal top termination of base flashing with a metal termination bar and elastomeric joint sealant.

B. Install stripping, according to roofing system manufacturer's written instructions, where metal flanges and edgings are set on built-up roofing.

1. Flashing-Sheet Stripping: Install flashing-sheet stripping in a continuous bed of asphalt roofing cement and extend onto roofing membrane.

3.4 ROOF COATING APPLICATION

A. Coating, Restorative: Once seam sealer mastic has adequately cured, coat prepared roof membrane and flashing surfaces with restorative coating in number of coats and thickness of application recommended in writing by manufacturer for application.

3.5 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. Set walkway pads in cold-applied adhesive.

3.6 DISPOSAL

A. Collect demolished materials and place in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

1. Storage or sale of demolished items or materials on-site is not permitted.

B. Transport and legally dispose of demolished materials off Owner's property.

3.7 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period.

B. Correct deficiencies in or remove coating that does not comply with requirements, repair substrates, and reapply coating.

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

3.8 ROOFING INSTALLER'S WARRANTY

A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner:

2. Address:

3. Building Name/Type:
 4. Address:
 5. Area of Work:
 6. Acceptance Date:
 7. Warranty Period:
 8. Expiration Date:
- B. 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,
- C. 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.
- D. 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 74 mph (120 k/hr.);
 - c. fire;
 - d. failure of rehabilitation 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.

E. IN WITNESS THEREOF, this instrument has been duly executed by:

1. Authorized Signature:
2. Name:
3. Date:

END OF SECTION 070150.73